DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2810 METERS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
1980	44,360	769	2	15,015	34	14,246	32
1981	24,426	905	4	8,646	35	7,741	32
1982	34,256	1,091	3	12,800	37	11,709	34
1983	58,836	1,673	3	15,702	27	14,029	24
1984	63,821	738	1	10,694	17	9,956	16
1985	34,017	678	2	7,340	22	6,662	20
1986	49,461	1,064	2	9,448	19	8,384	17
1987	58,238	1,086	2	3,347	6	2,261	4
1988	46,074	1,034-	2-	6,303	14	7,337	16
1989	28,598	1,010	4	8,864	31	7,854	27
1990	77,800	1,889	2	1,666	2	223-	0
1991	85,222	1,321	2		0	1,321-	2-
1992	72,432	6,450	9	841	1	5,609-	8-
1993	50,387	12,835	25	2,612	5	10,223-	20-
1994	60,429	18,042	30	19,727	33	1,685	3
1995	89,728	4,369	5	18,263	20	13,894	15
1996	85,011	40	0	18,808	22	18,768	22
1997	69,582	406	1	29,350	42	28,944	42
1998	176,137	1,510	1	33,876	19	32,366	18
1999	190,950	1,815	1	38,022	20	36,207	19
2000		1,879		1,685		194-	
2001		3,117		2,244		873-	
2002		2,666		2,330		336-	
2003		1,402		4,371		2,969	
2004	102,135	296	0	6,885	7	6,589	6
2005	131,239		0		0		0
2006	265,830		0		0		0
2007	359,876		0		0		0
2008	356,538		0		0		0
TOTAL	2,615,383	66,017	3	278,839	11	212,822	8
THREE-YEAR MOVING AVERAGES							
80-82	34,347	922	3	12,154	35	11,232	33
81-83	39,173	1,223	3	12,383	32	11,160	28
82-84	52,304	1,167	2	13,066	25	11,899	23
83-85	52,225	1,030	2	11,245	22	10,215	20
84-86	49,100	827	2	9,161	19	8,334	17
85-87	47,239	943	2	6,712	14	5,769	12

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2810 METERS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
THREE-YEAR MOVING AVERAGES							
86-88	51,258	372	1	6,366	12	5,994	12
87-89	44,303	354	1	6,171	14	5,817	13
88-90	50,824	622	1	5,611	11	4,989	10
89-91	63,873	1,407	2	3,510	5	2,103	3
90-92	78,485	3,220	4	835	1	2,385-	3-
91-93	69,347	6,869	10	1,151	2	5,718-	8-
92-94	61,083	12,442	20	7,726	13	4,716-	8-
93-95	66,848	11,749	18	13,534	20	1,785	3
94-96	78,389	7,484	10	18,933	24	11,449	15
95-97	81,440	1,605	2	22,141	27	20,536	25
96-98	110,243	652	1	27,345	25	26,693	24
97-99	145,556	1,244	1	33,750	23	32,506	22
98-00	122,362	1,735	1	24,528	20	22,793	19
99-01	63,650	2,270	4	13,984	22	11,714	18
00-02		2,554		2,086		468-	
01-03		2,395		2,981		586	
02-04	34,045	1,455	4	4,528	13	3,073	9
03-05	77,791	566	1	3,752	5	3,186	4
04-06	166,401	99	0	2,295	1	2,196	1
05-07	252,315		0		0		0
06-08	327,415		0		0		0
FIVE-YEAR AVERAGE							
04-08	243,124	59	0	1,377	1	1,318	1

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2811 METERS - LEASED

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	COST OF REMOVAL PCT	GROSS SALVAGE AMOUNT	GROSS SALVAGE PCT	NET SALVAGE AMOUNT	NET SALVAGE PCT
2004	1,663	0		0		0	
2005	28,313	0		0		0	
2006	69,712	0		0		0	
2007	67,007	0		0		0	
2008							
TOTAL	166,695	0		0		0	
THREE-YEAR MOVING AVERAGES							
04-06	33,229	0		0		0	
05-07	55,011	0		0		0	
06-08	45,573	0		0		0	
FIVE-YEAR AVERAGE							
04-08	33,339	0		0		0	

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2820 METER INSTALLATIONS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
1980	23,536	564	2	2,805	12	2,241	10
1981	14,897	6	0	3,134	21	3,128	21
1982	17,381	8	0	1,084	6	1,076	6
1983	31,237	2-	0	2,050	7	2,052	7
1984	33,973	68	0	2,486	7	2,418	7
1985	20,584		0	2,846	14	2,846	14
1986	17,419		0	1,618	9	1,618	9
1987	32,090	10	0	3,044	9	3,034	9
1988	20,095		0	2,581	13	2,581	13
1989	18,351		0	1,204	7	1,204	7
1990	57,234		0	1,969	3	1,969	3
1991	62,824	36	0	1,128	2	1,092	2
1992	52,537		0	33	0	33	0
1993	36,728	738	2	292	1	446-	1-
1994	32,931	6	0	89	0	83	0
1995	48,587	283	1	531	1	248	1
1996	25,275		0		0		0
1997	38,151		0		0		0
1998	80,727		0		0		0
1999	57,346		0		0		0
2000							
2001							
2002							
2003							
2004	44,579		0		0		0
2005	57,269		0		0		0
2006	199,280		0		0		0
2007							
2008							
TOTAL	1,023,031	1,717	0	26,894	3	25,177	2
THREE-YEAR MOVING AVERAGES							
80-82	18,605	193	1	2,341	13	2,148	12
81-83	21,172	4	0	2,089	10	2,085	10
82-84	27,530	25	0	1,873	7	1,848	7
83-85	28,598	22	0	2,461	9	2,439	9
84-86	23,992	23	0	2,317	10	2,294	10
85-87	23,365	3	0	2,503	11	2,500	11

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2820 METER INSTALLATIONS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
THREE-YEAR MOVING AVERAGES							
86-88	23,202	3	0	2,414	10	2,411	10
87-89	23,512	3	0	2,276	10	2,273	10
88-90	31,893		0	1,918	6	1,918	6
89-91	46,136	12	0	1,434	3	1,422	3
90-92	57,532	12	0	1,043	2	1,031	2
91-93	50,697	258	1	484	1	226	0
92-94	40,732	248	1	138	0	110-	0
93-95	39,416	342	1	304	1	38-	0
94-96	35,598	96	0	207	1	111	0
95-97	37,338	94	0	177	0	83	0
96-98	48,051		0		0		0
97-99	58,741		0		0		0
98-00	46,024		0		0		0
99-01	19,115		0		0		0
00-02							
01-03							
02-04	14,860		0		0		0
03-05	33,949		0		0		0
04-06	100,376		0		0		0
05-07	85,516		0		0		0
06-08	66,427		0		0		0
FIVE-YEAR AVERAGE							
04-08	60,225		0		0		0

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2821 METER INSTALLATIONS - LEASED

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	COST OF REMOVAL PCT	GROSS SALVAGE AMOUNT	GROSS SALVAGE PCT	NET SALVAGE AMOUNT	NET SALVAGE PCT
2005	20,028	0		0		0	
2006	35,684	0		0		0	
2007							
2008							
TOTAL	55,712	0		0		0	
THREE-YEAR MOVING AVERAGES							
05-07	18,571	0		0		0	
06-08	11,895	0		0		0	
FIVE-YEAR AVERAGE							
04-08	11,143	0		0		0	

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2830 HOUSE REGULATORS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
1980	4,614	29	1	974	21	945	20
1981	4,743	455	10	3,040	64	2,585	55
1982	3,216	435	14	2,072	64	1,637	51
1983	2,492		0	1,035	42	1,035	42
1984	1,898	28	1	700	37	672	35
1985	4,371	41	1	2,873	66	2,832	65
1986	5,467	155	3	3,675	67	3,520	64
1987	6,521	39	1	2,449	38	2,410	37
1988	5,541	67	1	2,707	49	2,640	48
1989	9,307	885	10	2,755	30	1,870	20
1990	15,816	1,006	6	198	1	808-	5-
1991	12,354	683	6	913	7	230	2
1992	13,129	928	7	6,142	47	5,214	40
1993	19,067	1,135	6	4,544	24	3,409	18
1994	17,868	437	2	4,374	24	3,937	22
1995	11,977	752	6	5,395	45	4,643	39
1996	16,188		0	9,988	62	9,988	62
1997	16,522	272	2	5,557	34	5,285	32
1998	20,252		0	7,232	36	7,232	36
1999	5,002	1,294	26	1,486	30	192	4
2000		1,169				1,169-	
2001		843				843-	
2002		3,303				3,303-	
2003		8,199				8,199-	
2004	38,322	2,049	5		0	2,049-	5-
2005	13,807		0		0		0
2006	29,210		0		0		0
2007							
2008							
TOTAL	277,684	24,204	9	68,109	25	43,905	16
THREE-YEAR MOVING AVERAGES							
80-82	4,191	306	7	2,029	48	1,723	41
81-83	3,483	297	9	2,049	59	1,752	50
82-84	2,535	154	6	1,269	50	1,115	44
83-85	2,920	23	1	1,536	53	1,513	52
84-86	3,912	75	2	2,416	62	2,341	60
85-87	5,453	79	1	2,999	55	2,920	54

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2830 HOUSE REGULATORS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
THREE-YEAR MOVING AVERAGES							
86-88	5,843	87	1	2,943	50	2,856	49
87-89	7,123	330	5	2,637	37	2,307	32
88-90	10,222	653	6	1,887	18	1,234	12
89-91	12,492	858	7	1,289	10	431	3
90-92	13,766	872	6	2,418	18	1,546	11
91-93	14,850	915	6	3,866	26	2,951	20
92-94	16,688	833	5	5,020	30	4,187	25
93-95	16,304	775	5	4,771	29	3,996	25
94-96	15,344	397	3	6,586	43	6,189	40
95-97	14,896	341	2	6,980	47	6,639	45
96-98	17,654	91	1	7,592	43	7,501	42
97-99	13,925	522	4	4,758	34	4,236	30
98-00	8,418	821	10	2,906	35	2,085	25
99-01	1,667	1,102	66	495	30	607-	36-
00-02		1,772				1,772-	
01-03		4,115				4,115-	
02-04	12,774	4,517	35		0	4,517-	35-
03-05	17,376	3,416	20		0	3,416-	20-
04-06	27,113	683	3		0	683-	3-
05-07	14,339		0		0		0
06-08	9,737		0		0		0
FIVE-YEAR AVERAGE							
04-08	16,268	410	3		0	410-	3-

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2840 HOUSE REGULATOR INSTALLATIONS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
1980	978	122	12	154	16	32	3
1981	1,881	1	0	134	7	133	7
1982	1,242		0	191	15	191	15
1983	885		0	109	12	109	12
1984	1,356	16	1	63	5	47	3
1985	1,373		0	133	10	133	10
1986	1,389		0	104	7	104	7
1987	1,590	1	0	213	13	212	13
1988	1,863		0	163	9	163	9
1989	4,144		0	223	5	223	5
1990	4,359		0	255	6	255	6
1991	3,797		0	73	2	73	2
1992	3,957		0	4	0	4	0
1993	8,943	499	6	42	0	457-	5-
1994	6,023	26	0	19	0	7-	0
1995	3,549	36	1	46	1	10	0
1996	4,700		0		0		0
1997	14,562		0		0		0
1998	10,239		0		0		0
1999	2,701		0		0		0
2000							
2001							
2002							
2003							
2004	34,397		0		0		0
2005	17,871		0		0		0
2006	35,211		0		0		0
2007							
2008							
TOTAL	167,010	701	0	1,926	1	1,225	1
THREE-YEAR MOVING AVERAGES							
80-82	1,367	41	3	159	12	118	9
81-83	1,336		0	144	11	144	11
82-84	1,161	5	0	121	10	116	10
83-85	1,205	5	0	102	8	97	8
84-86	1,373	5	0	100	7	95	7
85-87	1,450		0	150	10	150	10

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2840 HOUSE REGULATOR INSTALLATIONS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
THREE-YEAR MOVING AVERAGES							
86-88	1,614		0	160	10	160	10
87-89	2,532		0	200	8	200	8
88-90	3,455		0	214	6	214	6
89-91	4,100		0	184	4	184	4
90-92	4,037		0	111	3	111	3
91-93	5,565	166	3	40	1	126-	2-
92-94	6,308	175	3	22	0	153-	2-
93-95	6,172	187	3	36	1	151-	2-
94-96	4,757	20	0	22	0	2	0
95-97	7,604	12	0	15	0	3	0
96-98	9,833		0		0		0
97-99	9,167		0		0		0
98-00	4,313		0		0		0
99-01	900		0		0		0
00-02							
01-03							
02-04	11,466		0		0		0
03-05	17,423		0		0		0
04-06	29,160		0		0		0
05-07	17,694		0		0		0
06-08	11,737		0		0		0
FIVE-YEAR AVERAGE							
04-08	17,496		0		0		0

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2850 INDUSTRIAL MEAS. & REG. STATION EQUIP.

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
1980	452		0	18	4	18	4
1981	661	226	34	39	6	187-	28-
1982							
1983	3,542		0		0		0
1984		569		290		279-	
1985							
1986	4,743	622	13	331	7	291-	6-
1987	1,602	95	6	329	21	234	15
1988	7,866	1,009	13	470	6	539-	7-
1989	2,149	799	37	356	17	443-	21-
1990	22,374	2,351	11	22	0	2,329-	10-
1991	23,687	1,921	8	389	2	1,532-	6-
1992	3,001	161	5	8	0	153-	5-
1993	6,490	1,252	19	36	1	1,216-	19-
1994	1,746		0	7	0	7	0
1995	4,370	1,800	41	52	1	1,748-	40-
1996	1,367	501	37		0	501-	37-
1997							
1998	5,041	207	4		0	207-	4-
1999	6,340	214	3		0	214-	3-
2000							
2001							
2002							
2003							
2004							
2005							
2006							
2007							
2008							
TOTAL	95,431	11,727	12	2,347	2	9,380-	10-
THREE-YEAR MOVING AVERAGES							
80-82	371	75	20	19	5	56-	15-
81-83	1,401	75	5	13	1	62-	4-
82-84	1,181	190	16	97	8	93-	8-
83-85	1,181	190	16	97	8	93-	8-
84-86	1,581	397	25	207	13	190-	12-
85-87	2,115	239	11	220	10	19-	1-

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2850 INDUSTRIAL MEAS. & REG. STATION EQUIP.

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	COST OF REMOVAL PCT	GROSS SALVAGE AMOUNT	GROSS SALVAGE PCT	NET SALVAGE AMOUNT	NET SALVAGE PCT
THREE-YEAR MOVING AVERAGES							
86-88	4,737	576	12	376	8	200-	4-
87-89	3,872	634	16	385	10	249-	6-
88-90	10,796	1,386	13	283	3	1,103-	10-
89-91	16,070	1,690	11	256	2	1,434-	9-
90-92	16,354	1,478	9	140	1	1,338-	8-
91-93	11,059	1,111	10	144	1	967-	9-
92-94	3,746	471	13	17	0	454-	12-
93-95	4,202	1,017	24	32	1	985-	23-
94-96	2,494	767	31	20	1	747-	30-
95-97	1,913	767	40	17	1	750-	39-
96-98	2,136	236	11		0	236-	11-
97-99	3,794	141	4		0	141-	4-
98-00	3,794	141	4		0	141-	4-
99-01	2,113	71	3		0	71-	3-
00-02							
01-03							
02-04							
03-05							
04-06							
05-07							
06-08							
FIVE-YEAR AVERAGE							
04-08							

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2921 TRANSPORTATION EQUIPMENT - TRAILERS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	PCT	GROSS SALVAGE AMOUNT	PCT	NET SALVAGE AMOUNT	PCT
1980	6,372		0		0		0
1981							
1982	4,767		0	1,545	32	1,545	32
1983							
1984							
1985							
1986	3,073	91	3	1,850	60	1,759	57
1987							
1988							
1989	1,328		0		0		0
1990							
1991							
1992				67		67	
1993							
1994							
1995							
1996							
1997	19,604		0		0		0
1998							
1999							
2000							
2001							
2002							
2003							
2004							
2005							
2006							
2007							
2008							
TOTAL	35,144	91	0	3,462	10	3,371	10
THREE-YEAR MOVING AVERAGES							
80-82	3,713		0	515	14	515	14
81-83	1,589		0	515	32	515	32
82-84	1,589		0	515	32	515	32
83-85							
84-86	1,024	30	3	617	60	587	57
85-87	1,024	30	3	617	60	587	57

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2921 TRANSPORTATION EQUIPMENT - TRAILERS

SUMMARY OF BOOK SALVAGE

YEAR	REGULAR RETIREMENTS	COST OF REMOVAL AMOUNT	COST OF REMOVAL PCT	GROSS SALVAGE AMOUNT	GROSS SALVAGE PCT	NET SALVAGE AMOUNT	NET SALVAGE PCT
THREE-YEAR MOVING AVERAGES							
86-88	1,024	30	3	617	60	587	57
87-89	443		0		0		0
88-90	443		0		0		0
89-91	443		0		0		0
90-92				22		22	
91-93				22		22	
92-94				22		22	
93-95							
94-96							
95-97	6,535		0		0		0
96-98	6,535		0		0		0
97-99	6,535		0		0		0
98-00							
99-01							
00-02							
01-03							
02-04							
03-05							
04-06							
05-07							
06-08							
FIVE-YEAR AVERAGE							
04-08							

III-160 DEPRECIATION CALCULATIONS

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1701 AMI METERS - LEASED

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. IOWA 20-S0.5						
NET SALVAGE PERCENT.. 0						
2008	601,512.93	21,414	28,121	573,392	13.56	42,286
	601,512.93	21,414	28,121	573,392		42,286
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					13.6	7.03

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1900 STRUCTURES AND IMPROVEMENTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
FLORENCE SERVICE BUILDING						
INTERIM SURVIVOR CURVE.. IOWA 100-R1						
PROBABLE RETIREMENT YEAR.. 6-2041						
NET SALVAGE PERCENT.. 0						
2006	6,447.49	542	636	5,811	27.26	213
KENTUCKY SERVICE BUILDING - 19TH & AUGUSTINE						
INTERIM SURVIVOR CURVE.. IOWA 100-R1						
PROBABLE RETIREMENT YEAR.. 6-2012						
NET SALVAGE PERCENT.. 0						
1939	213.98	204	214			
1947	498,843.32	472,455	498,843			
1949	7,874.04	7,450	7,874			
1950	2,833.13	2,669	2,833			
1951	610.66	576	611			
1953	4,989.45	4,708	4,989			
1955	121.96	115	122			
1956	313.02	294	313			
1957	1,480.66	1,388	1,481			
1958	91.02	85	91			
1959	1,905.03	1,782	1,905			
1961	3,761.02	3,502	3,761			
1964	1,660.34	1,537	1,660			
1965	2,410.30	2,233	2,410			
1966	478.18	443	478			
1967	8,188.75	7,544	8,189			
1969	4,337.05	3,992	4,337			
1970	1,925.44	1,764	1,925			
1972	4,634.39	4,229	4,634			
1973	8,585.30	7,833	8,585			
1974	6,637.72	6,023	6,638			
1975	6,319.85	5,716	6,320			
1976	337.18	305	337			
1977	975.57	879	976			
1978	23,626.36	21,186	23,626			
1979	39,938.23	35,701	39,938			
1980	11,560.66	10,313	11,561			
1981	33,194.05	29,486	33,194			

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1900 STRUCTURES AND IMPROVEMENTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
KENTUCKY SERVICE BUILDING - 19TH & AUGUSTINE						
INTERIM SURVIVOR CURVE.. IOWA 100-R1						
PROBABLE RETIREMENT YEAR.. 6-2012						
NET SALVAGE PERCENT.. 0						
1982	12,516.21	11,078	12,516			
1983	14,035.96	12,349	14,036			
1984	42,353.87	37,047	42,354			
1985	24,798.14	21,621	24,798			
1986	443.45	384	443			
1987	12,451.85	10,709	12,452			
1988	593.39	507	593			
1989	35,301.47	29,946	35,301			
1990	3,340.07	2,812	3,340			
1991	38,025.34	31,744	38,025			
1992	58,847.35	48,649	58,847			
1993	59,866.03	48,905	59,866			
1994	230,910.34	186,160	230,910			
1995	2,711.75	2,156	2,712			
1996	3,182.30	2,490	3,182			
1998	26,943.53	20,229	26,464	480	3.49	138
1999	105,835.05	77,524	101,419	4,416	3.47	1,273
2000	208,595.64	148,061	193,699	14,897	3.48	4,281
2001	50,200.30	34,302	44,875	5,325	3.48	1,530
2002	65,033.55	42,356	55,411	9,623	3.48	2,765
2003	8,358.45	5,121	6,699	1,659	3.48	477
2004	61,373.12	34,633	45,308	16,065	3.47	4,630
2005	43,769.17	21,968	28,740	15,029	3.47	4,331
2006	10,412.19	4,361	5,705	4,707	3.47	1,356
2007	124.53	38	50	75	3.47	22
	1,797,869.71	1,469,562	1,725,590	72,276		20,803
ERLANGER OPERATIONS CENTER						
INTERIM SURVIVOR CURVE.. IOWA 100-R1						
PROBABLE RETIREMENT YEAR.. 6-2065						
NET SALVAGE PERCENT.. 0						
2005	2,100,000.00	166,110	195,050	1,904,950	40.75	46,747
2007	2,087,225.32	78,897	92,642	1,994,583	38.18	52,242
	4,187,225.32	245,007	287,692	3,899,533		98,989

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1900 STRUCTURES AND IMPROVEMENTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
MINOR STRUCTURES						
SURVIVOR CURVE.. IOWA 40-R1						
NET SALVAGE PERCENT.. -5						
1999	5,371.46	1,565	1,838	3,802	24.75	154
	5,996,913.98	1,716,676	2,015,756	3,981,422		120,159
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					33.1	2.00

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1910 OFFICE FURNITURE AND EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1989	172,316.50	168,009	138,899	33,418	0.50	33,418
1990	74,248.83	68,680	56,780	17,469	1.50	11,646
1991	70,008.65	61,258	50,644	19,365	2.50	7,746
1992	6,353.10	5,241	4,333	2,020	3.50	577
1994	3,835.01	2,780	2,298	1,537	5.50	279
2000	33,068.30	14,054	11,619	21,449	11.50	1,865
2001	36,555.84	13,708	11,334	25,222	12.50	2,018
2008	6,169.61	154	127	6,043	19.50	310
	402,555.84	333,884	276,034	126,523		57,859
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					2.2	14.37

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1930 STORES EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1994	5,562.77	4,033	9,314-	14,877	5.50	2,705
	5,562.77	4,033	9,314-	14,877		2,705
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					5.5	48.63

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1940 TOOLS, SHOP AND GARAGE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. 25-SQUARE						
NET SALVAGE PERCENT.. 0						
1984	3,301.79	3,236	3,001	301	0.50	301
1985	7,445.60	6,999	6,490	956	1.50	637
1986	3,691.35	3,322	3,080	611	2.50	244
1987	786.43	676	627	159	3.50	45
1988	7,153.00	5,865	5,438	1,715	4.50	381
1989	1,337.96	1,044	968	370	5.50	67
1990	2,813.16	2,082	1,930	883	6.50	136
1991	35,487.06	24,841	23,033	12,454	7.50	1,661
1992	18,669.09	12,322	11,425	7,244	8.50	852
1993	12,732.47	7,894	7,320	5,412	9.50	570
1994	8,260.17	4,791	4,442	3,818	10.50	364
1996	2,992.80	1,496	1,387	1,606	12.50	128
2002	4,465.70	1,161	1,077	3,389	18.50	183
2003	46,509.55	10,232	9,488	37,022	19.50	1,899
2005	2,964.11	415	385	2,579	21.50	120
2007	13,853.41	831	770	13,083	23.50	557
2008	6,230.65	125	116	6,115	24.50	250
	178,694.30	87,332	80,977	97,717		8,395
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					11.6	4.70

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1970 COMMUNICATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2000	39,252.18	22,244	39,252			
2006	1,347,260.59	224,588	467,223	880,038	12.50	70,403
2007	2,460,225.21	246,023	511,815	1,948,410	13.50	144,327
	3,846,737.98	492,855	1,018,290	2,828,448		214,730
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					13.2	5.58

DUKE ENERGY KENTUCKY
COMMON PLANT

ACCOUNT 1980 MISCELLANEOUS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2005	11,371.92	2,653	2,155	9,217	11.50	801
	11,371.92	2,653	2,155	9,217		801
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					11.5	7.04

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2041 RIGHTS OF WAY

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 50-SQUARE						
NET SALVAGE PERCENT.. 0						
1961	16,886.85	16,043	16,887			
1972	7,551.70	5,513	7,552			
	24,438.55	21,556	24,439			
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					0.0	0.00

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2050 STRUCTURES AND IMPROVEMENTS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-R4						
NET SALVAGE PERCENT.. -5						
1961	1,194,033.14	1,071,943	1,253,735			
1963	1,741.01	1,522	1,828			
1970	10,435.91	8,143	10,033	925	13.31	69
1971	23,663.21	18,076	22,272	2,574	14.05	183
1972	6,642.53	4,965	6,118	857	14.78	58
1973	8,189.23	5,983	7,372	1,227	15.52	79
1974	4,680.08	3,340	4,115	799	16.26	49
1975	1,727.21	1,203	1,482	332	17.01	20
1977	15,661.74	10,413	12,831	3,614	18.25	198
1979	3,572.65	2,235	2,754	997	20.00	50
1981	379.83	224	276	123	21.52	6
1986	6,229.14	3,047	3,754	2,787	25.81	108
1989	1,326.34	568	700	693	28.34	24
1990	49,012.04	19,901	24,521	26,942	29.34	918
1991	3,324.02	1,283	1,581	1,909	30.12	63
1998	4,507.34	1,054	1,299	3,434	36.67	94
1999	11,206.91	2,370	2,920	8,847	37.67	235
2000	26,467.14	5,008	6,171	21,619	38.67	559
2001	7,831.50	1,307	1,610	6,613	39.67	167
2002	51,490.30	7,450	9,180	44,885	40.67	1,104
2004	135,248.51	13,548	16,693	125,318	42.67	2,937
	1,567,369.78	1,183,583	1,391,245	254,495		6,921
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					36.8	0.44

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2110 LIQUID PETROLEUM GAS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 40-S1.5						
NET SALVAGE PERCENT.. -10						
1961	976,993.87	918,863	972,908	101,785	8.06	12,628
1964	2,027.28	1,856	1,965	265	8.97	30
1965	2,019.79	1,836	1,944	278	9.13	30
1966	10,522.69	9,445	10,001	1,574	9.58	164
1968	3,462.69	3,039	3,218	591	10.26	58
1971	78,732.83	66,903	70,838	15,768	11.04	1,428
1972	27,026.69	22,571	23,899	5,830	11.58	503
1974	21,887.44	17,775	18,820	5,256	12.23	430
1975	106,105.55	84,853	89,844	26,872	12.58	2,136
1976	14,383.85	11,313	11,978	3,844	12.95	297
1977	7,625.84	5,893	6,240	2,148	13.34	161
1978	4,979.82	3,776	3,998	1,480	13.75	108
1979	65,554.96	48,718	51,583	20,527	14.17	1,449
1980	58,352.96	42,441	44,937	19,251	14.60	1,319
1981	7,162.06	5,113	5,414	2,464	14.87	166
1984	11,031.84	7,285	7,713	4,422	16.31	271
1987	27,187.85	16,398	17,363	12,544	17.71	708
1989	60,099.34	33,650	35,629	30,480	18.81	1,620
1992	25,640.82	12,565	13,304	14,901	20.54	725
1993	10,880.49	5,065	5,363	6,606	21.13	313
1995	1,150.30	475	503	762	22.47	34
1996	73,370.31	28,352	30,020	50,687	23.09	2,195
1997	30,406.78	10,924	11,567	21,880	23.71	923
1998	41,149.54	13,593	14,392	30,872	24.47	1,262
1999	45,764.19	13,773	14,583	35,758	25.22	1,418
2000	357,976.15	97,065	102,774	291,000	25.98	11,201
2002	502,208.14	105,569	111,778	440,651	27.51	16,018
2003	458,720.78	82,148	86,980	417,613	28.28	14,767
2004	526,445.47	77,424	81,978	497,112	29.17	17,042
2005	122,382.62	14,095	14,924	119,697	29.94	3,998
2006	455,671.93	37,593	39,804	461,435	30.83	14,967
2008	36,622.48	608	644	39,641	32.72	1,212
	4,173,547.35	1,800,977	1,906,906	2,683,994		109,581
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					24.5	2.63

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2741 RIGHTS OF WAY - GENERAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 65-R4						
NET SALVAGE PERCENT.. 0						
1910	10,635.46	10,635	10,635			
1919	1,621.43	1,582	1,621			
1924	8,823.50	8,500	8,824			
1925	678.47	652	678			
1933	5,568.76	5,213	5,569			
1952	1,342.39	1,085	1,211	131	13.43	10
1953	1,826.75	1,460	1,630	197	13.94	14
1954	25.70	20	22	4	14.46	
1955	27,640.73	21,444	23,938	3,703	15.46	240
1956	180.45	138	154	26	15.99	2
1957	15,131.04	11,456	12,788	2,343	16.52	142
1958	308.05	230	257	51	17.07	3
1959	1,946.26	1,436	1,603	343	17.61	19
1960	1,108.84	801	894	215	18.61	12
1961	7,019.04	5,001	5,583	1,436	19.17	75
1962	19,073.27	13,393	14,951	4,122	19.72	209
1963	1,814.75	1,247	1,392	423	20.72	20
1964	1,991.19	1,347	1,504	487	21.29	23
1965	134,989.37	89,849	100,299	34,690	21.86	1,587
1966	1,070.30	696	777	293	22.86	13
1967	12,722.90	8,131	9,077	3,646	23.44	156
1968	5,087.66	3,173	3,542	1,546	24.44	63
1969	3,480.98	2,131	2,379	1,102	25.01	44
1970	9,619.27	5,777	6,449	3,170	25.60	124
1971	17,951.13	10,501	11,722	6,229	26.60	234
1972	35,609.14	20,408	22,781	12,828	27.19	472
1973	6,934.62	3,865	4,315	2,620	28.19	93
1974	16,960.64	9,245	10,320	6,641	28.79	231
1975	28,419.62	15,043	16,793	11,627	29.79	390
1976	8,582.46	4,407	4,920	3,662	30.79	119
1977	22,107.90	11,074	12,362	9,746	31.39	310
1978	3,731.10	1,810	2,020	1,711	32.39	53
1979	941.95	442	493	449	33.39	13
1980	15,885.32	7,244	8,086	7,799	34.00	229
1981	5,112.34	2,249	2,511	2,601	35.00	74
1982	44,454.50	18,849	21,041	23,414	36.00	650
1983	6,959.60	2,858	3,190	3,770	36.61	103

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2741 RIGHTS OF WAY - GENERAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 65-R4						
NET SALVAGE PERCENT.. 0						
1984	3,024.89	1,193	1,332	1,693	37.61	45
1985	10,039.09	3,799	4,241	5,798	38.61	150
1986	24,359.25	8,825	9,851	14,508	39.61	366
1987	21,569.99	7,513	8,387	13,183	40.23	328
1988	15,344.70	5,096	5,689	9,656	41.23	234
1989	69,914.21	22,086	24,655	45,259	42.23	1,072
1990	37,094.33	11,117	12,410	24,684	43.23	571
1991	29,490.94	8,361	9,333	20,158	44.23	456
1992	180,997.49	48,381	54,008	126,989	45.23	2,808
1993	9,764.91	2,452	2,737	7,028	46.23	152
1994	105,098.80	24,845	27,734	77,365	46.85	1,651
1995	909.60	200	223	687	47.85	14
1996	25,191.12	5,134	5,731	19,460	48.85	398
2005	2,674.77	153	171	2,504	57.85	43
2006	51,359.23	2,106	2,351	49,008	58.48	838
2008	10,163.32	83	93	10,070	60.48	167
	1,084,353.52	454,736	505,277	579,075		15,020
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					38.6	1.39

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2750 STRUCTURES AND IMPROVEMENTS - GENERAL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-R2.5						
NET SALVAGE PERCENT.. -5						
1909	838.18	880	880			
1927	2,450.16	2,474	2,573			
1935	106.66	105	112			
1953	181.28	164	190			
1960	481.63	410	506			
1971	40,333.78	29,222	41,126	1,224	16.85	73
1972	13,340.47	9,459	13,312	695	17.55	40
1973	26,902.59	18,754	26,394	1,854	17.97	103
1974	3,422.20	2,331	3,281	312	18.69	17
1978	369.00	229	322	65	21.05	3
1980	22,083.46	13,020	18,323	4,865	22.26	219
1981	853.89	491	691	206	22.75	9
1986	9,563.62	4,654	6,550	3,492	26.04	134
1999	3,684.93	835	1,175	2,694	34.55	78
2000	30,027.79	6,139	8,640	22,889	35.17	651
2003	3,874.50	528	743	3,325	36.87	90
	158,514.14	89,695	124,818	41,621		1,417
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					29.4	0.89

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2761 MAINS - CAST IRON, COPPER AND ALL VALVES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 41-R2.5						
NET SALVAGE PERCENT.. -20						
1915	57,663.56	69,196	69,196			
1923	36.54	44	44			
1925	31.63	38	38			
1926	115.57	139	139			
1927	1,106.38	1,328	1,328			
1928	221.31	266	266			
1929	295.51	355	355			
1930	1,521.94	1,826	1,826			
1931	1,769.39	2,123	2,123			
1932	189.23	227	227			
1933	1,381.45	1,652	936	722	0.26	722
1934	389.90	467	265	203	0.13	203
1935	1,680.60	2,001	1,134	883	0.57	883
1936	58.03	69	39	31	1.03	30
1937	4,188.17	4,959	2,811	2,215	0.96	2,215
1938	10,248.14	12,052	6,832	5,466	1.44	3,796
1939	1,742.55	2,035	1,154	937	1.93	485
1940	1,279.16	1,493	846	689	1.92	359
1941	1,423.35	1,649	935	773	2.43	318
1942	902.18	1,044	592	491	2.46	200
1943	204.96	237	134	112	2.52	44
1944	92.66	106	60	51	3.07	17
1947	98.69	112	63	55	3.44	16
1948	60.82	69	39	34	3.60	9
1949	14,832.41	16,733	9,485	8,314	3.79	2,194
1950	2,893.92	3,250	1,842	1,631	4.00	408
1951	26,302.39	29,401	16,666	14,897	4.23	3,522
1952	3,364.35	3,741	2,121	1,916	4.48	428
1953	2,625.52	2,903	1,646	1,505	4.74	318
1954	19,228.06	21,126	11,976	11,098	5.02	2,211
1955	13,714.81	14,968	8,485	7,973	5.32	1,499
1956	31,497.74	34,331	19,461	18,336	5.30	3,460
1957	118,252.72	127,897	72,500	69,403	5.64	12,305
1958	94,217.64	101,065	57,290	55,771	5.99	9,311
1959	52,106.75	55,713	31,582	30,946	6.06	5,107
1960	13,149.59	13,929	7,896	7,884	6.45	1,222
1961	10,354.06	10,859	6,156	6,269	6.85	915

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2761 MAINS - CAST IRON, COPPER AND ALL VALVES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 41-R2.5						
NET SALVAGE PERCENT.. -20						
1962	8,515.35	8,886	5,037	5,181	6.97	743
1963	10,946.39	11,297	6,404	6,732	7.41	909
1964	8,078.28	8,282	4,695	4,999	7.58	659
1965	3,417.21	3,461	1,962	2,139	8.05	266
1966	5,820.53	5,848	3,315	3,670	8.26	444
1967	617.76	612	347	394	8.75	45
1968	4,580.67	4,475	2,537	2,960	9.25	320
1969	4,786.47	4,628	2,623	3,121	9.52	328
1970	6,332.36	6,027	3,416	4,183	10.04	417
1971	7,566.23	7,116	4,034	5,045	10.34	488
1972	11,648.43	10,766	6,103	7,875	10.89	723
1973	10,051.27	9,121	5,170	6,892	11.45	602
1974	28,422.68	25,417	14,408	19,699	11.80	1,669
1975	25,251.13	22,129	12,544	17,757	12.37	1,435
1976	2,592.82	2,225	1,261	1,850	12.95	143
1977	21,405.44	17,963	10,183	15,504	13.55	1,144
1978	48,406.97	39,866	22,598	35,490	13.94	2,546
1979	43,431.50	34,903	19,785	32,333	14.55	2,222
1980	74,471.63	58,329	33,065	56,301	15.17	3,711
1981	46,421.90	35,390	20,061	35,645	15.79	2,257
1982	39,631.38	29,491	16,717	30,841	16.24	1,899
1983	26,032.21	18,799	10,656	20,583	16.87	1,220
1984	38,499.45	26,939	15,271	30,928	17.52	1,765
1985	38,166.46	25,831	14,643	31,157	18.17	1,715
1986	42,282.42	27,627	15,661	35,078	18.82	1,864
1987	12,620.73	7,978	4,522	10,623	19.31	550
1988	40,038.59	24,331	13,792	34,254	19.98	1,714
1989	19,529.91	11,380	6,451	16,985	20.66	822
1990	85,267.90	47,518	26,936	75,385	21.34	3,533
1991	34,654.48	18,485	10,479	31,106	21.87	1,422
1992	12,115.32	6,141	3,481	11,057	22.56	490
1993	16,723.67	8,025	4,549	15,519	23.26	667
1994	9,537.02	4,315	2,446	8,998	23.96	376
1995	11,765.39	5,013	2,842	11,276	24.52	460
1996	16,194.08	6,438	3,649	15,784	25.23	626
1997	14,476.97	5,354	3,035	14,337	25.81	555
1998	58,388.34	19,864	11,260	58,806	26.54	2,216

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2761 MAINS - CAST IRON, COPPER AND ALL VALVES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 41-R2.5						
NET SALVAGE PERCENT.. -20						
1999	16,097.65	5,011	2,841	16,476	27.13	607
	1,394,028.67	1,154,684	687,267	985,568		95,769
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					10.3	6.87

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2762 MAINS - STEEL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 55-R2.5						
NET SALVAGE PERCENT.. -20						
1917	54.79	64	60	6	2.84	2
1919	75.05	87	82	8	3.09	3
1921	246.11	284	267	28	3.41	8
1922	1.10	1	1			
1923	157.30	181	170	19	3.79	5
1924	347.45	398	374	43	3.99	11
1925	161.25	184	173	21	4.22	5
1926	3,416.40	3,890	3,660	440	4.45	99
1927	10,414.93	11,816	11,117	1,381	4.71	293
1928	7,780.58	8,794	8,274	1,063	4.97	214
1929	14,585.40	16,419	15,447	2,055	5.25	391
1930	6.81	8	8			
1931	8,546.06	9,537	8,973	1,282	5.83	220
1933	106.31	118	111	17	6.47	3
1935	280.69	309	291	46	6.50	7
1941	6.97	7	7	1	8.26	
1942	3,623.99	3,875	3,646	703	8.13	86
1943	161.24	171	161	32	8.57	4
1944	242.15	255	240	51	9.03	6
1945	21.58	23	22	4	8.96	
1946	2,359.61	2,460	2,314	518	9.44	55
1947	1,151.70	1,190	1,120	262	9.93	26
1948	179.20	185	174	41	9.92	4
1949	118.78	121	114	29	10.43	3
1950	4,994.31	5,084	4,783	1,210	10.46	116
1951	936.26	943	887	237	10.99	22
1952	1,691.63	1,686	1,586	444	11.52	39
1953	33,492.53	33,238	31,271	8,920	11.61	768
1954	14,883.00	14,600	13,736	4,124	12.17	339
1955	20,354.47	19,733	18,565	5,860	12.72	461
1956	51,305.74	49,457	46,530	15,037	12.86	1,169
1957	50,908.98	48,451	45,584	15,507	13.44	1,154
1958	274,480.68	257,836	242,576	86,801	14.01	6,196
1959	187,917.56	175,259	164,887	60,614	14.19	4,272
1960	370,428.72	340,631	320,471	124,043	14.79	8,387
1961	268,523.63	243,379	228,975	93,253	15.39	6,059
1962	178,647.25	159,496	150,056	64,321	16.00	4,020

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2762 MAINS - STEEL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 55-R2.5						
NET SALVAGE PERCENT.. -20						
1963	441,650.82	390,649	367,529	162,452	16.23	10,009
1964	301,586.77	262,525	246,988	114,916	16.85	6,820
1965	548,272.54	469,365	441,586	216,341	17.48	12,376
1966	401,321.07	337,736	317,748	163,837	18.10	9,052
1967	312,105.37	259,584	244,221	130,305	18.38	7,089
1968	639,987.27	522,537	491,611	276,374	19.02	14,531
1969	645,731.67	517,309	486,693	288,185	19.67	14,651
1970	538,404.61	422,863	397,836	248,250	20.32	12,217
1971	408,854.12	316,453	297,724	192,901	20.64	9,346
1972	551,509.51	417,934	393,199	268,612	21.30	12,611
1973	253,940.34	188,231	177,091	127,637	21.97	5,810
1974	383,126.88	277,598	261,169	198,583	22.64	8,771
1975	395,616.66	281,521	264,860	209,880	22.99	9,129
1976	255,768.24	177,554	167,046	139,876	23.68	5,907
1977	244,491.98	165,443	155,652	137,738	24.36	5,654
1978	653,751.10	430,691	405,201	379,300	25.06	15,136
1979	1,262,492.11	813,398	765,258	749,733	25.45	29,459
1980	2,260,824.39	1,415,095	1,331,345	1,381,644	26.14	52,856
1981	1,270,387.85	771,380	725,727	798,738	26.85	29,748
1982	1,549,781.28	911,829	857,864	1,001,874	27.55	36,366
1983	1,694,758.11	964,589	907,501	1,126,209	28.26	39,852
1984	840,945.67	464,807	437,298	571,837	28.69	19,932
1985	1,689,370.42	900,502	847,207	1,180,038	29.41	40,124
1986	2,021,968.88	1,037,270	975,881	1,450,482	30.13	48,141
1987	3,691,803.13	1,828,772	1,720,539	2,709,625	30.58	88,608
1988	4,986,688.56	2,367,879	2,227,740	3,756,286	31.31	119,971
1989	4,857,202.04	2,204,975	2,074,477	3,754,165	32.05	117,135
1990	9,183,352.62	3,976,024	3,740,709	7,279,314	32.78	222,066
1991	5,054,311.09	2,091,272	1,967,503	4,097,670	33.26	123,201
1992	2,473,567.11	969,737	912,344	2,055,937	34.01	60,451
1993	1,127,314.63	417,332	392,633	960,145	34.75	27,630
1994	100,534.25	35,167	33,086	87,555	35.25	2,484
1995	67,159.85	21,977	20,676	59,916	36.00	1,664
1996	238,056.33	72,845	68,534	217,134	36.52	5,946
1997	209,312.00	59,227	55,722	195,452	37.28	5,243
1998	750,806.14	195,870	184,278	716,689	37.81	18,955
1999	2,189,164.73	519,095	488,373	2,138,625	38.58	55,434

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2762 MAINS - STEEL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 55-R2.5						
NET SALVAGE PERCENT.. -20						
2000	177,928.65	38,112	35,856	177,658	39.12	4,541
2001	3,620,995.02	690,886	649,997	3,695,197	39.67	93,148
2002	2,171,316.77	362,436	340,986	2,264,594	40.23	56,291
2003	1,871,688.84	266,828	251,036	1,994,991	40.80	48,897
2004	1,178,197.73	139,404	131,154	1,282,683	41.16	31,163
2005	3,462,549.63	322,848	303,740	3,851,320	41.55	92,691
2006	1,058,398.25	71,759	67,512	1,202,566	41.75	28,804
2007	131,607.54	5,496	5,171	152,758	41.60	3,672
2008	23,870.23	352	331	28,313	40.31	702
	69,705,083.01	30,785,326	28,963,345	54,682,756		1,698,731
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					32.2	2.44

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2763 MAINS - PLASTIC

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R2.5						
NET SALVAGE PERCENT.. -20						
1965	1,138.83	921	890	477	21.01	23
1968	6,773.29	5,201	5,028	3,100	22.79	136
1970	104,417.04	77,185	74,616	50,684	24.00	2,112
1971	174,591.00	126,502	122,291	87,218	24.61	3,544
1972	181,430.57	128,736	124,451	93,266	25.23	3,697
1973	118,585.66	82,351	79,610	62,693	25.85	2,425
1974	62,519.56	42,448	41,035	33,988	26.48	1,284
1975	67,549.70	44,810	43,318	37,742	27.10	1,393
1976	28,717.99	18,592	17,973	16,489	27.74	594
1977	7,535.44	4,757	4,599	4,444	28.38	157
1978	60,352.85	37,110	35,875	36,548	29.02	1,259
1979	99,965.21	59,811	57,820	62,138	29.67	2,094
1980	167,549.18	97,413	94,170	106,889	30.32	3,525
1981	36,078.51	20,361	19,683	23,611	30.98	762
1983	9,656.60	5,113	4,943	6,645	32.30	206
1984	40,567.85	20,753	20,062	28,619	32.97	868
1986	27,908.80	13,339	12,895	20,596	33.99	606
1987	59,341.10	27,252	26,345	44,864	34.68	1,294
1988	12,114.41	5,335	5,157	9,380	35.36	265
1989	71,356.28	30,055	29,055	56,573	36.06	1,569
1990	59,290.45	23,828	23,035	48,114	36.75	1,309
1991	172,385.94	65,886	63,693	143,170	37.45	3,823
1992	1,260,850.95	456,932	441,722	1,071,299	38.14	28,089
1993	2,396,094.53	820,039	792,743	2,082,570	38.85	53,605
1994	3,854,557.84	1,247,489	1,205,964	3,419,505	39.26	87,099
1995	3,082,427.32	933,975	902,886	2,796,027	39.97	69,953
1996	3,560,973.36	1,004,194	970,768	3,302,400	40.69	81,160
1997	4,276,861.35	1,115,748	1,078,608	4,053,626	41.41	97,890
1998	3,516,801.19	846,564	818,385	3,401,776	41.85	81,285
1999	2,630,140.44	575,685	556,522	2,599,647	42.58	61,053
2000	3,339,785.16	660,877	638,878	3,368,864	43.05	78,255
2001	6,813,455.97	1,196,170	1,156,353	7,019,794	43.78	160,342
2002	11,178,538.09	1,718,365	1,661,166	11,753,080	44.26	265,546
2003	10,271,564.26	1,349,684	1,304,757	11,021,120	44.75	246,282
2004	15,477,732.97	1,688,311	1,632,113	16,941,167	45.00	376,470
2005	10,748,535.56	920,935	890,280	12,007,963	45.52	263,795
2006	9,969,661.51	622,107	601,399	11,362,195	45.58	249,280

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2763 MAINS - PLASTIC

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. IOWA 60-R2.5						
NET SALVAGE PERCENT.. -20						
2007	8,866,507.04	340,474	329,141	10,310,667	45.45	226,857
2008	12,643,436.16	171,445	165,738	15,006,385	43.75	343,003
	115,457,749.96	16,606,753	16,053,967	122,495,333		2,802,909
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					43.7	2.43

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2765 MAINS - STEEL - FEEDER LINES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 55-R2.5						
NET SALVAGE PERCENT.. -20						
1910	280.88	335	337			
1917	575.29	670	690			
1924	2,027.03	2,323	2,396	36	3.99	9
1931	545.02	608	627	27	5.83	5
1933	482.94	534	551	29	6.47	4
1941	494.82	529	546	48	8.26	6
1948	58,787.56	60,605	62,505	8,040	9.92	810
1949	2,599.74	2,655	2,738	382	10.43	37
1952	2,217.47	2,210	2,279	382	11.52	33
1953	181,290.46	179,913	185,554	31,995	11.61	2,756
1954	10,565.19	10,364	10,689	1,989	12.17	163
1955	1,268,412.13	1,229,700	1,268,253	253,842	12.72	19,956
1957	103,172.26	98,191	101,269	22,538	13.44	1,677
1958	50,018.88	46,986	48,459	11,564	14.01	825
1959	103,888.28	96,890	99,928	24,738	14.19	1,743
1960	17,556.33	16,144	16,650	4,418	14.79	299
1961	34,149.53	30,952	31,922	9,057	15.39	588
1962	378.20	338	349	105	16.00	7
1963	16,583.27	14,668	15,128	4,772	16.23	294
1965	1,450,381.46	1,241,643	1,280,571	459,887	17.48	26,309
1966	55,642.70	46,827	48,295	18,476	18.10	1,021
1967	151,128.22	125,696	129,637	51,717	18.38	2,814
1968	754,530.17	616,059	635,374	270,062	19.02	14,199
1969	207,404.98	166,156	171,365	77,521	19.67	3,941
1970	473,297.22	371,728	383,382	184,575	20.32	9,083
1971	872,553.68	675,357	696,531	350,533	20.64	16,983
1972	698,029.84	528,967	545,551	292,085	21.30	13,713
1973	25,412.14	18,836	19,427	11,068	21.97	504
1974	1,049,518.39	760,439	784,280	475,142	22.64	20,987
1975	625,756.86	445,289	459,250	291,658	22.99	12,686
1976	13,686.47	9,501	9,799	6,625	23.68	280
1977	329,108.36	222,701	229,683	165,247	24.36	6,784
1978	297,173.39	195,778	201,916	154,692	25.06	6,173
1979	168,226.15	108,385	111,783	90,088	25.45	3,540
1980	157,817.66	98,781	101,878	87,503	26.14	3,347
1982	304,506.14	179,159	184,776	180,631	27.55	6,556
1983	6,359.69	3,620	3,733	3,899	28.26	138

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2765 MAINS - STEEL - FEEDER LINES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 55-R2.5						
NET SALVAGE PERCENT.. -20						
1984	85,903.13	47,480	48,969	54,115	28.69	1,886
1985	61,378.46	32,717	33,743	39,911	29.41	1,357
1986	543,546.90	278,840	287,582	364,674	30.13	12,103
1987	291,365.54	144,331	148,856	200,783	30.58	6,566
1988	241,711.23	114,774	118,372	171,681	31.31	5,483
1989	2,975,315.65	1,350,674	1,393,021	2,177,358	32.05	67,936
1990	14,881.18	6,443	6,645	11,212	32.78	342
1991	1,509,182.77	624,439	644,016	1,167,003	33.26	35,087
1992	829,086.79	325,035	335,226	659,678	34.01	19,397
1993	322,475.21	119,380	123,123	263,847	34.75	7,593
1994	416,165.13	145,575	150,139	349,259	35.25	9,908
1995	12,293.53	4,023	4,149	10,603	36.00	295
1996	22,720.37	6,952	7,170	20,094	36.52	550
1997	46,408.75	13,132	13,544	42,147	37.28	1,131
1998	50,313.62	13,126	13,538	46,838	37.81	1,239
1999	402,825.52	95,518	98,513	384,878	38.58	9,976
2000	492,608.82	105,517	108,825	482,306	39.12	12,329
2001	39,174.95	7,475	7,709	39,301	39.67	991
2002	137,974.83	23,031	23,753	141,817	40.23	3,525
2003	1,353,379.73	192,938	198,987	1,425,069	40.80	34,928
2004	27,767.86	3,285	3,388	29,933	41.16	727
2005	315,688.70	29,435	30,358	348,468	41.55	8,387
2006	992,081.04	67,263	69,372	1,121,125	41.75	26,853
2007	1,363,831.72	56,954	58,739	1,577,859	41.60	37,929
2008	1,742,342.91	25,717	26,523	2,064,288	40.31	51,210
	23,784,983.14	11,443,591	11,802,361	16,739,618		535,998
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					31.2	2.25

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2780 MEASURING & REGULATING - GENERAL - SYSTEM
EXCLUDING ELECTRONIC EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 40-R1.5						
NET SALVAGE PERCENT.. -15						
1935	551.98	616	635			
1947	38.20	41	44			
1949	5,140.75	5,417	5,912			
1953	6,318.91	6,494	7,267			
1955	4,215.97	4,280	4,848			
1956	3,666.39	3,697	4,216			
1957	2,466.84	2,469	2,837			
1958	950.62	944	1,093			
1959	16,126.69	15,883	18,546			
1960	777.63	759	894			
1961	14,423.75	13,947	16,587			
1963	2,407.00	2,292	2,768			
1965	6,794.54	6,322	7,642	172	10.26	17
1966	573.66	527	637	23	10.69	2
1968	9,868.62	8,871	10,724	625	11.31	55
1969	10,808.68	9,575	11,575	855	11.78	73
1970	11,399.90	9,944	12,021	1,089	12.26	89
1971	143,726.16	123,964	149,855	15,430	12.50	1,234
1972	104,820.96	88,877	107,439	13,105	13.00	1,008
1973	24,099.46	20,171	24,384	3,330	13.28	251
1974	24,300.67	19,959	24,128	3,818	13.81	276
1975	19,958.63	16,071	19,428	3,524	14.34	246
1976	16,271.59	12,893	15,586	3,126	14.67	213
1977	6,663.34	5,166	6,245	1,418	15.23	93
1978	35,146.27	26,753	32,340	8,078	15.58	518
1979	102,232.20	76,301	92,237	25,330	15.95	1,588
1980	62,660.23	45,592	55,114	16,945	16.55	1,024
1981	15,708.74	11,179	13,514	4,551	16.94	269
1982	31,839.46	22,028	26,629	9,986	17.55	569
1983	12,135.23	8,185	9,894	4,062	17.98	226
1984	104,987.92	68,928	83,324	37,412	18.42	2,031
1985	32,413.91	20,673	24,991	12,285	18.87	651
1986	168,441.53	104,176	125,934	67,774	19.34	3,504
1987	17,871.30	10,693	12,926	7,626	19.82	385
1988	91,972.57	53,127	64,223	41,545	20.31	2,046
1989	130,358.56	72,498	87,639	62,273	20.82	2,991

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2780 MEASURING & REGULATING - GENERAL - SYSTEM
EXCLUDING ELECTRONIC EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 40-R1.5						
NET SALVAGE PERCENT.. -15						
1990	8,312.92	4,440	5,367	4,193	21.34	196
1991	98,325.65	50,262	60,759	52,315	21.87	2,392
1992	39,710.09	19,440	23,500	22,167	22.26	996
1993	51,130.83	23,791	28,760	30,040	22.81	1,317
1994	26,094.62	11,532	13,941	16,068	23.23	692
1995	21,534.86	8,995	10,874	13,891	23.67	587
1997	23,285.48	8,561	10,349	16,429	24.47	671
1998	76,364.82	26,100	31,551	56,269	24.83	2,266
1999	46,330.76	14,578	17,623	35,657	25.22	1,414
2000	708,154.11	202,861	245,229	569,148	25.63	22,206
2001	87,520.20	22,646	27,376	73,272	25.83	2,837
2002	52,988.25	12,163	14,703	46,233	26.07	1,773
2003	135,076.69	26,920	32,542	122,796	26.24	4,680
2004	79,222.14	13,329	16,113	74,992	26.27	2,855
2005	131,278.90	17,754	21,462	129,509	26.26	4,932
2006	309,856.07	31,357	37,906	318,428	25.91	12,290
2007	340,100.24	22,059	26,667	364,448	25.10	14,520
2008	45,298.36	1,136	1,373	50,720	22.49	2,255
	3,522,723.85	1,417,236	1,710,171	2,340,957		98,238
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					23.8	2.79

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2781 MEASURING & REGULATING - GENERAL - SYSTEM
ELECTRONIC EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 20-S1.5						
NET SALVAGE PERCENT.. -15						
1976	9,321.74	10,139	10,720			
1986	135,429.25	130,357	145,877	9,867	4.38	2,253
1987	31,052.72	29,329	32,821	2,890	4.68	618
1988	27,683.04	25,583	28,629	3,206	5.01	640
1994	54,049.86	41,639	46,596	15,561	7.15	2,176
1995	3,799.69	2,796	3,129	1,241	7.60	163
1996	28,084.62	19,663	22,004	10,293	8.03	1,282
1997	28,631.08	18,932	21,186	11,740	8.50	1,381
1998	13,128.47	8,117	9,083	6,015	9.03	666
2002	6,270.87	2,621	2,933	4,279	11.39	376
2003	19,539.19	7,044	7,883	14,587	12.04	1,212
2004	11,995.27	3,595	4,023	9,772	12.77	765
2005	57,526.67	13,595	15,213	50,943	13.53	3,765
2006	99,210.95	16,943	18,960	95,133	14.34	6,634
2007	73,922.63	7,642	8,552	76,459	15.19	5,034
2008	28,347.51	981	1,098	31,502	16.11	1,955
	627,993.56	338,976	378,707	343,488		28,920
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					11.9	4.61

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2782 MEASURING & REGULATING - GENERAL - DISTRICT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 53-R2						
NET SALVAGE PERCENT.. -25						
1909	1,324.10	1,655	1,655			
1910	790.42	988	988			
1930	683.94	799	855			
1937	2,128.52	2,416	2,661			
1938	1,351.39	1,524	1,689			
1939	1.99	2	2			
1948	1,403.07	1,496	1,754			
1949	1,423.51	1,503	1,779			
1952	15,020.07	15,488	18,775			
1953	12,006.48	12,245	15,008			
1955	4,216.45	4,230	5,271			
1959	2,520.47	2,433	3,151			
1960	2,832.87	2,697	3,541			
1961	4,752.05	4,458	5,940			
1963	2,049.31	1,877	2,562			
1964	4,478.32	4,036	5,598			
1965	2,336.22	2,083	2,920			
1966	6,971.70	6,112	8,715			
1969	172.23	145	215			
1970	8,163.68	6,719	10,205			
1971	4,561.64	3,678	5,693	9	20.64	
1972	1,878.25	1,491	2,308	40	20.97	2
1973	26,665.90	20,709	32,054	1,278	21.64	59
1974	10,564.00	8,064	12,482	723	21.99	33
1975	21,000.40	15,653	24,228	2,023	22.68	89
1976	18,501.10	13,529	20,940	2,186	23.06	95
1977	2,257.00	1,609	2,490	331	23.75	14
1978	50,274.91	35,079	54,296	8,548	24.14	354
1979	20,187.49	13,697	21,200	4,034	24.85	162
1980	24,713.69	16,376	25,347	5,545	25.26	220
1981	31,356.29	20,158	31,201	7,994	25.97	308
1982	11,678.95	7,312	11,318	3,281	26.41	124
1983	10,848.54	6,570	10,169	3,392	27.13	125
1984	17,235.44	10,134	15,685	5,859	27.58	212
1985	21,620.50	12,321	19,071	7,955	28.05	284
1986	19,391.30	10,636	16,462	7,777	28.78	270
1989	44,358.02	21,735	33,642	21,806	30.25	721

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2782 MEASURING & REGULATING - GENERAL - DISTRICT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 53-R2						
NET SALVAGE PERCENT.. -25						
1990	24,859.96	11,613	17,975	13,100	31.00	423
1992	13,666.49	5,807	8,988	8,095	32.04	253
1996	11,583.38	3,873	5,995	8,484	34.23	248
2003	44,747.25	7,199	11,143	44,791	37.24	1,203
2004	26,197.41	3,524	5,454	27,293	37.34	731
2005	36,565.03	3,903	6,041	39,665	37.48	1,058
2007	125,470.12	6,148	9,516	147,322	36.81	4,002
2008	165,982.93	2,967	4,592	202,887	34.59	5,865
	860,792.78	336,691	501,574	574,418		16,855
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					34.1	1.96

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2801 SERVICES - CAST IRON, COPPER AND VALVES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-R1.5						
NET SALVAGE PERCENT.. -25						
1935	108.87	136	136			
1936	99.29	124	124			
1937	3,988.66	4,986	4,986			
1938	1,953.29	2,442	2,442			
1939	953.16	1,191	1,191			
1940	3,933.40	4,884	4,917			
1941	369.96	456	462			
1946	520.96	627	651			
1947	3,269.25	3,921	4,087			
1948	8,004.06	9,564	10,005			
1949	9,054.80	10,775	11,319			
1950	9,444.73	11,188	11,801	5	3.23	2
1951	3,626.75	4,275	4,509	24	3.48	7
1952	3,424.30	4,015	4,235	45	3.74	12
1953	8,195.37	9,552	10,075	169	4.02	42
1954	11,712.76	13,565	14,308	333	4.32	77
1955	5,711.41	6,608	6,970	169	4.30	39
1956	12,987.46	14,916	15,733	501	4.64	108
1957	12,533.40	14,282	15,064	603	4.99	121
1958	25,774.07	29,125	30,719	1,499	5.36	280
1959	61,296.46	69,027	72,806	3,815	5.45	700
1960	73,717.28	82,232	86,734	5,413	5.85	925
1961	102,169.55	113,447	119,658	8,054	5.97	1,349
1962	85,932.52	94,408	99,576	7,840	6.41	1,223
1963	111,693.68	121,969	128,646	10,971	6.58	1,667
1964	120,393.73	130,597	137,747	12,745	6.78	1,880
1965	129,228.46	138,436	146,015	15,521	7.26	2,138
1966	103,835.93	110,326	116,366	13,429	7.50	1,791
1967	128,923.56	135,773	143,206	17,948	7.76	2,313
1968	111,912.74	116,711	123,101	16,790	8.04	2,088
1969	171,723.51	176,360	186,015	28,639	8.58	3,338
1970	143,070.96	145,289	153,243	25,596	8.89	2,879
1971	111,073.18	111,420	117,520	21,321	9.23	2,310
1972	39,305.96	38,918	41,049	8,083	9.58	844
1973	11,554.75	11,280	11,897	2,546	9.95	256
1974	2,869.36	2,760	2,911	676	10.34	65
1975	2,974.24	2,815	2,969	749	10.75	70

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2801 SERVICES - CAST IRON, COPPER AND VALVES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-R1.5						
NET SALVAGE PERCENT.. -25						
1976	488.56	455	480	131	11.17	12
1977	5,243.72	4,790	5,052	1,503	11.60	130
1978	9,482.39	8,532	8,999	2,854	11.87	240
1980	7,111.09	6,131	6,467	2,422	12.82	189
1981	5,626.67	4,739	4,998	2,035	13.31	153
1982	1,848.80	1,525	1,608	703	13.66	51
1983	2,214.57	1,779	1,876	892	14.18	63
1984	2,067.74	1,615	1,703	882	14.71	60
1985	1,596.18	1,214	1,281	714	15.11	47
1986	1,436.93	1,059	1,117	679	15.67	43
1987	1,365.30	976	1,029	678	16.09	42
1988	2,132.49	1,475	1,556	1,110	16.54	67
1989	4,017.71	2,674	2,820	2,202	17.13	129
1990	4,389.31	2,812	2,966	2,521	17.60	143
1993	999.46	562	593	656	18.98	35
1998	1,996.68	826	871	1,625	21.24	77
1999	1,021.27	389	410	867	21.65	40
2003	356.81	87	92	354	22.83	16
2006	2,128.22	263	277	2,383	22.82	104
2007	71,323.84	5,661	5,971	83,184	22.14	3,757
2008	931,703.47	28,533	30,097	1,134,532	19.91	56,983
	2,695,893.03	1,824,497	1,923,456	1,446,411		88,905
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					16.3	3.30

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2802 SERVICES - STEEL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-R1.5						
NET SALVAGE PERCENT.. -25						
1930	8,244.78	10,306	10,306			
1931	77.96	97	97			
1932	94.70	118	118			
1933	93.44	116	117			
1934	243.63	302	305			
1935	1,489.09	1,833	1,861			
1936	842.15	1,038	1,053			
1937	878.15	1,075	1,098			
1938	162.72	198	203			
1939	1,009.24	1,219	1,262			
1940	1,178.29	1,423	1,473			
1941	433.64	520	539	3	2.92	1
1942	572.86	686	712	4	2.94	1
1943	348.33	416	432	3	2.99	1
1944	68.36	81	84	1	3.52	
1948	153.92	179	186	6	4.44	1
1951	730.21	840	871	42	5.00	8
1952	2,671.31	3,056	3,170	169	5.23	32
1953	915.68	1,042	1,081	64	5.48	12
1954	1,756.13	1,986	2,060	135	5.74	24
1955	3,073.24	3,453	3,582	260	6.02	43
1956	8,780.61	9,796	10,162	814	6.32	129
1957	12,578.47	13,928	14,449	1,274	6.64	192
1958	16,744.13	18,391	19,079	1,851	6.97	266
1959	14,784.09	16,192	16,798	1,682	6.99	241
1960	18,271.23	19,829	20,571	2,268	7.36	308
1961	10,410.90	11,189	11,608	1,406	7.75	181
1962	2,425.09	2,580	2,677	354	8.14	43
1963	2,318.58	2,453	2,545	353	8.26	43
1964	5,730.95	5,993	6,217	947	8.69	109
1965	39,298.00	40,816	42,343	6,780	8.85	766
1966	14,979.83	15,360	15,935	2,790	9.31	300
1967	13,338.08	13,493	13,998	2,675	9.78	274
1968	10,480.31	10,505	10,898	2,202	10.01	220
1969	28,270.55	27,917	28,961	6,377	10.50	607
1970	15,608.87	15,250	15,820	3,691	10.76	343
1971	15,243.84	14,649	15,197	3,858	11.28	342

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2802 SERVICES - STEEL

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-R1.5						
NET SALVAGE PERCENT.. -25						
1972	17,458.25	16,568	17,188	4,635	11.58	400
1973	4,039.49	3,782	3,923	1,126	11.89	95
1974	3,355.56	3,083	3,198	996	12.45	80
1975	2,342.66	2,119	2,198	730	12.80	57
1976	5,739.15	5,106	5,297	1,877	13.16	143
1977	4,579.66	3,985	4,134	1,591	13.75	116
1978	7,300.44	6,235	6,468	2,658	14.14	188
1979	45,075.30	37,734	39,145	17,199	14.55	1,182
1980	60,606.42	49,659	51,517	24,241	14.98	1,618
1981	47,010.68	37,656	39,065	19,698	15.42	1,277
1982	36,651.71	28,533	29,600	16,215	16.05	1,010
1983	41,016.40	31,116	32,280	18,991	16.52	1,150
1984	65,943.18	48,674	50,495	31,934	16.99	1,880
1985	73,867.56	52,945	54,925	37,409	17.48	2,140
1986	88,458.41	61,700	64,008	46,565	17.82	2,613
1987	100,536.05	67,824	70,361	55,309	18.34	3,016
1988	97,972.25	63,768	66,153	56,312	18.87	2,984
1989	218,493.65	136,886	142,006	131,111	19.41	6,755
1990	238,117.54	143,734	149,111	148,536	19.81	7,498
1991	274,124.69	158,307	164,229	178,427	20.38	8,755
1992	129,494.95	71,578	74,255	87,614	20.81	4,210
1993	281,060.00	148,119	153,660	197,665	21.26	9,298
1994	147,721.19	73,898	76,662	107,989	21.73	4,970
1995	111,689.80	52,773	54,747	84,865	22.21	3,821
1996	106,895.11	47,608	49,389	84,230	22.59	3,729
1997	110,475.32	45,902	47,619	90,475	23.10	3,917
1998	87,899.98	34,039	35,312	74,563	23.40	3,186
1999	75,282.61	26,819	27,822	66,281	23.83	2,781
2000	50,966.23	16,570	17,190	46,518	24.18	1,924
2001	3,214.79	944	979	3,039	24.45	124
2003	1,070.42	242	251	1,087	24.89	44
2005	311.18	48	50	339	24.91	14
2006	656,184.70	75,461	78,284	741,947	24.67	30,075
2008	239,858.39	6,836	7,092	292,731	21.48	13,628
	3,689,115.08	1,828,576	1,896,481	2,714,912		129,165

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT.. 21.0 3.50

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2803 SERVICES - PLASTIC

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

SURVIVOR CURVE.. IOWA 42-R1.5
NET SALVAGE PERCENT.. -25

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
1965	5,744.92	5,685	5,899	1,282	11.45	112
1966	884.05	864	897	208	11.85	18
1967	1,470.39	1,419	1,472	366	12.26	30
1968	14,352.85	13,660	14,174	3,767	12.69	297
1969	14,338.48	13,451	13,957	3,966	13.13	302
1970	24,563.08	22,696	23,550	7,154	13.58	527
1971	90,616.54	82,404	85,506	27,765	14.05	1,976
1972	236,888.78	212,933	220,949	75,162	14.26	5,271
1973	200,703.48	177,246	183,918	66,961	14.75	4,540
1974	167,878.05	145,529	151,007	58,841	15.25	3,858
1975	186,691.04	158,711	164,685	68,679	15.76	4,358
1976	127,061.33	106,334	110,337	48,490	16.04	3,023
1977	170,873.76	139,946	145,214	68,378	16.58	4,124
1978	148,984.24	119,281	123,771	62,459	17.12	3,648
1979	409,853.93	321,940	334,059	178,258	17.45	10,215
1980	576,771.58	441,807	458,438	262,526	18.01	14,577
1981	469,535.40	350,273	363,459	223,460	18.58	12,027
1982	458,282.28	333,973	346,545	226,308	18.95	11,942
1983	331,279.64	234,422	243,247	170,853	19.55	8,739
1984	334,494.88	230,509	239,186	178,933	19.94	8,974
1985	462,335.78	309,649	321,305	256,615	20.36	12,604
1986	566,558.68	366,493	380,289	327,909	20.98	15,630
1987	840,993.04	526,672	546,498	504,743	21.42	23,564
1988	1,051,645.15	635,982	659,923	654,633	21.87	29,933
1989	1,459,704.30	850,460	882,475	942,155	22.34	42,173
1990	2,149,938.34	1,203,159	1,248,451	1,438,972	22.82	63,057
1991	2,042,952.68	1,095,023	1,136,244	1,417,447	23.31	60,809
1992	1,751,322.52	895,801	929,522	1,259,631	23.82	52,881
1993	2,049,230.81	996,695	1,034,214	1,527,325	24.34	62,750
1994	2,112,657.64	976,576	1,013,338	1,627,484	24.71	65,863
1995	1,673,390.05	731,481	759,017	1,332,721	25.11	53,075
1996	1,572,275.18	646,205	670,531	1,294,813	25.52	50,737
1997	2,024,295.74	777,077	806,329	1,724,041	25.95	66,437
1998	2,566,636.33	913,081	947,453	2,260,842	26.40	85,638
1999	1,957,989.09	641,731	665,888	1,781,598	26.73	66,652
2000	768,973.33	230,404	239,077	722,140	26.96	26,786
2001	769,139.62	207,668	215,485	745,940	27.22	27,404

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2803 SERVICES - PLASTIC

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 42-R1.5						
NET SALVAGE PERCENT.. -25						
2002	3,320,774.91	793,250	823,111	3,327,858	27.51	120,969
2003	2,206,147.05	458,051	475,294	2,282,390	27.61	82,665
2004	415,226.21	72,665	75,400	443,633	27.65	16,045
2005	223,518.82	31,600	32,790	246,609	27.46	8,981
2006	38,321,551.32	4,038,133	4,190,144	43,711,795	27.17	1,608,826
2007	4,168,375.05	281,365	291,957	4,918,512	26.28	187,158
2008	3,528,287.21	91,735	95,188	4,315,171	23.54	183,312
	81,975,187.55	20,884,039	21,670,193	80,798,793		3,112,507
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					26.0	3.80

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2810 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. IOWA 37-R3						
NET SALVAGE PERCENT.. 0						
1904	978.82	979	979			
1905	205.40	205	205			
1908	104.98	105	105			
1909	222.55	223	223			
1910	386.18	386	386			
1911	279.35	279	279			
1913	64.45	64	64			
1914	5.43	5	5			
1916	1,353.74	1,354	1,354			
1917	45.37	45	45			
1919	24.23	24	24			
1920	184.39	184	184			
1922	9.06	9	9			
1924	365.11	365	365			
1925	62.65	63	63			
1926	283.40	283	283			
1928	118.88	119	119			
1929	1,012.98	1,013	1,013			
1930	883.01	883	883			
1931	1,058.04	1,058	1,058			
1932	101.52	102	102			
1933	557.39	557	557			
1934	1,417.97	1,418	1,418			
1935	4,304.39	4,304	4,304			
1936	1,070.55	1,071	1,071			
1937	5,473.81	5,474	5,474			
1938	2,906.16	2,906	2,906			
1939	5,026.14	5,026	5,026			
1940	2,642.63	2,643	2,643			
1942	615.55	616	616			
1943	171.81	172	172			
1946	157.91	158	158			
1947	1,100.23	1,096	749	351	0.23	351
1949	2,131.82	2,106	1,440	692	0.74	692
1950	438.15	431	295	143	1.02	140
1952	3,580.68	3,500	2,393	1,188	1.30	914
1953	2,299.59	2,234	1,527	773	1.64	471

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2810 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 37-R3						
NET SALVAGE PERCENT.. 0						
1954	2,235.22	2,156	1,474	761	1.99	382
1956	8,411.70	8,037	5,494	2,918	2.45	1,191
1957	7,979.02	7,602	5,197	2,782	2.55	1,091
1958	5,998.43	5,665	3,872	2,126	2.97	716
1959	5,944.24	5,591	3,822	2,122	3.13	678
1960	1,656.43	1,551	1,060	596	3.31	180
1961	4,636.00	4,316	2,950	1,686	3.52	479
1962	13,234.83	12,248	8,372	4,863	3.75	1,297
1963	7,844.86	7,210	4,929	2,916	4.00	729
1964	4,245.25	3,873	2,647	1,598	4.28	373
1965	39,722.78	35,941	24,568	15,155	4.58	3,309
1966	11,751.30	10,539	7,204	4,547	4.89	930
1967	17,179.76	15,257	10,429	6,751	5.23	1,291
1968	31,957.13	28,087	19,200	12,757	5.58	2,286
1969	48,358.71	42,024	28,727	19,632	5.95	3,299
1970	42,611.07	36,586	25,009	17,602	6.34	2,776
1971	66,303.01	56,192	38,412	27,891	6.75	4,132
1972	28,173.81	23,550	16,098	12,076	7.17	1,684
1973	30,947.60	25,488	17,423	13,525	7.60	1,780
1974	16,241.32	13,168	9,001	7,240	8.05	899
1975	651.35	519	355	296	8.52	35
1976	7,625.83	5,973	4,083	3,543	8.99	394
1977	15,295.30	11,756	8,036	7,259	9.48	766
1978	17,183.00	12,892	8,813	8,370	10.15	825
1979	78,562.67	57,712	39,451	39,112	10.66	3,669
1980	142,664.05	102,461	70,040	72,624	11.18	6,496
1981	141,942.13	99,147	67,774	74,168	11.87	6,248
1982	62,058.70	42,268	28,893	33,166	12.41	2,673
1983	87,491.24	58,007	39,652	47,839	12.96	3,691
1984	48,363.22	31,044	21,221	27,142	13.67	1,986
1985	73,832.83	45,983	31,433	42,400	14.23	2,980
1986	88,432.85	53,130	36,318	52,115	14.95	3,486
1987	56,529.55	32,697	22,351	34,179	15.67	2,181
1988	120,325.25	67,093	45,863	74,462	16.26	4,579
1989	346,957.41	185,379	126,721	220,236	17.00	12,955
1990	442,479.55	225,930	154,440	288,040	17.73	16,246
1991	396,728.43	193,722	132,424	264,304	18.34	14,411

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2810 METERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 37-R3						
NET SALVAGE PERCENT.. 0						
1992	122,629.96	56,864	38,871	83,759	19.09	4,388
1993	310,304.05	136,130	93,055	217,249	19.83	10,956
1994	293,695.98	121,385	82,976	210,720	20.59	10,234
1995	213,266.43	82,641	56,491	156,775	21.34	7,347
1996	480,815.51	173,719	118,750	362,066	22.10	16,383
1997	604,809.11	202,430	138,377	466,432	22.86	20,404
1998	579,221.73	178,227	121,832	457,390	23.63	19,356
1999	1,745.30	489	334	1,411	24.40	58
2000	44,131.10	11,143	7,617	36,514	25.17	1,451
	5,214,819.32	2,575,282	1,770,556	3,444,262		206,268
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					16.7	3.96

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2811 METERS - LEASED

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 37-R3						
NET SALVAGE PERCENT.. 0						
1999	499,801.84	140,094	103,702	396,100	24.40	16,234
2000	1,163,679.46	293,829	217,502	946,177	25.17	37,591
2001	201,655.86	45,231	33,481	168,175	25.94	6,483
2002	286,827.74	56,132	41,551	245,277	26.72	9,180
2003	330,468.17	54,891	40,632	289,836	27.61	10,498
2004	1,174,386.11	160,656	118,923	1,055,463	28.39	37,177
2005	173,007.23	18,529	13,716	159,291	29.18	5,459
2006	391,299.66	30,247	22,390	368,910	29.86	12,355
2007	541,405.90	25,338	18,756	522,650	30.55	17,108
2008	767,658.59	12,206	9,035	758,624	30.95	24,511
	5,530,190.56	837,153	619,688	4,910,503		176,596
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					27.8	3.19

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2820 METER INSTALLATIONS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 39-S2.5						
NET SALVAGE PERCENT.. 0						
1937	1,018.35	1,005	944	74	0.96	74
1938	782.66	767	720	63	1.44	44
1940	270.69	265	249	22	1.43	15
1941	2,494.92	2,425	2,277	218	1.94	112
1942	561.63	545	512	50	1.99	25
1943	815.87	791	743	73	2.07	35
1944	1,923.36	1,849	1,736	187	2.61	72
1945	1,398.09	1,341	1,259	139	2.72	51
1946	226.60	217	204	23	2.86	8
1947	533.17	508	477	56	3.01	19
1948	1,354.46	1,287	1,209	145	3.19	45
1949	3,111.06	2,943	2,764	347	3.39	102
1950	1,017.67	959	901	117	3.61	32
1953	809.58	755	709	101	4.02	25
1954	448.83	416	391	58	4.32	13
1955	307.42	285	268	39	4.30	9
1956	14.75	14	13	2	4.64	
1957	22.45	21	20	2	4.68	
1960	6,182.60	5,548	5,210	973	5.55	175
1961	3,187.47	2,846	2,673	514	5.69	90
1962	4,704.80	4,179	3,924	781	5.85	134
1963	12,967.83	11,447	10,750	2,218	6.05	367
1964	6,197.98	5,406	5,077	1,121	6.52	172
1965	8,492.18	7,352	6,904	1,588	6.75	235
1966	14,363.80	12,331	11,580	2,784	7.00	398
1967	14,697.50	12,505	11,743	2,955	7.28	406
1968	18,291.73	15,409	14,470	3,822	7.58	504
1969	26,889.26	22,412	21,047	5,842	7.89	740
1970	20,570.50	16,948	15,915	4,656	8.23	566
1971	19,705.26	16,036	15,059	4,646	8.58	541
1972	26,085.20	21,043	19,761	6,324	8.75	723
1973	30,024.12	23,875	22,420	7,604	9.14	832
1974	9,264.28	7,256	6,814	2,450	9.55	257
1975	3,338.90	2,573	2,416	923	9.98	92
1977	2,267.12	1,685	1,582	685	10.87	63
1978	3,980.28	2,902	2,725	1,255	11.34	111
1979	23,262.25	16,607	15,595	7,667	11.82	649

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2820 METER INSTALLATIONS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 39-S2.5						
NET SALVAGE PERCENT.. 0						
1980	47,092.87	32,885	30,881	16,212	12.31	1,317
1981	37,124.39	25,319	23,776	13,348	12.82	1,041
1982	27,788.62	18,485	17,359	10,430	13.34	782
1983	23,710.54	15,357	14,421	9,290	13.87	670
1984	31,546.88	19,865	18,655	12,892	14.41	895
1985	45,613.85	27,765	26,073	19,541	15.11	1,293
1986	42,270.07	24,918	23,400	18,870	15.67	1,204
1987	74,118.56	42,070	39,507	34,612	16.38	2,113
1988	94,859.93	51,926	48,762	46,098	16.95	2,720
1989	69,595.99	36,510	34,286	35,310	17.67	1,998
1990	184,343.24	92,430	86,799	97,544	18.40	5,301
1991	151,877.25	72,294	67,890	83,987	19.26	4,361
1992	71,300.40	32,235	30,271	41,029	20.00	2,051
1993	253,813.60	108,581	101,966	151,848	20.73	7,325
1994	283,878.19	114,034	107,086	176,792	21.60	8,185
1995	349,569.78	131,194	123,201	226,369	22.47	10,074
1996	649,484.44	226,540	212,738	436,746	23.34	18,712
1997	954,176.47	307,245	288,527	665,649	24.21	27,495
1998	504,167.75	148,780	139,715	364,453	25.09	14,526
1999	134.30	36	34	100	26.09	4
2004	422.51	54	51	372	30.83	12
2008	118,864.68	1,688	1,585	117,280	34.83	3,367
	4,287,338.93	1,754,964	1,648,044	2,639,296		123,182
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					21.4	2.87

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2821 METER INSTALLATIONS - LEASED

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 39-S2.5						
NET SALVAGE PERCENT.. 0						
1999	765,507.29	204,390	156,362	609,145	26.09	23,348
2000	1,137,757.77	272,721	208,636	929,122	26.96	34,463
2001	72,012.01	15,231	11,652	60,360	27.96	2,159
2002	29,205.99	5,374	4,111	25,095	28.83	870
2003	295,391.59	45,992	35,185	260,207	29.83	8,723
2004	276,065.86	35,171	26,906	249,160	30.83	8,082
2005	466,657.36	46,246	35,379	431,278	31.83	13,549
2006	951,690.49	67,380	51,547	900,143	32.83	27,418
2007	459,243.77	19,518	14,932	444,312	33.83	13,134
2008	118,864.70	1,688	1,291	117,574	34.83	3,376
	4,572,396.83	713,711	546,001	4,026,396		135,122
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					29.8	2.96

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2830 HOUSE REGULATORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 43-R2.5						
NET SALVAGE PERCENT.. 0						
1926	21.13	21	21			
1927	3.20	3	3			
1929	4,090.71	4,091	4,091			
1930	210.99	210	176	35	0.24	35
1931	214.25	213	178	36	0.63	36
1932	13.55	13	11	3	1.02	3
1935	35.25	34	28	7	1.68	4
1936	169.10	164	137	32	2.13	15
1937	299.27	291	243	56	2.03	28
1938	503.33	486	406	97	2.49	39
1939	325.13	314	262	63	2.44	26
1940	139.15	133	111	28	2.93	10
1941	471.74	452	378	94	2.92	32
1942	327.90	312	261	67	3.43	20
1943	42.85	41	34	9	3.46	3
1945	5.52	5	4	2	4.07	
1946	686.60	644	538	149	4.17	36
1947	828.72	775	648	181	4.29	42
1948	2,779.78	2,590	2,165	615	4.44	139
1949	4,546.24	4,220	3,527	1,019	4.60	222
1950	7,236.11	6,688	5,590	1,646	4.79	344
1951	10,576.43	9,730	8,132	2,444	5.00	489
1952	5,261.09	4,815	4,024	1,237	5.23	237
1953	5,299.47	4,824	4,032	1,267	5.48	231
1954	4,382.49	3,965	3,314	1,068	5.74	186
1955	6,061.27	5,448	4,553	1,508	6.02	250
1956	5,907.70	5,273	4,407	1,501	6.32	238
1957	2,889.36	2,559	2,139	750	6.64	113
1958	8,696.80	7,642	6,387	2,310	6.97	331
1959	7,162.93	6,276	5,245	1,918	6.99	274
1960	6,047.15	5,250	4,388	1,659	7.36	225
1961	6,390.04	5,494	4,592	1,798	7.75	232
1962	10,018.13	8,525	7,125	2,893	8.14	355
1963	10,557.69	8,887	7,427	3,131	8.55	366
1964	13,506.13	11,299	9,443	4,063	8.69	468
1965	7,931.76	6,556	5,479	2,453	9.13	269
1966	15,030.11	12,265	10,250	4,780	9.58	499

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2830 HOUSE REGULATORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 43-R2.5						
NET SALVAGE PERCENT.. 0						
1967	9,903.57	7,973	6,663	3,241	10.05	322
1968	8,990.11	7,136	5,964	3,026	10.52	288
1969	19,524.50	15,270	12,762	6,763	11.01	614
1970	20,555.15	15,908	13,295	7,260	11.25	645
1971	21,829.60	16,619	13,889	7,941	11.76	675
1972	13,527.35	10,123	8,460	5,067	12.28	413
1973	7,710.11	5,666	4,735	2,975	12.81	232
1974	9,506.23	6,855	5,729	3,777	13.34	283
1975	1,393.63	985	823	571	13.89	41
1976	1,018.32	705	589	429	14.45	30
1977	753.01	510	426	327	15.01	22
1978	4,054.31	2,684	2,243	1,811	15.58	116
1979	24,554.24	15,864	13,258	11,296	16.16	699
1980	75,103.07	47,307	39,537	35,566	16.75	2,123
1981	19,076.59	11,700	9,778	9,299	17.34	536
1982	6,029.97	3,596	3,005	3,025	17.94	169
1983	16,639.13	9,632	8,050	8,589	18.55	463
1984	9,829.07	5,515	4,609	5,220	19.17	272
1985	12,307.18	6,682	5,585	6,722	19.79	340
1986	45,826.84	24,027	20,081	25,746	20.42	1,261
1987	44,998.50	22,738	19,003	25,996	21.05	1,235
1988	54,922.57	26,687	22,304	32,619	21.69	1,504
1989	120,324.93	56,083	46,872	73,453	22.34	3,288
1990	85,190.32	37,986	31,747	53,443	22.99	2,325
1991	71,843.71	30,677	25,638	46,206	23.48	1,968
1992	39,960.72	16,220	13,556	26,405	24.15	1,093
1993	53,085.43	20,406	17,054	36,031	24.82	1,452
1994	109,838.18	39,816	33,276	76,562	25.50	3,002
1995	99,894.90	33,984	28,402	71,493	26.18	2,731
1996	60,709.68	19,275	16,109	44,601	26.87	1,660
1997	96,589.37	28,436	23,766	72,823	27.56	2,642
1998	182,708.66	49,697	41,535	141,174	28.11	5,022
1999	212,445.70	52,687	44,033	168,413	28.81	5,846
2004	463,094.83	57,516	48,069	415,026	31.73	13,080
2008	119.16	2	2	117	31.76	4
	2,172,527.71	837,475	700,596	1,471,932		62,193
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					23.7	2.86

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2831 HOUSE REGULATORS - LEASED

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. IOWA 43-R2.5						
NET SALVAGE PERCENT.. 0						
2004	1,012,230.79	125,719	119,013	893,218	31.73	28,151
2005	541,960.53	53,112	50,279	491,682	32.21	15,265
2006	394,784.93	28,148	26,647	368,138	32.59	11,296
2007	545,470.81	24,001	22,721	522,750	32.63	16,021
2008	697,724.16	10,815	10,238	687,486	31.76	21,646
	3,192,171.22	241,795	228,898	2,963,274		92,379
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					32.1	2.89

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2840 HOUSE REGULATOR INSTALLATIONS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 48-R2						
NET SALVAGE PERCENT.. 0						
1937	279.72	262	280			
1938	580.16	544	580			
1939	404.04	376	404			
1940	207.20	192	207			
1941	279.72	257	280			
1942	450.66	414	451			
1943	10.36	9	10			
1946	1,113.85	1,002	1,114			
1947	2,115.82	1,887	2,116			
1948	1,777.05	1,581	1,777			
1949	2,542.42	2,239	2,542			
1950	2,737.62	2,402	2,738			
1951	3,349.98	2,909	3,320	30	8.72	3
1952	5,749.72	4,971	5,673	77	8.86	9
1953	4,248.15	3,631	4,144	104	9.44	11
1954	5,746.17	4,885	5,575	171	9.60	18
1955	5,754.15	4,833	5,515	239	10.19	23
1956	5,463.62	4,561	5,205	259	10.39	25
1957	3,974.00	3,295	3,760	214	10.61	20
1958	14,567.32	11,918	13,600	967	11.23	86
1959	15,937.62	12,938	14,764	1,174	11.48	102
1960	3,801.55	3,061	3,493	309	11.74	26
1961	1,733.03	1,375	1,569	164	12.38	13
1962	9,379.48	7,371	8,412	967	12.67	76
1963	2,565.74	1,996	2,278	288	12.98	22
1964	4,045.32	3,096	3,533	512	13.64	38
1965	1,524.47	1,154	1,317	207	13.97	15
1966	3,810.53	2,850	3,252	559	14.32	39
1967	3,495.84	2,568	2,931	565	14.99	38
1968	2,529.49	1,834	2,093	436	15.36	28
1969	4,559.49	3,260	3,720	839	15.75	53
1970	2,644.82	1,853	2,115	530	16.45	32
1971	5,590.65	3,858	4,403	1,188	16.85	71
1972	4,290.07	2,913	3,324	966	17.26	56
1973	4,010.09	2,676	3,054	956	17.69	54
1974	255.53	167	191	65	18.41	4
1975	895.84	573	654	242	18.85	13

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2840 HOUSE REGULATOR INSTALLATIONS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 48-R2						
NET SALVAGE PERCENT.. 0						
1976	51.59	32	37	15	19.31	1
1977	48.49	30	34	14	19.78	1
1978	92.60	56	64	29	20.26	1
1979	6,689.45	3,907	4,459	2,230	21.01	106
1980	14,921.49	8,505	9,706	5,215	21.50	243
1981	5,334.23	2,963	3,381	1,953	22.00	89
1982	1,198.48	648	739	459	22.52	20
1983	2,927.66	1,538	1,755	1,173	23.04	51
1984	5,274.24	2,688	3,067	2,207	23.58	94
1985	2,429.75	1,199	1,368	1,062	24.12	44
1986	15,646.19	7,463	8,517	7,129	24.67	289
1987	33,874.35	15,514	17,704	16,170	25.45	635
1988	31,678.10	14,027	16,007	15,671	25.80	607
1989	98,092.50	41,699	47,585	50,508	26.37	1,915
1990	44,208.10	17,993	20,533	23,675	26.95	878
1991	34,711.13	13,485	15,389	19,322	27.55	701
1992	90,701.02	33,523	38,255	52,446	28.14	1,864
1993	52,980.28	18,559	21,179	31,801	28.75	1,106
1994	124,271.55	41,271	47,097	77,175	29.17	2,646
1995	120,757.75	37,664	42,981	77,777	29.79	2,611
1996	70,840.36	20,721	23,646	47,194	30.24	1,561
1997	92,249.31	25,036	28,570	63,679	30.87	2,063
1998	118,457.75	29,733	33,930	84,528	31.34	2,697
1999	103,519.68	23,799	27,159	76,361	31.82	2,400
2000	134,278.60	27,970	31,919	102,360	32.31	3,168
2001	82,165.15	15,348	17,515	64,650	32.66	1,979
2008	118,864.70	1,866	2,129	116,736	31.45	3,712
	1,538,685.79	512,948	585,119	953,567		32,357
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					29.5	2.10

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2841 HOUSE REGULATOR INSTALLATIONS - LEASED

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 48-R2						
NET SALVAGE PERCENT.. 0						
1999	344,085.08	79,105	62,011	282,074	31.82	8,865
2004	1,449,088.43	170,268	133,475	1,315,613	33.81	38,912
2005	539,690.40	50,461	39,557	500,133	33.95	14,731
2006	285,473.32	19,641	15,397	270,076	33.86	7,976
2007	715,836.45	30,709	24,072	691,764	33.47	20,668
2008	118,864.70	1,866	1,463	117,402	31.45	3,733
	3,453,038.38	352,050	275,975	3,177,062		94,885
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					33.5	2.75

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2850 INDUSTRIAL MEAS. & REG. STATION EQUIP.

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-R2						
NET SALVAGE PERCENT.. -10						
1952	250.87	265	276			
1953	1,403.07	1,473	1,543			
1954	106.00	111	117			
1955	309.42	322	340			
1959	1,029.10	1,042	1,132			
1962	1,004.94	997	1,105			
1963	743.50	733	818			
1965	2,026.70	1,969	2,229			
1966	536.44	517	590			
1967	1,344.27	1,283	1,479			
1968	553.04	520	608			
1969	37,218.79	34,607	40,941			
1970	1,375.85	1,264	1,513			
1971	4,894.93	4,463	5,384			
1972	2,142.73	1,927	2,357			
1973	157.82	140	173	1	8.55	
1979	1,335.60	1,066	1,321	148	11.15	13
1980	13,904.37	10,855	13,450	1,845	11.66	158
1983	20,354.71	14,789	18,325	4,065	13.11	310
1984	12,728.85	8,988	11,137	2,865	13.67	210
1985	8,568.64	5,870	7,273	2,153	14.23	151
1986	9,813.01	6,534	8,096	2,698	14.67	184
1987	5,535.59	3,561	4,412	1,677	15.26	110
1988	11,789.80	7,312	9,060	3,909	15.86	246
1989	6,120.05	3,663	4,539	2,193	16.34	134
1990	68,931.92	39,558	49,015	26,810	16.96	1,581
1991	25,260.80	13,907	17,232	10,555	17.47	604
1992	16,357.02	8,610	10,669	7,324	17.98	407
1993	21,598.41	10,791	13,371	10,387	18.63	558
1994	16,831.84	7,974	9,880	8,635	19.17	450
1995	17,312.42	7,739	9,589	9,455	19.72	479
1996	10,462.79	4,388	5,437	6,072	20.29	299
1997	7,822.30	3,068	3,802	4,803	20.76	231
1998	19,439.49	7,050	8,735	12,648	21.35	592
1999	38,358.37	12,789	15,847	26,347	21.85	1,206
2000	14,472.84	4,372	5,417	10,503	22.46	468
2001	10,892.69	2,957	3,664	8,318	22.89	363

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2850 INDUSTRIAL MEAS. & REG. STATION EQUIP.

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-R2						
NET SALVAGE PERCENT.. -10						
2002	118.73	28	35	96	23.44	4
2003	3,371.40	696	862	2,847	23.82	120
2004	11,015.52	1,898	2,352	9,765	24.24	403
2005	2,158.71	296	367	2,008	24.59	82
2006	10,031.84	1,013	1,255	9,780	24.75	395
	439,685.18	241,405	295,747	187,907		9,758
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					19.3	2.22

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2851 INDUSTRIAL MEAS. & REG. STATION EQUIP. - COMM.

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. IOWA 20-R2.5						
NET SALVAGE PERCENT.. -10						
1993	29,106.64	22,582	21,439	10,578	6.48	1,632
1995	12,620.37	8,865	8,416	5,466	7.64	715
2007	23,063.81	2,306	2,189	23,181	15.00	1,545
	64,790.82	33,753	32,044	39,225		3,892
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					10.1	6.01

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2870 OTHER EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 15-L3						
NET SALVAGE PERCENT.. 0						
1999	108,083.69	69,206	76,146	31,938	5.34	5,981
	108,083.69	69,206	76,146	31,938		5,981
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					5.3	5.53

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2871 OTHER EQUIPMENT - STREET LIGHTING

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. IOWA 30-S2.5						
NET SALVAGE PERCENT.. 0						
1996	9,616.81	4,292	4,264	5,353	15.51	345
1997	15,626.37	6,452	6,410	9,216	16.35	564
1998	5,168.06	1,959	1,946	3,222	17.20	187
	30,411.24	12,703	12,620	17,791		1,096
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					16.2	3.60

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2910 OFFICE FURNITURE AND EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1987	3,298.66	3,299	3,299			
1990	439.86	407	432	8	1.50	5
1991	1,549.87	1,356	1,439	111	2.50	44
1992	757.64	625	663	95	3.50	27
1994	3,100.88	2,248	2,386	715	5.50	130
2000	13,861.47	5,891	6,251	7,610	11.50	662
	23,008.38	13,826	14,470	8,539		868
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					9.8	3.77

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2921 TRANSPORTATION EQUIPMENT - TRAILERS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 11-R2						
NET SALVAGE PERCENT.. +5						
1995	2,620.51	2,188	2,489			
1996	3,852.04	3,115	3,659			
1997	32,725.30	25,422	31,089			
1998	8,890.83	6,590	8,296	150	2.96	51
1999	26,146.76	18,264	22,991	1,848	3.42	540
2000	3,385.80	2,207	2,778	439	3.89	113
2001	18,536.57	11,094	13,966	3,644	4.40	828
	96,157.81	68,880	85,268	6,081		1,532
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					4.0	1.59

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2940 TOOLS, SHOP AND GARAGE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUT. BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 25-SQUARE						
NET SALVAGE PERCENT.. 0						
1984	30,942.21	30,323	29,716	1,226	0.50	1,226
1985	35,194.82	33,083	32,420	2,775	1.50	1,850
1986	36,427.26	32,785	32,128	4,299	2.50	1,720
1987	29,595.19	25,452	24,942	4,653	3.50	1,329
1988	65,725.50	53,895	52,816	12,910	4.50	2,869
1989	70,750.82	55,186	54,081	16,670	5.50	3,031
1990	155,656.54	115,186	112,879	42,778	6.50	6,581
1991	81,130.64	56,791	55,653	25,478	7.50	3,397
1992	77,467.87	51,129	50,105	27,363	8.50	3,219
1993	106,967.79	66,320	64,992	41,976	9.50	4,419
1994	106,202.42	61,597	60,363	45,839	10.50	4,366
1995	52,706.44	28,461	27,891	24,815	11.50	2,158
1996	61,434.72	30,717	30,102	31,333	12.50	2,507
1997	109,714.40	50,469	49,458	60,256	13.50	4,463
1998	193.10	81	79	114	14.50	8
1999	440,538.41	167,405	164,052	276,486	15.50	17,838
2001	57,006.96	17,102	16,760	40,247	17.50	2,300
2002	42,172.04	10,965	10,745	31,427	18.50	1,699
2003	18,721.21	4,119	4,037	14,684	19.50	753
2004	46,609.77	8,390	8,222	38,388	20.50	1,873
2005	54,739.69	7,664	7,510	47,230	21.50	2,197
2007	18,357.55	1,101	1,079	17,279	23.50	735
2008	110,147.47	2,203	2,159	107,988	24.50	4,408
	1,808,402.82	910,424	892,189	916,214		74,946
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					12.2	4.14

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2960 POWER OPERATED EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. IOWA 11-R2.5						
NET SALVAGE PERCENT.. 0						
1996	47,220.92	41,144	47,221			
	47,220.92	41,144	47,221			
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					0.0	0.00

DUKE ENERGY KENTUCKY
GAS PLANT

ACCOUNT 2980 MISCELLANEOUS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2008

YEAR	ORIGINAL COST	CALCULATED ACCRUED	ALLOC. BOOK RESERVE	FUT. BOOK ACCRUALS	REM. LIFE	ANNUAL ACCRUAL
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
2004	125,560.68	28,251	34,550	91,011	15.50	5,872
	125,560.68	28,251	34,550	91,011		5,872
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PCT..					15.5	4.68

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-084

REQUEST:

Depreciation and Decommissioning

Provide a schedule that shows current versus proposed depreciation rates and net salvage parameters in the same format as the Gannett Fleming depreciation study on pages depreciation study presented by Mr. Spanos in Attachment JJS-1 on pages VI-4, VI-5, VIII-2, and VIII-3.

RESPONSE:

See AG-DR-01-084 Attachment, which sets forth a comparison of current versus proposed depreciation rates and net salvage percentages.

PERSON RESPONSIBLE: John J. Spanos

AG-DR-01-084

ATTACHMENT

IS BEING FILED

ELECTRONICALLY

AND PROVIDED ON

CD

DUKE ENERGY KENTUCKY
GAS PLANT

COMPARISON OF CURRENT AND PROPOSED NET SALVAGE PERCENT
AND ANNUAL DEPRECIATION RATES RELATED TO GAS PLANT

		CURRENT		PROPOSED	
	ACCOUNT	NET SALVAGE PERCENT	ANNUAL ACCRUAL RATE	NET SALVAGE PERCENT	ANNUAL ACCRUAL RATE
	(1)	(2)	(3)	(4)	(5)
	PRODUCTION PLANT				
2041	RIGHTS OF WAY	0	-	0	0.02
2050	STRUCTURES AND IMPROVEMENTS	(5)	0.40	(10)	4.70
2110	LIQUEFIED PETROLEUM GAS EQUIPMENT	(5)	2.45	(10)	8.86
	DISTRIBUTION PLANT				
2741	RIGHTS OF WAY	0	1.39	0	1.04
2750	STRUCTURES AND IMPROVEMENTS	(10)	1.12	(5)	1.44
	MAINS				
2761	CAST IRON, COPPER AND ALL VALVES	(20)	0.49	(20)	8.70
2762	STEEL	(20)	2.04	(20)	1.64
2763	PLASTIC	(20)	2.56	(20)	1.53
2765	STEEL FEEDER LINES	(20)	2.04	(20)	1.49
2780	MEASURING AND REGULATING STATION EQUIPMENT - GENERAL	(5)	2.08	(25)	2.04
2781	MEASURING AND REGULATING STATION EQUIPMENT - ELECTRONIC	(5)	1.39	(25)	6.37
2782	MEASURING AND REGULATING STATION EQUIPMENT - DISTRICT	(75)	3.71	(25)	1.65
	SERVICES				
2801	CAST IRON, COPPER AND ALL VALVES	(35)	-	(25)	5.27
2802	STEEL	(35)	1.35	(25)	3.34
2803	PLASTIC	(35)	2.80	(25)	2.39
2810	METERS	10	2.71	0	10.77
2820	METER INSTALLATIONS	0	3.16	0	3.82
2830	HOUSE REGULATORS	10	2.87	0	2.15
2840	HOUSE REGULATOR INSTALLATIONS	0	3.02	0	1.59
2850	INDUSTRIAL MEASURING AND REGULATING STATION EQUIPMENT	(10)	3.22	(10)	0.60
2851	INDUSTRIAL MEASURING AND REGULATING STATION EQUIPMENT - ELECTRONIC	(10)	2.58	(10)	3.64
2870	OTHER EQUIPMENT	0	10.77	0	-
2871	STREET LIGHTING EQUIPMENT	0	3.73	0	1.76
	GENERAL PLANT				
2910	OFFICE FURNITURE AND EQUIPMENT	0	5.48	0	- *
2911	OFFICE FURNITURE AND EQUIPMENT - ELECTRONIC DATA PROCESSING	0	20.00	0	22.95
2921	TRANSPORTATION EQUIPMENT - TRAILERS	5	-	5	- *
2940	TOOLS, SHOP AND GARAGE EQUIPMENT	0	4.01	0	4.70
2970	COMMUNICATION EQUIPMENT	0	6.67	0	6.76
2980	MISCELLANEOUS EQUIPMENT	0	-	0	13.20

* NEW ADDITIONS AFTER JANUARY 1, 2018 WILL HAVE THE FOLLOWING RATES:

ACCOUNT	RATE
2910 OFFICE FURNITURE AND EQUIPMENT	5.00
2921 TRANSPORTATION EQUIPMENT - TRAILERS	6.99

NOTE: ADDITIONS FOR NEW ACCOUNTS AFTER JANUARY 1, 2018 SHOULD USE THE FOLLOWING RATES:

ACCOUNT	RATE
2920 TRANSPORTATION EQUIPMENT	8.70
2960 POWER OPERATED EQUIPMENT	6.90

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-085

REQUEST:

Depreciation and Decommissioning

Refer to the calculation of projected test year depreciation expense performed on Schedule B-3.2. Provide a similar schedule substituting current depreciation rates in order to depict the changes in depreciation expense in the test year due to the proposed change in depreciation rates.

RESPONSE:

Please see the response to AG-DR-01-084 for a comparison of current depreciation rates to the proposed depreciation rates. The proforma adjustment filed as part of Schedule D-2.23 quantifies the change in annual depreciation expense due to the change in depreciation rates.

PERSON RESPONSIBLE: Cynthia S. Lee

AG-DR-01-086

REQUEST:

Property Tax Expense

Refer to the Direct Testimony of Mr. Panizza at pages 10-11. Provide the calculations of estimated test year property tax expense, including copies of the sources of the property tax rates, in electronic format with all formulas intact.

RESPONSE:

For calculations of estimated test year property tax expense, see AG-DR-01-086 Attachment 1. For copies of sources of property tax rates, see AG-DR-01-086 Attachments 2 and 3.

PERSON RESPONSIBLE: John R. Panizza
Robert H. "Beau" Pratt

AG-DR-01-086
ATTACHMENT 1
IS BEING FILED ELECTRONICALLY AND PROVIDED ON CD

Calculation of blended rate for forecasting purposes:

Based on 2015 property taxes, to be paid in 2016, amounts per bills ($000s)

				1% Annual Escalation					
Entity	State	Tax per bill	Net Tangible Plant	2015 rates	2016 rates	2017 rates	2018 rates	2019 rates	2020 rates
Duke Energy Kentucky - Gas	Kentucky	$ 2,637	$ 296,893	0.889%	0.898%	0.907%	0.916%	0.925%	0.934%
Duke Energy Kentucky - Common	Kentucky	$ 257	$ 9,126	2.816%	2.844%	2.873%	2.901%	2.930%	2.960%

Calculation of forecasted property tax expense, with and without escalation:

	1% Escalation			No Escalation		
	04-12/19	01-03/20	Test Period	04-12/19	01-03/20	Test Period
Kentucky Sited Property:						
Plant In Service	$ 386,760	$ 409,935		$ 386,760	$ 409,935	
Escalation	1.000%	1.000%				
Property Tax Rate	0.925%	0.934%		0.889%	0.889%	
Prior Year Plant In Service	$ 372,436	$ 386,760		$ 372,436	$ 386,760	
Prior Year Property Tax Rate	0.907%	0.916%		0.889%	0.889%	
Months	9	3		9	3	
Annual Property Tax Provision	$ 2,533	$ 886	$ 3,419	$ 2,483	$ 860	$ 3,343
KY Electric / Gas Common Sited Property:						
Plant In Service - Common	$ (6,193)	$ (11,343)		$ (6,193)	$ (11,343)	
Gas Share of Electric / Gas Split	30.000%	30.000%		30.000%	30.000%	
Plant In Service - Gas	$ (1,858)	$ (3,403)		$ (1,858)	$ (3,403)	
Escalation	1.000%	1.000%				
Property Tax Rate	2.901%	2.930%		2.816%	2.816%	
Prior Year Plant In Service	$ (225)	$ (1,858)		$ (225)	$ (1,858)	
Prior Year Property Tax Rate	2.873%	2.901%		2.844%	2.844%	
Months	9	3		9	3	
Annual Property Tax Provision	$ (5)	$ (13)	$ (18)	$ (5)	$ (13)	$ (18)
Total	$ 2,528	$ 872	$ 3,400	$ 2,478	$ 846	$ 3,325
Effect of Rate Escalation on Test Period	$ 75					

61A255(01-06) Commonwealth of Kentucky For County,School or Special Taxes

PROPERTY TAX STATEMENT
PUBLIC SERVICE COMPANY

Return Payment To:

Sheriff **Howard Wayne Niemeier**
County **Bracken**
Address **PO Box 186**
Brooksville KY 41004

Certification date: 12/4/2015
Print date : 12/7/2015

GNC: 005260
TYPE CO: GEU
TAX TYPE: 035
Date 03/31/2016

Assessment 2015 Tax Bill

Name: DUKE ENERGY KENTUCKY INC

Street: 550 SOUTH TRYON DEC-41B

City: CHARLOTTE
State: NC
Zip: 28202-0000

Attn: DAVID WRIGHT

PAYMENT INSTRUCTIONS

This statement for public service company property taxes is due and payable 30 days after notice. (KRS 136.050 (2). No discount is allowable for early payment. If not paid within 30 days, a 10 percent penalty plus a 10 percent sheriff's add-on fee (KRS 134.430(3) of total tax and interest at the tax interest rate p KRS 131.183 per annum applies. Make payme to sheriff of county named on statement.

Property Class-Rate Per $ 100					Value	County	School	Special
Real Estate	County	0.3960			$ 33,400.00	$132.26		
	Health	0.0480				$16.03		
	Ambulance	0.0860				$28.72		
	Extension	0.0670				$22.38		
	Soil	0.0200				$6.68		
	Library	0.0920				$30.73		
Real Estate	School	0.3690			$ 33,400.00		$123.25	
Tangible	County	0.3960			$ 358,305.00	$1,418.89		
	Health	0.0480				$171.99		
	Ambulance	0.0860				$308.14		
	Extension	0.0670				$240.06		
	Library	0.0920				$329.64		
Tangible	School	0.3690			$ 358,305.00		$1,322.15	
Totals By Taxing District			>>>>>>>>>>>>>>>>>>>>			**$2,705.53**	**$1,445.39**	

County Clerk

Total Tax *$4,150.92*

Payment Received By:

Sheriff/Deputy

Date

Penalty (10 percent of total tax if not paid within 30 days)

Fee (10% sheriff's add-on)

Interest (tax interest rate per KRS 131.183 per annum if not paid within 30 days)

Total Tax, Penalty, and Interest

. Payable To:
Helmig
County Sheriff
0 Conrad Lane
P.O. Box 198
Burlington, KY 41005

Property Tax Bill

Commonwealth of Kentucky
2015 Boone County Franchise Bill
Today's Date: Wednesday, December 9, 2015

DUKE ENERGY KENTUCKY INC
DAVID WRIGHT
550 SOUTH TRYON DEC 41B
CHARLOTTE, NC 28202-0000

Bill Date: December 9, 2015
Bill Number: 3
Map Number:
PVA Account Number: GNC 005260
Tax District: 00

Property Location:

Deed Book / Deed Page:
/

Property Description:

Farm Acres:
County Clerk: Kenny Brown

Assessment:

Property Class	Tax Authority	Assessed Value	Rate / $100	Tax
REAL_ESTATE	COUNTY	96,925,845.00	0.1050	101,772.14
REAL_ESTATE	SCHOOL BOONE	94,417,713.00	0.6440	608,050.07
REAL_ESTATE	LIBRARY	96,925,845.00	0.0520	50,401.44
REAL_ESTATE	HEALTH	96,925,845.00	0.0190	18,415.91
REAL_ESTATE	EXTENSION	96,925,845.00	0.0180	17,446.65
REAL_ESTATE	BELLEVIEW FIRE	20,462,173.00	0.2000	40,924.35
REAL_ESTATE	BURLINGTON FIRE	9,294,903.00	0.1700	15,801.34
REAL_ESTATE	FLORENCE FIRE	8,234,475.00	0.1000	8,234.48
REAL_ESTATE	HEBRON FIRE	10,121,480.00	0.1220	12,348.21
REAL_ESTATE	PETERSBURG FIRE	130,526.00	0.2000	261.05
REAL_ESTATE	PT. PLEASANT FIRE	5,037,797.00	0.1750	8,816.14
REAL_ESTATE	UNION FIRE	11,633,037.00	0.1670	19,427.17
REAL_ESTATE	VERONA FIRE	97,971.00	0.1850	181.25
REAL_ESTATE	WALTON FIRE	3,949,332.00	0.1990	7,859.17
REAL_ESTATE	SCHOOL - GRADED	2,508,132.00	1.0960	27,489.13
TANG .45	COUNTY	50,225,507.00	0.1240	62,279.63
TANG .45	SCHOOL - BOONE	45,734,855.00	0.6440	294,532.47
TANG .45	LIBRARY	50,225,507.00	0.0520	26,117.26
TANG .45	HEALTH	50,225,507.00	0.0190	9,542.85
TANG .45	EXTENSION	50,225,507.00	0.0430	21,596.97
TANG .45	BELLEVIEW FIRE	921,552.00	0.1600	1,474.48
TANG .45	BURLINGTON FIRE	5,402,586.00	0.2000	10,805.17
TANG .45	FLORENCE FIRE	5,017,983.00	0.1000	5,017.98
TANG .45	HEBRON FIRE	7,563,670.00	0.1220	9,227.68
TANG .45	PETERSBURG FIRE	1,999,780.00	0.1000	1,999.78
TANG .45	PT. PLEASANT FIRE	2,330,099.00	0.1750	4,077.67
TANG .45	UNION FIRE	4,922,782.00	0.2000	9,845.56
TANG .45	VERONA FIRE	927,053.00	0.1850	1,715.05
TANG .45	WALTON FIRE	7,106,696.00	0.2000	14,213.39
TANG .45	SCHOOL - GRADED	4,490,652.00	1.0960	49,217.55
			Total Assessment:	1,459,091.99

Adjustments:

Adjustment Type	Assessment Type	Assessed Value	Amount
		Total Adjustments:	

GROSS TAX IS DUE WITHIN 30 DAYS OF THIS NOTICE.
IF NOT PAID, A 10% PENALTY PLUS 10% INTEREST PER ANNUM WILL APPLY.

2015 BOONE COUNTY PROPERTY TAX BILL

Michael A. Helmig, Boone County Sheriff
(859) 334-2175
3000 Conrad Lane, Burlington, KY
Kenny Brown, Boone County Clerk

rty Description: 4.287 AC ON GRAVES RD (35-51B)
rty Location : GRAVES RD

g District	Rate per $100	Taxable Value	Tax Amount
	0.1220	$128,600	$156.89
Y	0.1050	$128,600	$135.03
L	0.6440	$128,600	$828.18
Y	0.0520	$128,600	$66.87
	0.0190	$128,600	$24.43
SION	0.0180	$128,600	$23.15
N FIRE	0.1220	$128,600	$156.89
	Gross Tax Due		$1,391.44

Bill Number: *4728*
Map Number: *035.00-00-051.02*
Bank Code: *0*
Deed Book: *985 -103*
District: *COMMON*
Exemption:
(Homestead/Disability)

Amount Due if:		
Paid by	11/01/15	$1,363.61
Paid by	12/31/15	$1,391.44
Paid by	1/31/16	$1,461.01
Paid after	1/31/16	$1,683.64

The Sheriff's Department collects the above tax through the close of business on 4/15/2016

RECEIVED
OCT 05 2015
TAX DEPARTMENT

IF YOU HAVE AN ESCROW ACCOUNT, PLEASE CONFIRM PAYMENT WITH YOUR MORTGAGE COMPANY

"The Place to Be"

Visit Our Website
www.cityofwalton.org

2015 Public Service Tangible Tax Statement

For questions about your bill, please call the following number: 859-485-4383

DUKE ENERGY KENTUCKY INC
DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

Property Information	Property Value Assessments
PIDN: PU 2015 T	Tangible Amount: $ 2,122,339.00
County: BOONE	Tax Rate: 2.31 per 1,000

Description	Tax Amount	2% Discount	Amount Due
2015 Tangible Tax	4,902.60	-98.05	$4,804.55

A 2% discount if paid by January 12 :	**$4,804.55**
At face value if paid by February 12:	**$4,902.60**
A 5% penalty if paid after March 12:	**$5,147.73**
A 10% penalty if paid after April 12:	**$5,392.86**

"The Place to Be"

Visit Our Website
www.cityofwalton.org

2015 Public Service Tax Statement

For questions about your bill, please call the following number: 859-485-4383

DUKE ENERGY KENTUCKY INC
DAVID WRIGHT
550 SOUTH TRYON DEC-41-B
CHARLOTTE, NC 28202-000

Property Information		Property Value Assessments	
PIDN: 2015 RE		Amount:	$ 2,174,159.00
County: BOONE		Tax Rate:	1.01 per 1,000

Description	Tax Amount	Discount	Amount Due
2015 Tax	2,195.90	-43.93	$2,151.98

A 2% discount if paid by January 12:	**$2,151.98**
At face value if paid by February 12:	**$2,195.90**
A 5% penalty if paid after March 12:	**$2,305.70**
A 10% penalty if paid after April 12:	**$2,415.49**

...re issued to the listed property owner as January 1st ... year. If the previous owner receives the bill, they ...forward the bill to the new owner. We do not have ...to the new deed transfers. If you purchased property ...ear, you need to call or go to the city website to obtain a ... of tax bill for your property. Postmarks are accepted. ...l payments to: City Clerk/Treasurer, City of Union, KY, ...43 Mt. Zion Rd., Union, KY 41091-9534

CITY OF UNION, KY

2015 Tax Bill

2328

Available on site for payments:
24-HR DROP BOX

Union City Building Office Hours:
10:00 a.m. to 4:00 p.m.
Monday - Friday
Closed most Fed. & State Holidays
PH: (859) 384-1511
FX: (859) 384-7760

DUKE ENERGY KENTUCKY INC
SHAWN PITTMAN & DAVID WRIGHT - TAX DEPT
550 SOUTH TRYON DEC-41B
CHARLOTTE NC 28202

Property Description:
PIDN: R20.15-00-001.32
Location:
Assessed Value $2,078,163.00
Taxable Value: $2,078,163.00
Legal Description: PUBLIC SERVICE BRANCH

Description	Rate	Amount	Discount	Due
Real Property	2.16000	$4,488.83	($89.78)	$4,399.05
Delinquent Taxes:				$0.00
ATTENTION: If your tax is to be paid through an escrow account, please forward this bill to your mortgage company immediately to avoid duplicate payment.				
Total due by Feb. 29, 2016 (Discount Amount)				$4,399.05
Amount due if paid March 31, 2016 (Base Amount)			2/29/16	$4,488.83

PLEASE NOTE: If not paid on or before December 31, 2015 a 10% penalty shall be attached January 1, 2016. Additionally all delinquent taxes after the 31st day of December, 2015 shall bear interest at the rate of twelve (12%) per annum until paid.

DETACH AND RETURN THE BOTTOM PORTION WITH PAYMENT
City of Union - Property Tax Bill 2015

If you wish to have a receipt, enclose a self-addressed, stamped envelope for us to mail a receipt back to you.
If requested, we can email you a copy. Also, tax information is available on the city website ...

Tax bills are issued to the listed property owner as January 1st of the tax year. If the previous owner receives the bill, they should forward the bill to the new owner. We do not have access to the new deed transfers. If you purchased property this year, you need to call or go to the city website to obtain a copy of tax bill for your property. Postmarks are accepted, mail payments to: City Clerk/Treasurer, City of Union, KY, 1843 Mt. Zion Rd., Union, KY 41091-9534

CITY OF UNION, KY

2015 Tax Bill

2327

Available on site for payments:
24-HR DROP BOX

Union City Building Office Hours:
10:00 a.m. to 4:00 p.m.
Monday - Friday
Closed most Fed. & State Holidays
PH: (859) 384-1511
FX: (859) 384-7760

DUKE ENERGY KENTUCKY INC
SHAWN PITTMAN & DAVID WRIGHT - TAX DEPT
550 SOUTH TRYON DEC-41B
CHARLOTTE NC 28202

Property Description:
PIDN: P20.15-00-001.31
Location:
Assessed Value $830,880.00
Taxable Value: $830,880.00
Legal Description: PUBLIC SERVICE BRANCH

2/23/16

Description	Rate	Amount	Discount	Due
Tangible Property	1.88000	$1,562.05	($31.24)	$1,530.81
Delinquent Taxes:				$0.00
ATTENTION: If your tax is to be paid through an escrow account, please forward this bill to your mortgage company immediately to avoid duplicate payment.				
Total due by Feb. 29, 2016 (Discount Amount)				$1,530.81
Amount due if paid March 31, 2016 (Base Amount)				$1,562.05

PLEASE NOTE: If not paid on or before December 31, 2015 a 10% penalty shall be attached January 1, 2016. Additionally all delinquent taxes after the 31st day of December, 2015 shall bear interest at the rate of twelve (12%) per annum until paid.

CITY OF
FLORENCE
KENTUCKY®

DATE	INVOICE NO
12/21/2015	0161510

BILL TO
DUKE ENERGY KENTUCKY INC DAVID WRIGHT-TAX DEPT 550 SOUTH TRYON ST-DEC 41B CHARLOTTE, NC 28202-0000

DUE DATE
1/21/2016

DESCRIPTION	QUANTITY	EFFECTIVE RATE	AMOUNT	DISCOUNT	CREDIT	BALANCE
PREVIOUS ACCOUNT BALANCE						0.00
Franchise Fees 2015:						
Franch Fee Real Prop	1.00	44,510.49	44,510.49	0.00	0.00	44,510.49
Franchise Fees - Tangible Prop	1.00	45,095.97	45,095.97	0.00	0.00	45,095.97
		INVOICE TOTAL:	**89,606.46**	**0.00**	**0.00**	**89,606.46**

DD
(/8/16

514 Sixth Avenue · Dayton, Kentucky 41074

Phone: (859) 491-1600 · Fax: (859) 491-3538

CITY OF DAYTON, KENTUCKY
PROPERTY TAX BILL
2015

DATE: May 17, 2016

DUKE ENERGY KENTUCKY INC
DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

GNC: 005260
TYPE CO: GEU
TAX TYPE: 035

		Rate	Tax Due
Real Estate	$5,572,093.00	.4950	$27,581.86
Tangible	$2,762,799.00	.7500	$20,720.99
Total Due			$48,302.85

PD 6/6/16

Please remit to: City of Dayton
Clerk's Office
514 Sixth Avenue
Dayton, KY 41074

CITY OF NEWPORT
P.O. BOX 1090
NEWPORT, KY 41071
(859) 292-3660

...KEEP THIS COPY FOR YOUR RECORDS...

PROPERTY DESCRIPTION	PROPERTY ASSESSMENT	BILL NUMBER
1140 ORCHARD ST LOT 205 UNITS: 1 PROP CL: C	GROSS VALUE: 34,200 EXEMPTIONS: 0 TAXABLE VALUE: 34,200	1532 PIDN: 999-99-05-264

YEAR	TAX	SCHOOL	WASTE	PEN & INT	TOTAL
2015	93.71	333.45	220.50	0.00	647.66

DELINQUENTS LISTED BELOW:

AMOUNT DUE IF:	
PAID BY 10/31/2015	647.66
PAID BY 11/30/2015	714.63
PAID BY 12/31/2015	741.02

ADDITIONAL FEES
AFTER 12/31/2015
WILL BE APPLIED.

MAILING ADDRESS	BANK CODE	CURRENT YEAR RATES
DUKE ENERGY KY INC 550S TYRON ST/DEC41B CHARLOTTE NC 28202		CITY RATE: 2.74 SCHOOL RATE: 9.75 REGULAR WASTE FEE: 220.50 HOMESTEAD WASTE FEE: 176.50

MEMO TO TAXPAYER

FOR YOUR CONVENIENCE, THE CITY WILL EXTEND THEIR HOURS FOR THE COLLECTION OF TAX PAYMENTS:
OCT 29TH & 30TH UNTIL 6 PM. SAT OCT 31ST WE WILL BE OPEN FROM 9 AM UNTIL 1 PM.

10/6/2015

Campbell County Sheriff's Office
Mike Jansen
Sheriff

1098 Monmouth Street
Newport, Kentucky 41071
(859) 292-3833
www.campbellcountysheriffky.org

Duke Energy Kentucky, Inc.
Attn: David Wright
550 South Tryon DEC-41B
Charlotte, NC 28202

2015

COUNTY FRANCHISE PROPERTY TAX BILL

DATE:	**5/16/2016**		
TOTAL TAX DUE:			**1,002,558.62**
AMOUNT DUE IF PAID BY:			
	6/15/2016	Face Amount	**1,002,558.62**
PAID AFTER	**6/15/2016**	21% Penalty (see below)	**1,213,095.93**

PAYMENT INSTRUCTIONS

The enclosed bill is for franchise property taxes. Franchise tax bills are due on the day they are prepared and if payment is not made within 30 days, a 10% penalty, 10% percent Sheriff's add on fee, plus interest will accrue.

Payments should be made to:

Campbell County Sheriff
1098 Monmouth Street, Suite 216
Newport, KY 41071-3429

CITY OF BELLEVUE, KENTUCKY
616 Poplar Street
Bellevue, Kentucky 41073
Phone (859) 431-8888 Fax (859) 261-8387
www.bellevueky.org

002

16-May-16

DUKE ENERGY KENTUCKY INC
DAVID W. WRIGHT
550 SOUTH TRYON DEC41B
CHARLOTTE, NC 28202

wrong Tax Distr
Call City
DG
6/6/16

2015 FRANCHISE TAX

DESCRIPTION	ASSESSED VAL	RATE PER $100		AMOUNT DUE
REAL ESTATE	~~$5,413,756.00~~	6,818,481.60	0.00318	~~$17,215.74~~
TANGIBLE	~~$3,555,828.00~~	2,898,854	0.00327	~~$11,627.56~~
			TOTAL	~~$28,843.30~~

PLEASE REMIT PAYMENT TO:	AMOUNT DUE IF PAID BY 06/16/2016	~~$28,843.30~~
CITY OF BELLEVUE 616 POPLAR STREET BELLEVUE, KY 41073		

return bottom portion with payment

F15-017

DUKE ENERGY KENTUCKY INC
DAVID W. WRIGHT
550 SOUTH TRYON DEC41B
CHARLOTTE, NC 28202

2015 FRANCHISE TAX

DESCRIPTION	ASSESSED VALUE	RATE PER $100		AMOUNT DUE
REAL ESTATE	$24,966.00		0.00318	$79.39
TANGIBLE	$3,555,828.00		0.00327	$11,627.56
			TOTAL	$11,706.95

PLEASE REMIT TO:	AMOUNT DUE IF PAID BY 06/16/2016	$28,843.30
CITY OF BELLEVUE		

FOR TAX YEAR 2015

PROPERTY TAX BILL NO. 2015RE

Make check payable to:

CITY OF WILDER
520 Licking Pike
Wilder, KY 41071

GNC 005260

	Assessed Value	Rate	Amount of Tax
Real Estate	**$2,683,709.00** ✓	**.200%**	**$5,367.42**
Total Due			**$5,367.42**

RETURN NOTICE WITH PAYMENT
WHETHER PAYING IN PERSON OR BY MAIL. WHEN PAYING BY MAIL, INCLUDE SELF-ADDRESSED STAMPED ENVELOPE FOR RECEIPT.

DA
6/6/16

Owner:
Duke Energy Kentucky Inc.
David W. Wright
550 South Tryon DEC41B
Charlotte, NC 28202-0000

Penalty of 5% after 60 days and 10% after 90 days of Date Received

FOR TAX YEAR 2015

PROPERTY TAX BILL NO. 2015T

Make check payable to:

CITY OF WILDER
520 Licking Pike
Wilder, KY 41071

GNC 005260

	Assessed Value	Rate	Amount of Tax
Tangible	**$1,966,576.00** ✓	**.337%**	**$6,627.36**
Total Due			**$6,627.36**

RETURN NOTICE WITH PAYMENT
WHETHER PAYING IN PERSON OR BY MAIL. WHEN PAYING BY MAIL, INCLUDE SELF-ADDRESSED STAMPED ENVELOPE FOR RECEIPT.

DA
6/6/16

5,367.42 +
6,627.36 +
002
11,994.78 *

Owner:
Duke Energy Kentucky Inc.
David W. Wright
550 South Tryon DEC41B
Charlotte, NC 28202-0000

Penalty of 5% after 60 days and 10% after 90 days of Date Received

CITY OF HIGHLAND HEIGHTS
176 Johns Hill Road Highland Heights, KY 41076-1498 P: 859-441-8575 F: 859-441-8293 www.hhky.com
HOME OF NORTHERN KENTUCKY UNIVERSITY
TDD: 1-800-648-6057

DUKE ENERGY KENTUCKY INC
DAVID W WRIGHT
550 SOUTH TRYON DEC41B
CHARLOTTE, NC 28202-0000

ASSESSMENT FOR LOCAL TAX, INCLUDING FRANCHISE

TAX YEAR 2015 GNC:005260

ASSESSED VALUE	RATE	AMOUNT OF TAX
$5,452,981.00	$1.65	$8,997.42

2% 8817.48

6/6/17

In accordance with KRS 134.020, companies paying local property taxes for telecommunication service providers are entitled to a 2% discount if the bill is paid within 30 days. If paid after 30 days but within 60 days, the face amount of the bill is due. If paid after 60 days but within 90 days, a 5% penalty should be charged. After 90 days, the bill should accrue a 10% penalty and applicable interest

05-17-2017 J

Phone (859) 441-5104
Fax (859) 441-5104

130 North Fort Thomas Avenue
Fort Thomas, Kentucky 41075

2015 PUBLIC SERVICE PROPERTY ASSESSMENT

DUKE ENERGY KENTUCKY INC
ATTN: DAVID WRIGHT
550 SOUTH TRYON DEC41B
CHARLOTTE, NC 28202

DATE 5/16/2016

TERMS NET 30 DAYS

BILL # 1516-19-15 (CITY)

RATE PER HUNDRED

REAL AND TANGIBLE PROPERTY

CITY	SCHOOL GEN'L	SCHOOL BLDG	TOTAL RATE
0.390			0.390

REAL PROPERTY ASSESSMENT:	$	14,443,019.00 ✓
TANGIBLE PROPERTY ASSESSMENT:	$	8,206,084.00 ✓
TOTAL ASSESSMENT:	$	22,649,103.00

COMPUTATION OF TAXES DUE

CITY	SCHOOL GEN'L	SCHOOL BLDG	TOTAL TAX
$ 88,331.50	$ -	$ -	**$ 88,331.50**

PAID 6/9/16

If paid after 30 days but within 60 days, the face amount of the bill is due. If paid after 60 days but within 90 days, a 5% penalty shall be charged. After 90 days, the bill shall accrue a 10% penalty and applicable 8% interest.

MAKE REMITTANCE TO:

CITY OF FORT THOMAS
130 N. FORT THOMAS AVENUE
FORT THOMAS, KY 41075-1579
ATTN: JOSEPH EWALD, TREASURER

Phone (859) 441-5104
Fax (859) 441-5104

130 North Fort Thomas Avenue
Fort Thomas, Kentucky 41075

2015 PUBLIC SERVICE PROPERTY ASSESSMENT

DUKE ENERGY KENTUCKY INC
ATTN: DAVID WRIGHT
550 SOUTH TRYON DEC41B
CHARLOTTE, NC 28202

DATE 5/16/2016

TERMS NET 30 DAYS

BILL # 1516-19-15 (SCHOOL)

RATE PER HUNDRED

REAL AND TANGIBLE PROPERTY

CITY	SCHOOL GEN'L	SCHOOL BLDG	TOTAL RATE
	0.914	0.122	1.036

REAL PROPERTY ASSESSMENT:	$	13,661,807.00
TANGIBLE PROPERTY ASSESSMENT:	$	7,892,564.00
TOTAL ASSESSMENT:	$	21,554,371.00

COMPUTATION OF TAXES DUE

CITY	SCHOOL GEN'L	SCHOOL BLDG	TOTAL TAX
$ -	$ 197,006.95	$ 26,296.33	**$ 223,303.28**

6/6/16

If paid after 30 days but within 60 days, the face amount of the bill is due. If paid after 60 days but within 90 days, a 5% penalty shall be charged. After 90 days, the bill shall accrue a 10% penalty and applicable 8% interest.

MAKE REMITTANCE TO:
CITY OF FORT THOMAS
130 N. FORT THOMAS AVENUE
FORT THOMAS, KY 41075-1579
ATTN: JOSEPH EWALD, TREASURER

CITY OF COLD SPRING

5694 East Alexandria Pike
Cold Spring, KY 41076
PHone: 859-441-9604

Date of Billing: 5/20/2016

Public Service Property Assessment
Tax Year 2015

Duke Energy Kentucky Inc.
David Wright
550 South Tryon DEC-41B
Charlotte, NC 28202

				Amount Due with discount if paid by 6/20/2016	Amount Due After 6/20/2016
Real Estate Assessment Amt:	$2,545,727.00	Tax Rate @	0.00164		
Tangible/ Personal Assessment Amt:	$2,846,643.00	Tax Rate @	0.00165		
Total Local Assessment:	$5,392,370.00	=	$8,871.95	**$8,694.51**	$8,871.95

2% Discount if paid no later than 6/20/2016

5% penalty will be applied if unpaid after 60 days from due date and 10% penalty will be applied if unpaid after 90 days from due date

MAKE YOUR CHECK PAYABLE TO THE CITY OF COLD SPRING, 5694 EAST ALEXANDRIA PIKE, COLD SPRING, KY 41076

NOTE. YOUR CHECK IS YOUR RECEIPT. FOR RECEIPTED COPY SEND SELF-ADDRESSED STAMPED ENVELOPE

CITY OF NEWPORT
INVOICE

Invoice Number 2016/21/0009035
Invoice Date 5/10/2016
Invoice Due Date 6/09/2016

Customer Id 00000001671

DUKE ENERGY KENTUCKY INC
Attn: TAX DEPT-DAVID WRIGHT
550 SOUTH TYRON DEC-41B
CHARLOTTE NC 28202-0000

Mail Remittance To:
CITY OF NEWPORT
FINANCE DEPARTMENT
998 MONMOUTH STREET
NEWPORT KY 41071-2184
(859) 292-3660

Desc: PUBLIC SERVICE ASSESSMENT 2015 Prop Loc:

Service	Quantity	Unit	Unit Price	Amount
SREAL 16442406 @ 9.75 PER 1000	1.00		160313.46	160,313.46
STAN 8317543 @ 9.75 PER 1000	1.00		81096.04	81,096.04
CREAL 16453084 @ 2.74 PER 1000	1.00		45081.45	45,081.45
CTAN 8378665 @ 2.52 PER 1000	1.00		21114.24	21,114.24

Total Amount Due 307,605.19

6/6/16

Please Make Check Payable To: CITY OF NEWPORT

Please Reference Invoice Numbers On All Remittance

Established 1911

City of Silver Grove

Tax Statement – May 17, 2016

County: Campbell

Tax Year: 2015

Tax Payer: Duke Energy Kentucky Inc
David W. Wright

Address: 550 South Tryon Dec – 41B
Charlotte, NC 28202

Tax District: Silver Grove

Tangible Tax Rate: 0.175

Real Estate Tax Rate: 0.209

Real Estate: $440,647.00

Tangible Personal: $516,004.00

Total Assessment: $956,651.00

Real Estate Tax Due: $920.95

Tangible Tax Rate Due: $903.01

Total Due: $1,823.96

DC
6/6/16

City of Southgate

122 Electric Avenue
Southgate, Kentucky 41071-3166
Phone: (859) 441-0075 · Fax: (859) 441-0244

2015 PSC/TANGIBLE TAX BILL

12/10/15	GNC 5260	City of Southgate								TOTALS
Bill #	Name	Real Prop	Amount	Tang/PP Prop	Amount	Fire Tax Real Prop	Amount	Fire Tang/PP	Amount	
P-15-02	Duke Energy KY Inc	0.00562		0.0075		0.0005387		0.0005387		
	David Wright	2,534,940	14,246.36	1,749,632	13,122.24	2,534,940	1,365.57	1,749,632	942.53	$29,676.70
	550 South Tryon DEC-41B									
	Charlotte, NC 28202	Southgate Independent Schools								
		School Real	Amount	School Tang/PP	Amount					
		0.01061		0.01061						
		2,098,213	22,262.04	1,124,802	11,934.15					$34,196.19
					SUB TOTAL (Face Amount)					$63,872.89
					2% Discount if paid by February 10, 2016					$1,277.46
					DISCOUNTED AMOUNT if paid by Feb 10, 2016					$62,595.43
					After February 10, 2015 but no later than March 10, 2016 (face amount)					$63,872.89
					5% Penalty & Interest added after March 10, 2016					

RETURN THIS PORTION WITH PAYMENT

2015 PSC/TANGIBLE TAX BILL

12/10/15	GNC 5260	City of Southgate								TOTALS
Bill #	Name	Real Prop	Amount	Tang/PP Prop	Amount	Fire Tax Real Prop	Amount	Fire Tang/PP	Amount	
P-15-02	Duke Energy KY Inc	0.00562		0.0075		0.0005387		0.0005387		
	David Wright	2,534,940	14,246.36	1,749,632	13,122.24	2,534,940	1,365.57	1,749,632	942.53	$29,676.70
	550 South Tryon DEC-41B									
	Charlotte, NC 28202	Southgate Independent Schools								
		School Real	Amount	School Tang/PP	Amount					
		0.01061		0.01061						
		2,098,213	22,262.04	1,124,802	11,934.15					$34,196.19
					SUB TOTAL (Face Amount)					$63,872.89
					2% Discount if paid by February 10, 2016					$1,277.46
					DISCOUNTED AMOUNT if paid by Feb 10, 2016					$62,595.43
					After February 10, 2015 but no later than March 10, 2016 (face amount)					$63,872.89
					5% Penalty & Interest added after March 10, 2016					

CITY OF MELBOURNE

502 GARFIELD AVENUE • P.O. BOX 63 • MELBOURNE, KENTUCKY 41059-0063
859 • 781-6664 • FAX 859 • 781-9444

July 28, 2016

2015 FRAN TAX BILL#**F58-15**

DUKE ENERGY KY INC
DAVID WIRGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

RECEIVED
AUG - 5 2016
TAX DEPARTMENT

2015 Franchise Fee Rate: **.00456**/100
2015 Real Tax Rate: **.00396**/100

Assessment	Type	Penalty	Interest	Tax Amount Due
$570,918	FRAN			**$2603.38**
$ 53,401	REAL			**$ 211.46**
				$2814.83

$ 2814.84

Please pay this amount: $2814.83

ALL PAYMENTS RECEIVED OR POSTMARKED AFTER 8/28/16 WILL BE SUBJECT TO PENALTY AND INTEREST
PLEASE RETURN THIS PORTION WITH YOUR PAYMENT

TOTAL AMOUNT DUE: **$2814.83**

AMOUNT ENCLOSED: _____

Due Date: August 28th, 2016

2015 Fran Tax Bill# **F58-15**

City of Melbourne
P O Box 63
Melbourne, KY 41059-0063

Where the city meets the country
Founded in 1834
Alexandria
8236 WEST MAIN STREET
ALEXANDRIA, KY 41001

Duke Energy KY Inc.
David Wright
550 South Tryon St. DEC-41B
Charlotte, NC 28202-0000

Invoice #: 232
Invoice Date: 2/9/2016

FRANCHISE TAX INVOICE

Date	Assessment	Rate (%)	Amount
2/9/2016	$5,413,756.00 (for the year 2015)	1.75	9,474.07

Duke Energy KY Inc. David Wright 550 South Tryon St. DEC-41B Charlotte, NC 28202-0000	**Total**	**$9,474.07**
	Payments/Credits	**$0.00**
	Balance Due	**$9,474.07**

CITY OF WARSAW ORDINANCE
303 EAST MAIN STREET
P.O. BOX 785
WARSAW, KENTUCKY 41095-0785
859-567-5900 Phone
859-567-5931 Fax only

Name: Duke Energy Kentucky
c/o David Wright
550 South Tryon DEC-41B
Charlotte, NC 28202

Date : 12/17/2015

Real Estate	Tangible	Total	Tax Year	Rate per $100	Total
878,829.00	92		2015	.129	$1133.69
107,618.00	90		2015	.065	$ 69.96

TOTAL DUE = **$1203.65**

Pay to:
City of Warsaw
Attn: Franchise Dpt.
P.O. Box 785
Warsaw KY 41095

2% Discount if Paid within 30 days
5% Penalty if not paid after 60 days
10% Penalty if not paid after 90 days
Please return this page when paying. Receipts sent only when self addressed, stamped envelopes accompany payment by mail

61A255(1-90) Commonwealth of Kentucky For County,School or Special Taxes

PROPERTY TAX STATEMENT
PUBLIC SERVICE COMPANY

Return Payment To:

Sheriff **Josh Neale**
County **Gallatin**
Address **PO Box 1025**
Warsaw, KY 41095

Bill No. 25
GNC No. 5260
Type Co. GEU

Assessment for **2015** Taxes Date 12/15/2015

Address:

Name: Duke Energy Kentucky Inc
David Wright
Street: 550 South Tyron DEC-41B

City: Charlotte

State: NC

Zip: 28202

Attn: David Wright

PAYMENT INSTRUCTIONS

This statement for public service company property taxes is due and payable 30 days after notice. **(KRS 136.050 (2))**. No discount is allowable for early payment. If not paid within 30 days, a 10 percent penalty of total tax plus interest at the interet rate per KRS 131.183 per annum applies. Make payment to sheriff of county named on statement.

Property Class-Rate Per $ 100				Value	County	School	Special
County- Real Estate	0.0890	School	0.6530	$1,469,601	$1,307.94	$9,596.49	********
County -Tangible	0.1630	School	0.6530	$376,539	$613.76	$2,458.80	********
Library- Real Estate	**********	*********	0.1150	$1,469,601	**********	**********	$1,690.04
Library- Tangible	**********	*********	0.1154	$376,539	**********	**********	$434.53
Health - Real Estate	**********	*********	0.0550	$1,469,601	**********	**********	$808.28
Health - Tangible	**********	*********	0.0550	$376,539	**********	**********	$207.10
Extension Service - Real Estate		*********	0.0560	$1,469,601	**********	**********	$822.98
Extension Service - Tangible		*********	0.0560	$376,539	**********	**********	$210.86
Soil Conservation - Real Estate		*********	0.0090	$1,469,601	**********	**********	$132.26
Totals By Taxing District		KKKKKKKKK			**$1,921.70**	**$12,055.29**	**$4,306.05**

Tracy Miles
County Clerk/ Phone:859-567-5411

Total Tax ***$18,283.04***

Payment Received By:

Sheriff/Deputy

Date

Penalty
(10 percent of total tax if not paid within 30 days)

Interest
(tax interest rate per KRS 131.183 per annum if not paid within 30 days)

Total Tax, Penalty, and Interest

CITY OF DRY RIDGE
P.O. BOX 145
DRY RIDGE, KY 41035

2014 **PROPERTY TAX BILL**

PROPERTY TYPE	RATE PER $100	ASSESSMENT	CURRENT TAXES
REAL TANGIBLE	$ 0.2410	$ 31,287 Revised	$ 7,540.16
TOTAL DUE			**$ 7,540.16** ✓

DUE BY
1/9/2016

DUKE ENERGY KENTUCKY INC
DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

Value wrong Should be 3,128,659 ✓ Combined
1/7/16

61A509 (1-12)
Commonwealth of Kentucky
DEPARTMENT OF REVENUE

Kentucky

DISTILLED SPIRITS OR TELECOMS PROPERTY TAX STATEMENT

For County, School or Special Taxes

Assessment for _____ Taxes

Bill No. _____

GNC No. _____ Type Co. _____

Date December 11, 2015

Make Payment To: City of Williamstown

Return Tax Payment To:
CITY OF WILLIAMSTOWN
PO Box 147
Williamstown, KY 41097

Telephone Number 859-824-3633

Name Duke Energy Kentucky cenc

Name David Wright

Address 550 South Tryon DEC-41B

Address _____

City, State, ZIP Code Charlotte, NC 28202

Name of District County/School/Special	Assessed Value Real Estate	Real Estate Rate Per $100 Value	Tax Due Real Estate	Assessed Value Tangible	Tangible Rate Per $100 Value	Tax Due Tangible	Total Real and Tangible Tax Due
Williamstown	1,462,478.00	.310	4533.68	250,708.00	.417	1045.45	5579.13

Important: See Reverse

Total District Tax $ 5579.13

Beginning for assessment date January 1, 2006, Telecoms as used on this form are broadly defined as: Communications Service Providers and Multi-Channel Video Programming Service Providers.

Specifically, these will include the following:

All Telephone Companies (Local, Long Distance and Wireless).

All Paging Companies.

All Cable Television Companies.

All Direct Broadcast System (DBS) Companies.

All Wireless Cable Direct Broadcast Companies.

All Telegraphic and Teletypewriter Service Companies.

All Coin-Operated Telephone Providers.

Signed _____ County Clerk

Payment Received By _____ Sheriff

Date _____ _____ By _____ Deputy

Total Tax		$ 5579.13
Amount Due If:		
Paid By January 11, 2016	2% Discount	5467.55 ✓
Paid By February 11, 2016	Face Amount	5579.13
Paid By March 11, 2016	5% Penalty	5858.09
Paid After April 11, 2016	~~25%~~ 10% Penalty	6443.90

PAYMENT INSTRUCTIONS

This bill is for property taxes on distilled spirits or telecoms. Under KRS 134.015, if paid within 30 days, a 2 percent discount applies. If paid after 30 days but within 60 days, the face amount is due. If paid between 61 and 90 days, a 5 percent penalty will be added. After 90 days, a 10 percent penalty, 10 percent sheriff's fee, will accrue. Make payment to the address in upper left-hand corner of front page.

If there is any question regarding this bill, contact Crystal Flynn at (859) 824-3633.

CITY OF CRITTENDEN
PO BOX 207
CRITTENDEN, KY 41030

DATE 12/10/15

CITY OF CRITTENDEN
P.O.BOX 207
CRITTENDEN, KY. 41030

THE REVENUE CABINET, DEPARTMENT OF PROPERTY TAXATION, HAS CERTIFIED TO ME AS CITY CLERK / TREASURER OF CRITTENDEN, THE FOLLOWING STATEMENT OF ASSESSMENT AGAINST PUBLIC SERVICE COMPANIES FOR TAX IN GRANT COUNTY WHICH IS FILED IN MY OFFICE AND IS HEREBY CERTIFIED TO YOU FOR COLLECTION.

TAX YEAR **2015** GNC: 5260 TYPE CO. GEU

TAX PAYER: DUKE ENERGY
Attn: David Wright
ADDRESS 550 South Tryon DEC - 41B
Charlotte, NC 28202

Tax Rate 0.00203

12/7/16

REAL ESTATE ASSESSMENT	$ 648,682.00	$ 1,316.82
TANGIBLE ASSESSMENT	$ 800,947.00	$ 1,625.92
TOTAL DUE:		$ 2,942.74

A COPY ATTESTED:
Megan Simpson
City Clerk/Treasurer

(1-06)
onwealth of Kentucky
ARTMENT OF REVENUE

PUBLIC SERVICE COMPANY
PROPERTY TAX STATEMENT
For County, School or Special Taxes
Assessment for Year 2015 Taxes

BILL NO: 37
GNC NO: 005260
DATE 12/10/2015
TYPE: GEU

Return Tax Payment to Sheriff
CHUCK DILLS
GRANT COUNTY
107 N MAIN STREET, COURTHOUSE
WILLIAMSTOWN, KY 41097
County Clerk TABATHA CLEMONS
Telephone 859-824-3321

Taxpayer Name: DUKE ENERGY KENTUCKY INC
ATTN:
Address: DAVID WRIGHT
550 SOUTH TYRON DEC-41B
CHARLOTTE NC 28202 0000

Name of District County/School/Spcls		Assessed Value Real Estate	Real Estate Rate Per $100 Value	Multi-plier	Tax Due Real Estate	Assessed Value Tangible	Tangible Rate Per $100 Value	Multi-plier	Tax Due Tangible	Total Real and Tangible Tax Due
REAL ESTATE	CEXT	5,809,293.00	0.0550		3,195.11		0.1132			3,195.11
REAL ESTATE	CNTY	5,809,293.00	0.1460		8,481.57		0.1460			8,481.57
REAL ESTATE	HLTH	5,809,293.00	0.0280		1,626.60		0.0280			1,626.60
REAL ESTATE	LIB	5,809,293.00	0.0950		5,518.83		0.1347			5,518.83
REAL ESTATE	MHTH	5,809,293.00	0.0160		929.49		0.0160			929.49
REAL ESTATE	SOIL	5,809,293.00	0.0100		580.93					580.93
COMMON SCHOOL	SCH2	4,342,168.00	0.5610		24,359.56		0.5610			24,359.56
GRADED SCHOOL	SCH1	1,467,125.00	0.9340		13,702.95		0.9340			13,702.95
TANGIBLE	CEXT		0.0550			5,707,393.00	0.1132		6,460.77	6,460.77
TANGIBLE	CNTY		0.1460			5,707,393.00	0.1460		8,332.79	8,332.79
TANGIBLE	HLTH		0.0280			5,707,393.00	0.0280		1,598.07	1,598.07
TANGIBLE	LIB		0.0950			5,707,393.00	0.1347		7,687.86	7,687.86
TANGIBLE	MHTH		0.0160			5,707,393.00	0.0160		913.18	913.18
COMMON SCHOOL	SCH2		0.5610			5,396,948.00	0.5610		30,276.88	30,276.88
TANG GRADED SC	SCH1		0.9340			310,445.00	0.9340		2,899.56	2,899.56

90
1/7/16

Signed Tabatha Clemons
County Clerk

Total Due: 116,564.15

Mail to

GRANT COUNTY SHERIFF
CHUCK DILLS
212 BARNES RD SUITE A
WILLIAMSTOWN KY 41097

Property Tax Payment Analysis Report - Statement and Parcel Details

2015 pay 2016 Statement year

State	County	Parcel Number	Stat
Kentucky	Grant KY - G	043-00-00-020.01-Fire fee	GR fee

Difference	Paid Tax Amount	Net Calculated Tax Amount	Pursued Discount	Gross Calculated Tax Amount	Levy	Taxable	Payment	Release	Install

2015 Grant County Property Tax Statement
Grant County Sheriff, 212 Barnes Road, Suite A
Williamstown, KY 41097

Account: 12332-1
District: 01-COMMON

Bill: 11119

Description	Revenue $100	Assessed Value	Tax
CRITTENDEN FIRE	25.0000	$100	$25.00

Description: POWER PLANT-7.474 AC
Location: HYDE RD 3218
Map No.: 043-00-00-020.01
Return This Card With Payment
Make Check Payable to:
Grant County Sheriff

Amount Due:

2% Discount: October 1, 2015 - November 1, 2015	$24.50
Face: November 2, 2015 - December 31, 2015	$25.00
5% Penalty: January 1, 2016 - January 31, 2016	$26.25
21% Penalty: February 1, 2016 - April 15, 2016	$30.25

** Additional penalty if paid after April 15, 2016. **
Please visit grantcountysheriff.com for additional information.
Include a self-addressed stamped envelope for receipt.

201501119

Chuck Dills
Grant County Sheriff
212 Barnes Road, Suite A
Williamstown, KY 41097

Presorted
First Class Mail
U.S. Postage PAID
Lexington, KY
Permit No. 1

2015 Grant County Property Tax Statement

TO ASSURE PROPER CREDIT
PLEASE BRING THIS CARD WITH YOU IF PAYING IN PERSON OR MAIL WITH PAYMENT.

IF THIS TAX BILL SHOULD BE PAID BY MORTGAGE COMPANY OR NEW OWNER, PLEASE FORWARD TO RESPONSIBLE PARTY PROMPTLY.

3137
Duke Energy Ky INC
Mail Stop 30C
400 South Tryon St
Charlotte, NC 28202

RECEIVED
OCT 09 2015
TAX DEPT

11707

10/22/2015

...perty Tax Statement
...12 Barnes Road, Suite A
...097

Account: 19848-1
District: 01-COMMON

Bill: 3137

...TATE REAL ESTATE	0.1220	$45,318	$55.29
COUNTY REAL ESTATE	0.1480	$45,318	$66.16
GRANT COUNTY SCHOOL CO SCH REAL ESTATE	0.5610	$45,318	$254.23
MENTAL HLTH REAL	0.0160	$45,318	$7.25
HEALTH REAL	0.0280	$45,318	$12.69
LIBRARY REAL	0.0950	$45,318	$43.05
EXTENSION REAL	0.0550	$45,318	$24.92
SOIL CONSERVATION	0.0100	$45,318	$4.53
DRY RIDGE FIRE	25.0000	$100	$25.00

...escription: 8.1980 AC
...ocation: WARSAW RD 2982
...ap No.: 034-00-00-020.00
Return This Card With Payment
...ake Check Payable to:
...rant County Sheriff

Amount Due:

2% Discount: October 1, 2015 - November 1, 2015	$483.26
Face: November 2, 2015 - December 31, 2015	$493.12
5% Penalty: January 1, 2016 - January 31, 2016	$517.78
21% Penalty: February 1, 2016 - April 15, 2016	$596.67

** Additional penalty if paid after April 15, 2016. **
Please visit grantcountysheriff.com for additional information.
Include a self-addressed stamped envelope for receipt.

201500317

Chuck Dills
Grant County Sheriff
212 Barnes Road, Suite A
Williamstown, KY 41097

Presorted
First Class Mail
U.S. Postage PAID
Lexington, KY
Permit No. 1

2015 Grant County Property Tax Statement

TO ASSURE PROPER CREDIT
PLEASE BRING THIS CARD WITH YOU IF PAYING IN PERSON OR MAIL WITH PAYMENT.

IF THIS TAX BILL SHOULD BE PAID BY MORTGAGE COMPANY OR NEW OWNER, PLEASE FORWARD TO RESPONSIBLE PARTY PROMPTLY.

11119
Union Light Heat & Power
1000 E Main St
Plainfield, IN 46168-1765

APST25B

11400

State	County	Parcel Number	Stat
Kentucky	Grant KY - G	034-00-00-020.00	War
		034-00-00-020.00-Fire	War

CITY OF CRESTVIEW HILLS

50 Town Center Boulevard, Crestview Hills, Kentucky 41017-2561
(859) 341-7373, FAX (859) 341-6993

IF YOU HAVE AN ESCROW ACCOUNT WITH A MORTGAGE COMPANY, PLEASE FORWARD TO THEM IMMEDIATELY.

Duke Energy Kentucky Inc
Shaw Pittman & David Wright
550 South Tryon Dec-41B
Charlotte, NC 28202-0000

Due Date **12/31/16**

2016 Property Tax Statement	LOCATION	PIDN

GROSS ASSESSMENT	HOMESTEAD EXEMPTION	MORTGAGOR
3,131,252		

PROPERTY VALUE DESCRIPTION	TAX RATE PER HUNDRED	NET ASSESSMENT	AMOUNT DUE
2016 Property Tax City	.160	3,131,252	5,010.00
		BILL TOTAL	**$5,010.00**

ALL PAYMENTS RECEIVED OR POSTMARKED AFTER DEC. 31 WILL BE SUBJECT TO PENALTY & INTEREST.
NO RECEIPT RETURNED UNLESS ACCOMPANIED BY SELF ADDRESSED STAMPED ENVELOPE

Please make check payable to

City of Crestview Hills
50 Town Center Blvd
Crestview Hills, KY 41017

PROPERTY OWNER
Duke Energy Kentucky Inc Shaw Pittman & David Wright 550 South Tryon Dec-41B Charlotte, NC 28202-0000

TAX PAYMENT SUB

Invoice #	2016-1310
PIDN	
Total	$5,010.00
Amount Enclosed	.
Check #	.

ACH

City of Crescent Springs
739 Buttermilk Pike
Crescent Springs, KY 41017
www.crescent-springs.ky.us
ph 859 341-3017
fax 859 341-3518

Public Service Tax

Duke Energy Kentucky Inc
Attn: David Wright
550 South Tryon DEC-41B
Charlotte, NC 28202

Bill Number: 1877
Date: 4/20/2016

Tax Year	*Type of Tax*	*Assessed Value*	*Rate*	*Tax Amount*
2015	Real Estate	$2,537,455 ✓	0.0023	$ 5,836.15
2015	Tangible	$1,484,601 ✓	0.00146	$ 2,167.52
		51% of $693,133.00)		$ 8,003.66
	If paid within 30 days 2% discount may be taken			(160.07)
			If paid by 5/20/2016	**$ 7,843.59** ✓

DO 5/17/16

---------- *Please remit this portion with your payment* ----------

PUBLIC SERVICE TAX BILL 2015

Remit Payment to:

City of Crescent Springs
739 Buttermilk Pike
Crescent Springs, KY 41017

Name: Duke Energy Kentucky Inc
Bill Number: 1877
Bill Date: 4/20/2016
Total Due $8,003.66
Amount Paid: _____

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 3588 Real Estate

P I D N: 055-11-14-008.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
408 13TH ST

Legal Description:
24 BA 3RD

Fair cash value: 10,000
Exemption_____: 10,000
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60.00
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

P-1 T23 P1 ******AUTO**MIXED AADC 450 UMO033474
C/O PROPERTY TAX DEPT
DUKE ENERGY KENTUCKY INC
PO BOX 1007 STE ST 22 M
CHARLOTTE NC 28201-1007

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 3589 Real Estate

P I D N: 055-11-14-009.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
410 13TH ST

Legal Description:
B A 3RD SUB LOT 23

Fair cash value: 5,000
Exemption_____: 5,000
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60.00
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

P-1 T23 P1 ******AUTO**MIXED AADC 450 UMO033478
C/O PROPERTY TAX DEPT
DUKE ENERGY KENTUCKY INC
PO BOX 1007 STE ST 22 M
CHARLOTTE NC 28201-1007

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60445 Real Estate

P I D N: 001-00-00-015.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		
EXTENSION DIST	0.00930		
HEALTH	0.02000		
LIBRARY	0.11300		
AREA PLANNING	0.02900		
(NO FIRE)	0.00000		
911 fee *			
		Gross Tax Due	60.00

Property Location:
3020 AMSTERDAM RD

Legal Description:

NIXIE 430 FE 1260 0010/02/15
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 41018807070 *3013-01942-02-31

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60.00
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

P-1 T1 P1 *******AUTO**5-DIGIT 41011 UMO000689
UNION LIGHT HEAT & POWER CO
107 BRENT SPENCE SQ
COVINGTON KY 41011-1433

41018@8070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF
See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60446 Real Estate

P I D N: 024-00-00-011.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
BOONE WALTON FIR	0.19900		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
284 EADS RD

Legal Description:
0.883 ACS NS EADS RD E CNO & TP RR

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	
Penalty 1	01/31/16	
Penalty 2	04/15/16	

P-1 T28 P2 ********** 3-DIGIT 410 UMO038568

CUT ALONG THIS LINE

NIXIE 430 DE 1300 0010/02/15
RETURN TO SENDER
NO SUCH NUMBER
UNABLE TO FORWARD
BC: 41018807070 *3013-09578-02-31

41018@8070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF
See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60444 Real Estate

P I D N: 026-43-03-011.01

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
SLEEPY HOLLOW RD

Legal Description:
2.177 ACS BS SLEEPY HOLLOW

Fair cash value: 1
Exemption______: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	
Penalty 1	01/31/16	
Penalty 2	04/15/16	

P-1 T28 P1 ***************3-DIGIT 410 UMO038048

NIXIE 430 DE 1300 0010/02/15

RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

BC: 41018807070 *3013-01940-02-30

41018@8070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60439 Real Estate

P I D N: 027-20-03-022.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
2445 BROMLEY CRESCENT SPRINGS

Legal Description:
5.363 ACS SEC BEECHWOOD & BROM CRES SPGS RD

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	6(
Penalty 1	01/31/16	6(
Penalty 2	04/15/16	6(

41018@8070

NIXIE 430 DE 1260 0010/02/15
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 41018807070 *3013-01945-02-30

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60443 Real Estate

P I D N: 029-20-01-018.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
TURKEYFOOT RD

Legal Description:
APPROX 1 ACRE ES TURKEYFOOT RD
N OF SUMMIT HILLS CC

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	6[illegible]
Penalty 1	01/31/16	6[illegible]
Penalty 2	04/15/16	6[illegible]

41018@8070

MIXIE 430 DE 1260 0010/02/15

RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

BC: 41018807070 *3013-01943-02-30

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 15150 Real Estate

P I D N: 040-11-08-001.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
LUDLOW SCHOOL	0.85700		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
109 HIGHWAY AVE

Legal Description:
MORNINGSIDE SUBD PT LOT 1

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	6[illegible]
Penalty 1	01/31/16	6
Penalty 2	04/15/16	6

MIXIE 430 FE 1260 0010/02/15

RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

BC: 41018807070 *3013-01949-02-30

41018@8070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 12274 Real Estate

P I D N: 055-12-02-082.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
517 HAWTHORNE ST

Legal Description:
HAWTHORNE SUBD LOT 117

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60
Penalty 1	01/31/16	6
Penalty 2	04/15/16	6

41018@8070

ENIXIE 430 DE 1260 0010/02/15

RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

BC: 41018807070 *3013-01952-02-30

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 12270 Real Estate

P I D N: 055-12-02-024.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
508 HAWTHORNE ST

Legal Description:
HAWTHORNE SUBD LOT 147
NEC HAWTHORNE & MONROE ST

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	6
Penalty 1	01/31/16	6
Penalty 2	04/15/16	6

41018@8070

NIXIE 430 FE 1260 0010/02/15
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 41018807070 *3013-01956-02-30

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 12275 Real Estate

P I D N: 054-23-20-001.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00

Property Location:
300 10TH ST

Legal Description:
NEC 10TH ST & PROSPECT ST
55'X80' PT LOT 204 FOOTES 2ND

Fair cash value: 1

NIXIE 410112012-1N 260 10/17/15
RETURN TO SENDER
UNABLE TO FORWARD
UNABLE TO FORWARD
RETURN TO SENDER

Discount		
Face		
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

O000680

COVINGTON KY 41011-1433

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60438 Real Estate

P I D N: 048-00-00-139.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
INDEPENDENCE FIR	0.19500		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
11749 TAYLOR MILL RD

Legal Description:
0.8202 ACS SES TAYLOR MILL RD NE RIGGS RD

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	
Face	12/31/15	
Penalty 1	01/31/16	
Penalty 2	04/15/16	

NIXIE 430 DE 1260 0010/02/15

RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

BC: 41018807070 *3013-01946-02-30

41018@8070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60441 Real Estate

P I D N: 044-20-00-071.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
4145 MADISON PK

Legal Description:
1.007 ACS 180' W OF MADISON PK
INT BEING 300' S OF STITH RD

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	
Penalty 1	01/31/16	
Penalty 2	04/15/16	

CUT ALONG THIS LINE

D 1 T28 P1 **********3-DIGIT 410 UMO038419

NIXIE 430 DE 1300 0010/04/15

RETURN TO SENDER
NO SUCH NUMBER
UNABLE TO FORWARD

BC: 41018807070 *3013-07256-04-26

41018@8070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60448 Real Estate

P I D N: 042-40-00-006.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
500 BROOKS ST

Legal Description:
24.946 ACRES E END BROOKS ST BOTH SIDES BANKLICK CREEK BOTH SIDES CSX RR APPROX 580 FT E OF RELOCATED MADISON PK

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	6(
Penalty 1	01/31/16	6(
Penalty 2	04/15/16	6(

41018@8070

NIXIE 430 DE 1260 0010/02/15
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 41018807070 *3013-01941-02-30

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 12271 Real Estate

P I D N: 040-34-04-007.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
600 2ND ST

Legal Description:
50'X237.50' NS SECOND ST
545' W OF PHILADELPHIA

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	
Penalty 1	01/31/16	
Penalty 2	04/15/16	

41018@8070

NIXIE 430 FE 1260 0010/02/15

RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

BC: 41018807070 *3013-01955-02-30

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 12273 Real Estate

P I D N: 040-13-00-001.01

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
50 RIVER RD

Legal Description:
I L LUDLOW FARM PT 1 THRU
15 ACRES BOTH SIDES OF RI
& BEING PART OF LOTS 1-15

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60.00
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

P-1 T1 P1 *******AUTO**5-DIGIT 41011 UI
UNION LIGHT HEAT & POWER CO
107 BRENT SPENCE SQ
COVINGTON KY 41011-1433

NIXIE 430 FE 1260 0010/02/15
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 41018807070 *3013-01953-02-30

41018@5070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 12276 Real Estate

P I D N: 055-13-02-010.02

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
1820-30 RUSSELL ST

Legal Description:
1.179 AC BETWEEN AUGUSTINE & RUSSELL STS
BEING LOT 1A RESUBD AMERIPLEX BUSINESS &
INDUSTRIAL PARK

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	
Face	12/31/15	
Penalty 1	01/31/16	
Penalty 2	04/15/16	

NIXIE 430 DE 1260 0010/02/15
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 41018807070 *3013-01950-02-30

41018@8070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 12268 Real Estate

P I D N: 055-14-07-001.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
1902-1930 AUGUSTINE ST

Legal Description:
225X385 FT SE COR 19TH & AUGUSTINE
(W 1/2 1 ALL 2-3-4-5-6-7-8 HOWARD SUBO)
AND PTS 9 THRU 14

Recieved
10/29/2015

Fai
Exe
Tax

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60.00
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

P-1 T28 P1 **********3-DIGIT 410 UMO038178
UNION LIGHT HEAT & POWER CO
1902 AUGUSTINE AVE # 1930
COVINGTON KY 41014

DETACH AND RETURN THIS PART

2015 KENTON

PAYABLE TO CHARLES
See Reverse Side F

NIXIE 430 DE 1260 0010/02/15
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 41018807070 *3013-01954-02-30

Bill Number: 12272 Real Estate

P I D N: 055-41-14-006.02

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
2226 OAKLAND AVE

Legal Description:
2.2 ACRES ES OAKLAND AVE INCLUDING
LOTS 15 16 & PT 17 CRAIG & FISCHER'S

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60.00
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

P-1 T1 P1 *******AUTO**5-DIGIT 41011 UMO000677
UNION LIGHT HEAT & POWER CO
107 BRENT SPENCE SQ
COVINGTON KY 41011-1433

41018@8070

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 60442 Real Estate

P I D N: 069-20-00-011.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COMMON SCHOOL	0.60900		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
8096 DECOURSEY PK

Legal Description:
LOT 80'X150' WS DECOURSEY PIKE
NEAR LOCUST PIKE INTERSECTION

Fair cash value: 1
Exemption_____: 1
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	
Face	12/31/15	
Penalty 1	01/31/16	
Penalty 2	04/15/16	

NIXIE 430 DE 1260 0010/02/15

RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

BC: 41018807070 *3013-01944-02-30

41018@8070

City of Villa Hills
719 Rogers Road
Villa Hills, KY 41017
ph 859-341-1515
fax 859-341-0012

Property Tax Statement

Duke Energy Kentucky Inc
David W. Wright
550 South Tryon DEC-41B
Charlotte, NC 28202

Bill Number: U20-16-15-052.60
Date: 10/1/2016

Tax Year	*Type of Tax*	*Assessed Value*	*Rate*	*Tax Amount*
2015	Real Estate	$5,018,464	0.00214	$ 10,739.51
2015	Personal Property	$2,442,029	0.0007	$ 1,709.42
				$ 12,448.93
	If paid within 30 days 2% discount may be taken			(248.98)
			If paid by 10/31/2016	**$ 12,199.95**

Payments received after 60 days of the invoice date will be subject to a 15% penalty and 0.5% interest per month (6% per annum).

If you have questions regarding this invoice, please contact Craig Bohman the City Administrator/Clerk at the number above or via e-mail at cbohman@villahillsky.org

---------- *Please remit this portion with your payment* ----------

CITY OF RYLAND HEIGHTS
10145 DECOURSEY PIKE
RYLAND HEIGHTS, KY 41045

ph 859-363-7707
fax 859-363-7711

rylandheights@mw.twcbc.com

DUKE ENERGY KENTUCKY INC
ATTN: DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

BILL NUMBER: PSC - 16-002

TAX YEAR	TAX TYPE	ASSESSED VALUE	RATE	TAX AMOUNT
2015	REAL PROP	$ 60,071.00	0.0012	$ 72.09
2015	PERS PROP	$ 2,011,480.00	0.00177	$ 3,560.32
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ 3,632.40
	2% DISCOUNT IF PAID WITHIN 30 DAYS			$ 72.65
				$ 3,559.76

Please remit this portion with your payment

PROPERTY TAX BILL

REMIT PAYMENT TO:
CITY OF RYLAND HEIGHTS
10145 DECOURSEY PIKE
RYLAND HEIGHTS, KY 41045

NAME: DUKE ENERGY KY INC
BILL NUMBER: PSC -16-002
BILLING DATE: 8/28/16
TOTAL DUE: $3632.40
AMOUNT PAID: _____

INVOICE

Invoice Date: 5/16/16

CITY OF ELSMERE
318 GARVEY AVE.
ELSMERE, KY 41018
859-342-7911

Bill To:
Duke Energy Kentucky Inc.
David Wright
550 South Tryon DEC-41B
Charlotte, NC 28202-0000

FRANCHISE TAX

Tangible Assessment: $2,642,371 ✓ 32.5 .193

Real Estate Assessment: $4,866,994 ✓ - 38.5 .223

MONTH	YEAR	TANGIBLE TAX	REAL ESTATE TAX
	2015	$5,099.78	$10,853.40

TOTAL AMOUNT DUE: **$15,953.18**
Payment due upon receipt

DE 6/10/16

CUT AND RETURN BOTTOM PORTION WITH PAYMENT

Duke Energy Kentucky Inc.
David Wright
550 South Tyron DEC-41B
Charlotte, NC 28202-0000

Franchise Tax

Invoice Date: 5/16/16

Total Amount Due: $15,953.18

Make Payable To: City of Elsmere

The City of
Fort Wright, Kentucky
409 Kyles Lane, Fort Wright, KY 41011-5146
www.fortwright.com
(859) 331-1700

April 19, 2016

Duke Energy Kentucky Inc.
David Wright
550 South Tryon DEC-41B
Charlotte, NC 28202-0000

Bill Number: 2015-PCS-015

RE: 2015 Real Estate and Tangible Property Tax

The Kentucky Revenue Cabinet, Public Services Division, has certified the 2015 Public Service assessment. Therefore, the 2015 "Tax Due" amount is now due.

Real Estate Valuation	Tax Rate Per $100 Real Valuation	Tangible Valuation	Tax Rate Per $100 Tang Valuation	Tax Due 30 Days By 5/11/16
5,111,916	0.276	3,859,240	0.400	**$ 29,545.85**

5/17/16

The "Tax Due" amount must be received by the City of Fort Wright, Kentucky or postmarked by May 19, 2016.

City of Taylor Mill

est. 1957

April 20, 2016

Duke Energy Kentucky Inc.
David Wright
550 South Tryon DEC-41B
Charlotte, NC 28202

Invoice for 2015 Property Assessment Tax for Public Service Company

The City of Taylor Mill, Kentucky has received the Cerfification of Pulic Service Company Property Assessment from the Commonwealth of Kentucky Deparment of Revenue. According to their records, the following tax amounts are due:

Tax Year	Tangible Property Amt.	Tax Rate	Tangible Amount Due
2015	$3,980,522.00 ✓	7.5/1000	$29,853.92
Tax Year	**Real Property Amt.**	**Tax Rate**	**Real Property Amount Due**
	$4,229,295.00 ✓	4.21/1000	$17,805.33
		TOTAL:	$47,659.25

Less 2% discount if paid by May 20, 2016	$953.18
Amount due by May 20, 2016:	$46,706.06

5/17/16

If paid between May 20, 2016 and June 20, 2016
please pay full amount due: $47,659.25

If paid between June 20, 2016 and July 20, 2016
please pay full amount due, plus a 5% late penalty: $50,042.21

Please make check payable to:
City of Taylor Mill
5225 Taylor Mill Road
Taylor Mill, KY 41015

For questions about this invoice, please contact:
Angie Wright at 859-581-3234
Thank you.

KENTON COUNTY KENTUCKY
PROPERTY TAX STATEMENT - PUBLIC SERVICE COMPANY
REAL & TANGIBLE TAX

TAX YEAR: 2015

GNC: 005260 BILLING DATE: 04/19/16

DUKE ENERGY KENTUCKY INC
DAVID WRIGHT
550 SOUTH TRYON
DEC-41B
CHARLOTTE, NC 28202

2016 APR 20 P 3:

Type code_: GEU gas & electric utili

	REAL ESTATE			TANGIBLE			
	Rate	Assessment	Tax Amount	Rate	Assessment	Tax Amount	Total
KENTON COUNTY	0.14800	26,256,744	186,859.98	0.20400	83,253,753	169,837.66	356,697.64
N.K.A.P.C.	0.02900	26,256,744	36,614.46	0.02933	83,253,753	24,418.33	61,032.79
HEALTH	0.02000	26,256,744	25,251.35	0.02000	83,253,753	16,650.75	41,902.10
CO-OP EXT SRV	0.00930	26,256,744	11,741.88	0.01030	83,253,753	8,575.14	20,317.02
LIBRARY	0.11300	26,256,744	142,670.12	0.19710	83,253,753	164,093.15	306,763.27
BEECHWOOD SCHL	0.00000	5,750,715	0.00	0.00000	3,300,140	0.00	0.00
COMMON SCHL	0.60900	59,824,471	364,331.03	0.60900	51,536,770	313,858.93	678,189.96
COVINGTON SCHL	1.11100	41,542,123	461,532.99	1.15700	17,558,583	203,152.81	664,685.80
ERLANGER	0.88800	14,629,657	0.00	0.88800	8,609,795	0.00	0.00
LUDLOW SCHL	0.85700	4,509,778	38,648.80	0.85700	2,248,465	19,269.35	57,918.15
WALTON SCHL	1.09600	0	0.00	1.09600	0	0.00	0.00
BOONE/WAL FD	0.19900	343,777	684.12	0.20000	2,556,091	5,112.18	5,796.30
EDGEWOOD FD	0.00000	0	0.00	0.00000	0	0.00	0.00
ELSMERE FD	0.20000	6,350,171	12,700.34	0.18700	5,871,997	10,980.63	23,680.97
INDEPENDENCE FD	0.19500	15,815,444	30,840.12	0.20000	13,269,933	26,539.87	57,379.99
KENTON FD	0.20000	26,642	53.28	0.20000	535,199	1,070.40	1,123.68
PINER/FISK FD	0.20000	260,826	521.65	0.20000	2,908,178	5,816.36	6,338.01
RYLAND HTS FD	0.19800	345,054	683.21	0.14400	3,793,648	5,462.85	6,146.06
			1,313,133.33			974,838.41	

TOTAL DUE: 2,287,971.74

5/16/16

Please Remit to: KENTON COUNTY SHERIFF
303 COURT STREET
SUITE 409
COVINGTON KY 41011

IF PAID BY		
Face	5/19/16	2,287,971.74
Pen1:5%	6/18/16	2,402,370.34
Pen2:10%+10%Shrf	7/18/16	2,768,445.83
Interest 1%	8/17/16	2,796,130.31
Interest 2%	9/16/16	2,823,814.74
Interest 3%	10/16/16	2,851,499.23
Interest 4%	11/15/16	2,879,183.68
Interest 5%	12/15/16	2,906,868.15
Interest 6%	1/14/17	2,934,552.56

(TAXPAYER COPY)

fran020b 04/19/16 02:25-pm

City of Edgewood
385 Dudley Road
Edgewood, KY 41017
Telephone: 859-331-5910 - Fax: 859-331-5912

April 19, 2016

Duke Energy Kentucky Inc.
David Wright
550 S. Tryon Street DEC-41B
Charlotte, NC 28202

Dear Sir:

The **2015** Public Service Tax Assessment for your company has been received from the Kenton County Clerk.

The amount now due for **2015** local taxes is as follows:

REAL ESTATE

Assessment	Rate	Amt due if paid By 5/23/16	Amt due if paid By 6/23/16
$5,444,681✓	2.44	$13,019.32	$13,285.02

TANGIBLE

Assessment	Rate	Amt due if paid By 5/23/16	Amt due if paid By 3/8/15
$4,447,124 ✓	2.44	$10,633.96	$10,850.98

GRAND TOTAL DUE BY 5/23/16 $23,653.28 ~~$23~~ 5/16/16
GRAND TOTAL DUE BY 6/23/16 $24,136.00

If payment is received after 6/23/16 a 5% penalty will apply and after 90 days a 10% penalty will apply.

Jeanette Kemper
City Clerk

505 COMMONWEALTH AVE. • ERLANGER, KY 41018 • 859-727-2525

PUBLIC SERVICE TAX
TAX YEAR 2015
042216-2

DUKE ENERGY KENTUCKY, INC.
DAVID W. WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

	Rate Per 100%	Rate Per 100%	Assessment	Amount
Real	.347		$14,102,179.00	$48,934.56
Tangible		.599	$ 6,669,310.00	$39,949.17

5/16/16

TOTAL DUE: $88,883.73

2% DISCOUNT APPLIED IF PAID BY: 05/22/16: $87,106.06
06/22/16: $88,883.73

All payments received or postmarked after due date but paid within 61-90 days, will be subject to a 5% Penalty: after 90 days a 10% penalty and 6% interest will accrue per annum.

Please remit to:

City of Erlanger
505 Commonwealth Ave.
Erlanger, KY 41018

MAKE CHECK PAYABLE TO

CITY OF LAKESIDE PARK

P.O. BOX 17127

LAKESIDE PARK, KY 41017

FORWARD A COPY TO MORTAGE COMPANY IF PAID THROUGH ESCROW ACCOUNT. RETURN NOTICE WITH PAYMENT. WHEN PAYING BY MAIL INCLUDE SELF-ADDRESSED ENVELOPE FOR RECEIPT.

OWNER:

DUKE ENERGY KENTUCKY INC.
DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

FOR TAX YEAR
2015

PROPERTY TAX BILL NO.
1489

DUE BY
6/5/16

	ASSESSED VALUE	RATE	AMOUNT OF
Real Estate	2,452,540	.314	$ 7,700.98
Tangible	1,478,010	1.182	$ 17,470.08
			$ 25,171.06

110

CITY OF CRESTVIEW HILLS

50 Town Center Boulevard, Crestview Hills, Kentucky 41017-2561
(859) 341-7373, FAX (859) 341-6993

IF YOU HAVE AN ESCROW ACCOUNT WITH A MORTGAGE COMPANY, PLEASE FORWARD TO THEM IMMEDIATELY.

UNION LIGHT HEAT & POWER CO
TAX DEPT
1000 E MAIN ST
PLAINFIELD, IN 46168-1765

Bill # 2015-1019

Due Date 12/31/15

2015 Property Tax Statement	LOCATION	PIDN
	2612 THOMAS MORE	029-10-00-001.02

GROSS ASSESSMENT	HOMESTEAD EXEMPTION	MORTGAGOR
650,000	0	

PROPERTY VALUE DESCRIPTION	TAX RATE PER HUNDRED	NET ASSESSMENT	AMOUNT DUE
2015 Property Tax City	.161	650,000	1,046.50
		BILL TOTAL	**$1,046.50**

ALL PAYMENTS RECEIVED OR POSTMARKED AFTER DEC. 31 WILL BE SUBJECT TO PENALTY & INTEREST.
NO RECEIPT RETURNED UNLESS ACCOMPANIED BY SELF ADDRESSED STAMPED ENVELOPE

City of Fort Mitchell 14-15 & 15-16
2355 Dixie Highway
Fort Mitchell, KY 41017-0157

Voice: 859-331-1212
Fax: 859-331-6102

INVOICE

Invoice Number: 895
Invoice Date: May 2, 2016
Page: 1

Bill To:	Ship to:
DUKE ENERGY KENTUCKY INC ATTN: DAVID WRIGHT 550 S TRYON DEC-41B CHARLOTTE, NC 28202	DUKE ENERGY KENTUCKY INC ATTN: DAVID WRIGHT 550 S TRYON DEC-41B CHARLOTTE, NC 28202

Customer ID	Customer PO	Payment Terms	
DUKE ENERGY KENTUCKY		2% DISC OF $202.04 IF PAID BY 6/2/1	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	Courier		6/1/16

Quantity	Item	Description	Unit Price	Amount
		FORT MITCHELL REAL PROPERTY TAX 2015 ASSESSMENT FOR PUBLIC SERVICE TAX $7,267,548.00 X .00139 = $10,101.89 (DOES NOT INCLUDE DISCOUNT AS LISTED ABOVE)		10,101.89

Subtotal	10,101.89
Sales Tax	
Total Invoice Amount	10,101.89
Payment/Credit Applied	
TOTAL	**10,101.89**

Check/Credit Memo No:

DC
5/16/19

City of Fort Mitchell 14-15 & 15-16
2355 Dixie Highway
Fort Mitchell, KY 41017-0157

Voice: 859-331-1212
Fax: 859-331-6102

INVOICE

Invoice Number: 891
Invoice Date: May 2, 2016
Page: 1

Bill To:	Ship to:
DUKE ENERGY KENTUCKY INC ATTN: DAVID WRIGHT 550 S TRYON DEC-41B CHARLOTTE, NC 28202	DUKE ENERGY KENTUCKY INC ATTN: DAVID WRIGHT 550 S TRYON DEC-41B CHARLOTTE, NC 28202

Customer ID	Customer PO	Payment Terms	
DUKE ENERGY KENTUCKY		2% DIS OF $547.82 IF PAID BY 6/2/16	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	Courier		6/1/16

Quantity	Item	Description	Unit Price	Amount
		BEECHWOOD SCHOOL TANGIBLE PROPERT 2015 TAX ASSESSMENT PUBLIC SERV UTILITY TAX OF $3,300,140.00 X .0083 = $27,391.16 (DOES NOT INCLUDE DISCOUNT AS LISTED ABOVE)		27,391.16

Subtotal	27,391.16
Sales Tax	
Total Invoice Amount	27,391.16
Payment/Credit Applied	
TOTAL	**27,391.16**

Check/Credit Memo No:

5/16/16

City of Fort Mitchell 14-15 & 15-16
2355 Dixie Highway
Fort Mitchell, KY 41017-0157

Voice: 859-331-1212
Fax: 859-331-6102

INVOICE

Invoice Number: 890
Invoice Date: May 2, 2016
Page: 1

Bill To:
DUKE ENERGY KENTUCKY INC ATTN: DAVID WRIGHT 550 S TRYON DEC-41B CHARLOTTE, NC 28202

Ship to:
DUKE ENERGY KENTUCKY INC ATTN: DAVID WRIGHT 550 S TRYON DEC-41B CHARLOTTE, NC 28202

Customer ID	Customer PO	Payment Terms	
DUKE ENERGY KENTUCKY		2% DISC OF $954.62 IF PAID BY 6/2/1	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	Courier		6/1/16

Quantity	Item	Description	Unit Price	Amount
		BEECHWOOD SCHOOL REAL PROPERTY 2015 TAX ASSESSMENT FOR PUBLIC SERV UTILITY TAX OF $5,750,715.00 X .0083 = $47,730.94 (DOES NOT INCLUDE DISCOUNT AS LISTED ABOVE)		47,730.94

Subtotal	47,730.94
Sales Tax	
Total Invoice Amount	47,730.94
Payment/Credit Applied	
TOTAL	**47,730.94**

Check/Credit Memo No:

5/16/16

CITY OF PARK HILLS

1106 Amsterdam Road
Park Hills, Kentucky 41011-2097
(859) 431-6252
Fax (859) 431-6410

FRANCHISE TAX NOTICE

BILLING DATE: April 20, 2016

NAME: DUKE ENERGY KY, INC

ADDRESS: ATTN: DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

2015 – REAL ESTATE TAX – 2,728,072.00 X .209 = $5,701.67

2015 - TANGIBLE TAX - $1,668,214.00 x .75 = $12,511.61

TOTAL: $18,213.28 5/16/16

FRANCHISE TAX STATEMENT

ERLANGER CONSOLIDATED SCHOOLS

Linda Holmes, Tax Collector
500 Graves Avenue
Erlanger, KY 41018
859-727-2009

April 21, 2016

DUKE ENERGY KENTUCKY INC.
ATTN: DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202

School Tax in accordance with assessment by State Tax Commission:

Tax Year 2015 #5260

Tangible Personal Assessment	$	8,609,795.
Franchise	$	
Real Estate Assessment	$	14,629,657.
Total Evaluation	$	23,239,452.
Rate per $100.	$	.00888
2015 School Tax	**$**	**206,366.33**

5/16/16

Payment is due upon receipt of invoice.

PLEASE MAKE CHECKS PAYABLE TO: ERLANGER-ELSMERE BOARD OF EDUCATION

PLEASE DETACH AND RETURN TOP PORTION WITH PAYMENT

CITY OF FAIRVIEW

P.O. Box 121
Independence KY 41051

City Property Tax

Description	Tax Rate	Amount Due
City of Fairview Property Tax Assessment: $240,088.00	720.26	720.26

A 10% penalty will be applied to amounts due if not paid in full by Dec.31.

If you have an escrow account, please contact your mortgage company.

Total	$720.26
Balance Due	$720.26

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF
See Reverse Side For Additional Information

PRESORTED FIRST CLASS MAIL US POSTAGE PAID CINCINNATI, OH PERMIT # 9714

Bill Number: 60447 Real Estate

P I D N: 029-10-00-001.02

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200	650,000	793.00
COUNTY	0.14800	650,000	962.00
COMMON SCHOOL	0.60900	650,000	3,958.50
EXTENSION DIST	0.00930	650,000	60.45
HEALTH	0.02000	650,000	130.00
LIBRARY	0.11300	650,000	734.50
AREA PLANNING	0.02900	650,000	188.50
(NO FIRE)	0.00000		0.00
NO 911 fee	1.0503		
		Gross Tax Due	6,826.95

Property Location:
2612 THOMAS MORE PKWY

Legal Description:
2.962 ACS ES THOMAS MORE PKWY N
OF MEDICAL VILLAGE DR BEING
LOT 5 SEC 4 ASHLEY PROFESSIONAL PARK

RECEIVED
OCT 09 2015
TAX DEPARTMENT

	If Paid on or Before	Amount Due:
Discount	11/01/15	6,690.41
Face	12/31/15	6,826.95
Penalty 1	01/31/16	7,168.31
Penalty 2	04/15/16	8,260.62

P-1 T23 P1 ******AUTO**MIXED AADC 450 UMO034178
GREG SCOTT - TAX DEPT
UNION LIGHT HEAT & POWER CO
1000 E MAIN ST
PLAINFIELD IN 46168-1765

Tax Dept. Charlotte

2612 0190612 700

6-690-411-2 0-*

0.00% 0.00 0.00

PGN-PropTax - 6520

CITY OF COVINGTON KENTUCKY

DATE	INVOICE NO
12/15/2015	0000735

BILL TO

DUKE ENERGY KENTUCKY INC
ATTN: DAVID WRIGHT
550 SOUTH TRYON DEC41B
CHARLOTTE, NC 28285

DD 1/8/16

DUE DATE
1/15/2016

DESCRIPTION	QUANTITY	EFFECTIVE RATE	AMOUNT	DISCOUNT	CREDIT	BALANCE
PREVIOUS ACCOUNT BALANCE						0.00
2015 FRANCHISE TAXES $45,656,168 @ 0.3130 PER HUNDRED REAL ESTATE = $142,903.81 $21,345,629 @ 0.3332 PER HUNDRED TANGIBLE = $71,123.64 TOTAL TAX DUE = $214,027.45:						
REALESTATE $142,903.81 TANGIBLE $71,123.64 TOTAL $214,027.45	1.00	214,027.45	214,027.45	0.00	0.00	214,027.45
		INVOICE TOTAL:	**214,027.45**	**0.00**	**0.00**	**214,027.45**

talie W

m: support@kentoncounty.org
Sent: Friday, November 20, 2015 1:46 PM
To: Polk, Natalie W
Subject: KENTON COUNTY PROPERTY TAX BILL 2015 # 3586

*** Exercise caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. ***

Tax bills can be paid at any Northern Kentucky Fifth Third Bank through December 31st 2015 or pay tax bills online at www.kcor.org. (Credit/Debit card transactions are subject to a convenience fee paid by the cardholder. The Sheriff does not receive any type of fee or commission for these transactions.)See Sheriff's answers to frequently asked questions.

2015 KENTON COUNTY PROPERTY TAX BILL
SHERIFF CHARLES L. KORZENBORN -- Phone:(859)392-1800

7014 1200 0000 3882 0806

:o: Tax Payer ~~Name:~~

ounty Sheriff
188070
KY 41018-8070

DUKE ENERGY KENTUCKY INC
139 E 4TH ST
CINCINNATI OH 45202-4003

Bill Number: 3586 Real Estate P I D N: 055-11-14-006.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	.12200		0.00
COUNTY	.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
COOP EXTENSION	.00930		0.00
HEALTH	.02000		0.00
LIBRARY	.11300		0.00
AREA PLANNING	.02900		0.00
(NO FIRE)			0.00
911 Fee *			60.00
		Gross Tax Due	60.00

Property Location:
404 13TH ST W

Description:
25' NS 13TH 25' W LEE
WBTI PT LOTS 25-26-68-69

Gross Assessment: 5,000.00
Less Exemption: 5,000.00
Taxable Value: 0.00

CITY OF COVINGTON KENTUCKY

Solid Waste and Recycling Disposal Fee

Bill for Period: January I to June 30, 2015

City of Covington
20 West Pike Street, Covington, Kentucky 4101l
859-292-2180

Bill No: 13814

13659
52

**********AUTO**MIXED AADC 450
DUKE ENERGY KENTUCKY INC
C/O PROPERTY TAX DEPT
PO BOX 1007
CHARLOTTE NC 28201-1007

Due-Date: **03/31/2015**

PIDN: **055.11.14.002.00**

Property Address
409 WATKINS STREET

Waste Units: **1.00**

Always be a good neighbor. Place waste/recycling toters out of sight on non-pickup days.

2015 Waste Fee Notice

Description			Amount Due
Waste	If paid by:	03/31/2015	$75.00
	If paid by:	04/30/2015	$76.88
	If paid by:	05/31/2015	$78.75
	If paid by:	06/30/2015	$80.63

Account balances unpaid as of 6/30/2015 will be added to your 2015 Real Estate Bill with applicable penalty and interest.

Holiday Schedule: No waste/recycling services will be available throughout the City on Thanksgiving Day, Christmas Day or New Year's Day. Please contact Department of Public Improvements at 859-292-2292 or refer to the City website for the complete schedule.

Detach and Return Stub Below With Payment

CITY OF COVINGTON KENTUCKY

Solid Waste and Recycling Disposal Fee

Bill for Period: January I to June 30, 2015

City of Covington
20 West Pike Street, Covington, Kentucky 4101I
859-292-2180

Bill No: 3507

13656
52

**********AUTO**MIXED AADC 450
DUKE ENERGY KENTUCKY INC
C/O PROPERTY TAX DEPT
STE ST22M
PO BOX 1007
CHARLOTTE NC 28201-1007

Due-Date: 03/31/2015

PIDN: 055.11.14.001.01

Property Address
411 -17 WATKINS STREET

Waste Units: 1.00

Always be a good neighbor. Place waste/recycling toters out of sight on non-pickup days.

2015 Waste Fee Notice

Description			Amount Due
Waste	If paid by:	03/31/2015	$75.00
	If paid by:	04/30/2015	$76.88
	If paid by:	05/31/2015	$78.75
	If paid by:	06/30/2015	$80.63

Account balances unpaid as of 6/30/2015 will be added to your 2015 Real Estate Bill with applicable penalty and interest.

Holiday Schedule: No waste/recycling services will be available throughout the City on Thanksgiving Day, Christmas Day or New Year's Day. Please contact Department of Public Improvements at 859-292-2292 or refer to the City website for the complete schedule.

Detach and Return Stub Below With Payment

CITY OF COVINGTON KENTUCKY

Solid Waste and Recycling Disposal Fee

Bill for Period: January 1 to June 30, 2015

City of Covington
20 West Pike Street, Covington, Kentucky 41011
859-292-2180

Bill No: 3508

13657
52

**********AUTO**MIXED AADC 450
DUKE ENERGY KENTUCKY INC
C/O PROPERTY TAX DEPT
STE ST22M
PO BOX 1007
CHARLOTTE NC 28201-1007

Due-Date: **03/31/2015**

PIDN: **055.11.14.009.00**

Property Address
410 13TH STREET WEST

Waste Units: **4.00**

Always be a good neighbor. Place waste/recycling toters out of sight on non-pickup days.

2015 Waste Fee Notice

Description			Amount Due
Waste	If paid by:	03/31/2015	$300.00
	If paid by:	04/30/2015	$307.50
	If paid by:	05/31/2015	$315.00
	If paid by:	06/30/2015	$322.50

Account balances unpaid as of 6/30/2015 will be added to your 2015 Real Estate Bill with applicable penalty and interest.

Holiday Schedule: No waste/recycling services will be available throughout the City on Thanksgiving Day, Christmas Day or New Year's Day. Please contact Department of Public Improvements at 859-292-2292 or refer to the City website for the complete schedule.

Detach and Return Stub Below With Payment

CITY OF COVINGTON KENTUCKY

City of Covington
20 West Pike Street, Covington, Kentucky 41011
(859) 292-2180

2015 TAX NOTICE FOR PROPERTY OWNERS
UNDER CITY OF COVINGTON ORDINANCE 0-50-80 AS AMENDED

9972-34-**********AUTO**MIXED AADC 450

DUKE ENERGY KENTUCKY INC
C/O PROPERTY TAX DEPT
STE ST22M
PO BOX 1007
CHARLOTTE NC 28201-1007

BILL NO: 4218

DUE-DATE: 10-15-2015

PIDN: 055.11.14.009.00

BANK CODE:

IF YOU HAVE AN ESCROW ACCOUNT, FORWARD A COPY OF THIS BILL TO YOUR MORTGAGE COMPANY

PROPERTY DESCRIPTION:
BAPTIST 3RD LOT 023PT
23.75X89 FT NS 13TH ST
100 FT W LEE ST

PROPERTY ADDRESS:
410 13TH STREET WEST

2015 PROPERTY TAX NOTICE

DESCRIPTION	ASSESSED VALUE	EXEMPTION	TAXABLE VALUE	RATE PER $100	AMOUNT DUE
REAL	5,000	5,000	0	0.3130	0.00
WASTE					300.00
				TOTAL TAX DUE:	300.00

Now accepting online payments, please visit:
www.covingtonkytax.com

DETACH AND RETURN STUB BELOW WITH PAYMENT

CITY OF INDEPENDENCE
5409 MADISON PIKE • INDEPENDENCE KY 41051

859-356-5302 • FAX: 859-356-6843

0000138945

April 20, 2016

DUKE ENERGY KENTUCKY INC. # 5260
C/O DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE, NC 28202-0000

PUBLIC SERVICE TAX ASSESSMENTS

2015 TANGIBLE TAX ASSM'T	RATE	AMOUNT DUE BY 06/20/16
$ 5,062,582.00	.642	$ 32,501.78
		$ 31,851.74 DISC. BY 05 20 16

2015 REAL ESTATE	RATE	AMOUNT DUE BY 06/20/16
$9,604,788.00	.254	$ 24,396.16
		$ 23,908.24

TOTAL DISCOUNT AMOUNT DUE BY 05/20/16 IS $ 55, 759.98. PD 5/16/16

Payments can be mailed to P O BOX 830, INDEPENDENCE KY 41051.
If you have any questions regarding this matter, you can call the City of Independence at 859-356-5302.

61A255 (10-02) Commonwealth of Kentucky For County,School or Special Taxes

CERTIFICATION OF PROPERTY ASSESSMANT
TAX YEAR 2015

Return Payment To:

Sheriff **Charles W. "Craig" Peoples** GNC: 5260
County **Pendleton**
Address **202 Chapel St.**
Falmouth, KY 41040

Assessment for 2015 Date 12/11/2015

Address:

Name: DUKE ENERGY KENTUCKY INC

Address: 550 SOUTH TRYON DEC-41B

State: CHARLOTTE

State: NC

Zip: 28202-0000

ATTN: DAVID W WRIGHT

PAYMENT INSTRUCTIONS

The Department of Revenue certifies this assessment to the County Clerk in accordance with KRS136.180. This assessment is subject to all tax levies as explained below.

Property Class-Rate Per $ 100				Value	County	School	Special
County- Real Estate	0.5440	School	0.6460	$3,436,973	$18,697.13	$22,202.85	$40,899.98
County -Tangible	0.7090	School	0.6460	$1,234,256	$8,750.88	$7,973.29	$16,724.17
							$0.00
							$0.00
Totals By Taxing District					**$27,448.01**	**$30,176.14**	**$57,624.15**

Rita M. Spencer, Clerk
Dan Caldwell, DC

Total Tax ***$57,624.15***

Payment Received By:

Penalty
(10 percent of total tax if not paid within 30 days)

Sheriff/Deputy

Date

Interest
(10 percent per annum if not paid within 30 days)

Total Tax, Penalty, and Interest ***$57,624.15***

CITY OF FALMOUTH

230 Main Street, Falmouth, Kentucky 41040
Phone: (859) 654-6937 Fax: (859) 654-3603
clohara@fuse.net

March 24, 2016

PUBLIC SERVICE Tax Year 2015 **City Clerk, Chrissy O'Hara**

Duke Energy Kentucky INC
David Wright
550 South Tyron Dec-41B
Charlotte, NC 28202-0000

Property Class – Rate Per $100 Value	Assessed Value	District	Bill No.
Tangible .750	477299.00✓ ÷ 100= 4772.99 × .750= **$3579.74**	2	85
Real Estate .632	2341111.00✓ ÷ 100= 23411.11 × .632= **$14795.82**	2	85

PO 4/14/16

Total Tax Due:	**$18375.56**

RETURN NOTICE WITH PAYMENT WHETHER PAYING IN PERSON OR BY MAIL. WHEN PAYING BY MAIL INCLUDE SELF-ADDRESSED STAMPED ENVELOPE FOR RECEIPT.

Check Date: Apr 07 2016	Vendor Number: 0000138900	Name: CITY OF BUTLER			Check Number: 1000009621	
Invoice Number	Invoice Date	Voucher ID	Gross Amount	Discounts Taken	Late Charge	Paid Amount
PI-12651-35824	Apr 04 2016	10074902	3,096.36	0.00	0.00	3,096.36
2015 PROPERTY TAX PAYMENT						

Donna
859-472-5015

CITY OF BUTLER
P.O. BOX 229
BUTLER, KY

To obtain receipt send your bill along with a self addressed stamped envelope.

2015 City Taxes

Duke Energy Kentucky Inx.
David Wright
550 South Tryon DEC 41 B
Charlotte, Nc 28202

Due: 12-31-16

№ 0676

	TAX	BONDS & INTEREST
Real Estate	2473.39	
Personal Property	403.95	622.97
Franchise		
Fire Trucks - Bonds and I		
Penalty		
Rec'd Payment	$ 2877.34	
	3096.36	NP

U.S. Postal Service
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)
For delivery information visit our website at www.usps.com
OFFICIAL USE

Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)
To
Sen
Stre or F
City

DOWNTOWN STA CHARLOTTE NC APR 13 2016 USPS 28204 Postmark Here

City of Butler
Post Office Box 229
Butler, KY 41006

PS Form 3800, August 2006 See Reverse for Instructions

7009 2820 0001 1899 7407

Check Number:	Date	Total Gross Amount	Total Discounts	Total Late Charges	Total Paid Amount
1000009621	Apr 07 2016	$3,096.36	$0.00	$0.00	$3,096.36

DUKE ENERGY NAME AND LOGO ARE ON BACK. HOLD AT AN ANGLE TO VIEW. VOID IF ABSENT.

DUKE ENERGY.

DE Kentucky Other Elec
1697 Monmouth St Ste A
WOODLAWN, KY 41071

PNC BANK, N.A. 001
Jeannette, PA

[redacted]

Corporate Accounts Payable
ST25B 400 South Tryon Street
Charlotte, NC 28285

[redacted]

Date 4/7/16

Pay *Three thousand ninety-six and 36 / 100 Dollars* $**3,096.36

To The Order Of

CITY OF BUTLER
PO BOX 229
BUTLER, KY 41006

Authorized Signature

[redacted]

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF REVENUE
FRANKFORT, KY 40619

NOTICE DATE	PERIOD	CASE	TAX
12/07/2015	01/01/2015-12/31/2015	310473080035	PUBLIC SERVICE COMPANY

NOTICE #	RETURN VAL#	TAXPAYER-ID	TAXPAYER NAME
107955670	000005260	[redacted]	DUKE ENERGY KENTUCKY INC

FOR QUESTIONS REGARDING THIS NOTICE, PLEASE CONTACT:

ROBERT 3569
DEPARTMENT OF REVENUE
STATION NUMBER 32
P O BOX 491
FRANKFORT KY 40601

TEL: (502) 564-8175
FAX: (502) 564-8192
OFFICE HOURS: 8:00 A.M. TO 5:00 P.M. EASTERN TIME

EXPLANATION OF NOTICE

THE PUBLIC SERVICE COMPANY RETURN WAS RECEIVED AND THE PROPERTY TAX DUE HAS BEEN CALCULATED. LOCAL PROPERTY TAXES WILL BE BILLED SEPARATELY BY LOCAL JURISDICTIONS. KRS 136.180(2)

TAX LIABILITY		TAX LIABILITY 1,706,266.75
TOTAL LIABILITY		TOTAL LIABILITY 1,706,266.75
TOTAL DUE:	TOTAL AMOUNT OF TAX/TOT 1,706,266.75	BALANCE DUE 1,706,266.75

<<<< EXPLANATION OF NOTICE CONTINUED ON NEXT PAGE >>>>

DETACH VOUCHER AND RETURN WITH PAYMENT. MAKE CHECK PAYABLE TO KENTUCKY STATE TREASURER.

NOTICE OF TAX DUE

	VALIDATING NUMBER	CASE NUMBER
00170626675	000005260	310473080035

#BWNCSLW
#15C4K 3142 296877 O#

* TOTAL DUE AS OF * 01/21/2018 * $1,706,266.75

* DUKE ENERGY KENTUCKY INC
DAVID WRIGHT
550 SOUTH TRYON DEC-41B
CHARLOTTE NV 28202

ENTER AMOUNT PAID:

10A5009911 KENTUCKY DEPARTMENT OF REVENUE
FRANKFORT, KY 40619

99999 310473080 3 035 107955670 8 00170626675 20151231 5

Check Number: [redacted]

(7-11)

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF REVENUE
OFFICE OF PROPERTY VALUATION
PUBLIC SERVICE BRANCH
Station 32 4Th FL, 501 HIGH STREET
FRANKFORT, KY 40601-2103
Phone (502) 564-8175 Fax (502) 564-8192

Due

NOTICE OF ASSESSMENT FOR COMMERCIAL WATERCRAFT

DUKE ENERGY KENTUCKY INC
DAVID W WRIGHT
550 SOUTH TRYON ST DEC-41B
CHARLOTTE, NC 28202-0000

GNC: 010267
TYPE CO: CW
TAX TYPE: 038
TAX ID: [redacted]

This Notice of Assessment will become final on 04/18/2016, 45 days from the notice date. A corresponding Notice of Tax Due is being sent from the Compliance and Accounts Receivable System based on the Total Assessment shown below. The Notice of Tax Due will include the state and local tax liability, any applicable interest and/or filing penalties that may be assessed. All commercial watercraft entities will receive a single tax bill that includes both the state and local tax liabilities combined. Local assessment certifications will no longer be issued.

If you protest this assessment, see enclosed 61F007 Notification-Protesting your Assessment for Commercial Watercraft. You must submit a written protest in accordance with KRS 131.110; and as required by KRS 136.180(2), your protest must specify the valuation you claim to be true. Your written protest stating your claimed value and your payment of tax for your claimed value must be submitted to the Department of Revenue on or before 04/18/2016 or no further remedies will be available regarding this assessment per KRS 134.590. Submit your protest and payment to: ATTN Public Service Branch, Division of State Valuation, Office of Property Valuation, Department of Revenue, Station 32 4Th FL, 501 High Street, Frankfort, KY 40601-2103. You may contact the Public Service Branch at Phone (502) 564-8175 and Fax (502) 564-8192.

The state rate for Commercial Watercraft Companies is 45.00 cents per $100 valuation
The local rate for Commercial Watercraft Companies is 101.253 cents per $100 valuation

NOTICE DATE: 03/04/2016 **TAX YEAR:** 2015 (For Year Ending December 31, 2014)

DC 3/4/16

1. Kentucky Mileage Percent	**90.000000**
2. Unit Assessment Value	**$286,347.00**
3. Kentucky Assessment	**$257,712.00**
4. State Tax Due	**$1,159.70**
5. Local Tax Due	**$2,609.42**
6. Total Kentucky State & Local Tax Liability	**$3,769.12**

A 10% penalty is charged for late filed returns per KRS 132.290(3). A 20% penalty is charged for omitted property per KRS 132.290(4). Applicable interest will be applied when late or omitted. KRS 131.010(6) KRS134.015 KRS136.050

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 3590 Real Estate

P I D N: 055-11-14-001.01

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
411-17 WATKINS ST

Legal Description:
LOTS 19 20 21 22 & 62 63 64 65 WBTI 3RD

Fair cash value: 500,000
Exemption_____: 500,000
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60.00
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

P-1 T23 P1 ******AUTO**MIXED AADC 450 UMO033477
PROPERTY TAX DEPT
DUKE ENERGY KENTUCKY INC
PO BOX 1007 STE ST 22 M
CHARLOTTE NC 28201-1007

CUT ALONG THIS LINE

2015 KENTON COUNTY TAX BILL

PAYABLE TO CHARLES L. KORZENBORN, SHERIFF

See Reverse Side For Additional Information

PRESORTED
FIRST CLASS
MAIL
US POSTAGE PAID
CINCINNATI, OH
PERMIT # 9714

Bill Number: 3587 Real Estate

P I D N: 055-11-14-002.00

Taxing District	Rate@100	Taxable Value	Tax Amount
STATE	0.12200		0.00
COUNTY	0.14800		0.00
COVINGTON SCHOOL	1.11100		0.00
EXTENSION DIST	0.00930		0.00
HEALTH	0.02000		0.00
LIBRARY	0.11300		0.00
AREA PLANNING	0.02900		0.00
(NO FIRE)	0.00000		0.00
911 fee *			60.00
		Gross Tax Due	60.00

Property Location:
409 WATKINS ST

Legal Description:
66 WBTI 24 3/4X89' SS WATKINS

Fair cash value: 15,000
Exemption_____: 15,000
Taxable value__:

	If Paid on or Before	Amount Due:
Discount	11/01/15	60.00
Face	12/31/15	60.00
Penalty 1	01/31/16	60.00
Penalty 2	04/15/16	60.00

P-1 T23 P1 ******AUTO**MIXED AADC 450 UMO033473
PROPERTY TAX DEPT
DUKE ENERGY KENTUCKY INC
PO BOX 1007
CHARLOTTE NC 28201-1007

CUT ALONG THIS LINE

Dusty Rhodes, Hamilton County Auditor

generated on 1/27/2017 11:03:58 AM EST

Property Report

Parcel ID	Address	Index Order	Tax Year
[redacted]		Parcel Number	2016 Payable 2017

Payment Information

ROBERT A. GOERING, TREASURER

Mail Payments to:	Hamilton County Treasurer 138 E. Court Street, Room 402 Cincinnati, Ohio 45202
Tax District:	001 - CINTI CORP-CINTI CSD

Current Owner(s)	DUKE ENERGY KENTUCKY INC
Tax Bill Mail Address	DUKE ENERGY KENTUCKY INC 550 S TRYON ST P O BOX 1321 (DEC41B) CHARLOTTE NC 28201

Tax Overview

Tax Lien Pending	No
Tax Lien Sold	No
Full Rate 110.73	0.000000
Effective Rate	0.000000
Non Business Credit	0.000000
Owner Occupancy Credit	0.000000
Certified Delinquent Year	
Delinquent Payment Plan	No
TOP (Treasurer Optional Payment) Note: May represent multiple parcels	$0.00

Taxable Value	
Land	0
Improvements	86,280
Total	86,280

Current Year Tax Detail

	Prior Delinquent	Adj. Delinquent	1st Half	Adj. 1st Half	2nd Half	Adj. 2nd Half
Real Estate			$4,781.21		$4,781.21	
Credit			$0.00		$0.00	
Subtotal			$4,781.21		$4,781.21	
Non Business Credit			$0.00		$0.00	
Owner Occupancy Credit			$0.00		$0.00	
Homestead			$0.00		$0.00	
Sales CR			$0.00		$0.00	
Subtotal	**$0.00**	**$0.00**	**$4,781.21**	**$0.00**	**$4,781.21**	**$0.00**
Interest/Penalty	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Real Estate Paid	$0.00		$0.00		$0.00	
Real Estate Owed	$0.00		$4,781.21		$4,781.21	
Special Assess Paid	$0.00		$0.00		$0.00	
Special Assess Owed	$0.00		$0.00		$0.00	
Total Due	$0.00		$4,781.21		$4,781.21	
Total Paid	$0.00		$0.00		$0.00	
Unpaid Delq Contract	$0.00		$0.00		$0.00	
Total Owed	**$0.00**		**$4,781.21**		[redacted]	

Payment Information for Current And Prior Year

Date	Half	Prior	1st Half	2nd Half	Surplus
2/1/2016	1 - 2015	$0.00	$4,155.11	$4,155.11	$0.00
2/2/2015	1 - 2014	$0.00	$2,255.51	$2,255.51	$0.00

Information believed accurate but not guaranteed. Treasurer disclaims liability for any errors or omissions

ROBERT A. GOERING
HAMILTON COUNTY TREASURER

Dear Fellow Taxpayer:

Please note that all tax levies approved by voters in 2016 are reflected on this tax bill.

For the convenience of taxpayers, the Treasurer's office will be open for extended hours on the due date of January 31, 2017—7:30 a.m. to 5:30p.m.

Also remember you can always communicate with the Treasurer's Office by using our web address: ***http://www.hamiltoncountyohio.gov/treasurer/***

*.....**Robert A. Goering, Treasurer***

HAMILTON COUNTY REAL ESTATE TAX BILL: FIRST HALF 2016

BOOK PLAT PARCEL	PROPERTY OWNER	PROPERTY DESCRIPTION
570-0260-0028-00	UNION LIGHT HEAT AND POWER COMPANY THE	SS BROWER RD REAR0.717 A C R1 T2 S35
TAXING DISTRICT/CLASS		
221 INDUSTRIAL		

MARKET VALUE		ASSESSED VALUE (35% OF MARKET)	FULL TAX RATE (mills)	REDUCTION FACTOR	EFFECTIVE TAX RATE (mills)	NON-BUSINESS CREDIT ROLLBACK FACTOR
LAND	6,110	2,140				0.096745
BUILDING	0	0	86.21	0.109249	76.791673	OWNER OCCUPANCY CREDIT ROLLBACK FACTOR
TOTAL	6,110	2,140				0.024186

CALCULATIONS

GROSS REAL ESTATE TAX	184.48
-REDUCTION FACTOR AMOUNT	20.14
-NON-BUSINESS CREDIT	
-OWNER OCCUPANCY CREDIT	
-HOMESTEAD	
HALF YEAR REAL ESTATE TAXES	82.17
+CURRENT ASSESSMENT	70.29
+DELINQUENT ASSESSMENT	
+DELINQUENT REAL ESTATE	
HALF YEAR AMOUNT DUE	152.46
FULL YEAR AMOUNT	303.27
AMOUNT DUE BY 01/31/2017	152.46

LAST DAY TO PAY WITHOUT PENALTY
Jan 31, 2017

TAX DISTRIBUTION: FIRST HALF

SCHOOL DISTRICT	45.39
TOWNSHIP	15.42
CITY/VILLAGE	
JOINT VOCATIONAL SCHOOL	2.63
COUNTY GENERAL FUND	2.40
PUBLIC LIBRARY	1.07
FAMILY SERVICE/TREATMENT	0.36
HLTH/HOSPITAL CARE-INDIGENT	2.92
MENTAL HEALTH LEVY	2.50
DEVELOPMENTAL DISABILITIES	4.42
PARK DISTRICT	0.03
CRIME INFORMATION CENTER	0.32
CHILDREN SERVICES	2.88
SENIOR SERVICES	1.35
ZOOLOGICAL PARK	0.48

* YOUR CANCELLED CHECK IS YOUR RECEIPT
* NORMAL OFFICE HOURS 8:00 A.M. TO 4:00 P.M. MON-FRI
* EXTENDED HOURS 7:30 A.M. TO 5:30 P.M. ON DUE DATES

(Please detach this portion and return with your payment)

ROBERT A. GOERING, HAMILTON COUNTY TREASURER
REAL ESTATE TAX BILL: FIRST HALF 2016

PROPERTY OWNER	BOOK PLAT PARCEL	AMOUNT DUE BY: Jan 31, 2017
UNION LIGHT HEAT AND POWER COMPANY THE	570-0260-0028-00	**152.46**

☐ Change of address? See reverse side.

FULL YEAR AMOUNT
303.27

Make checks payable to: **Robert A. Goering, Treasurer**
☐ Pay with DISCOVER card? See reverse side.

UNION LIGHT HEAT & POWER
1000 E MAIN ST
PLAINFIELD IN 46168-1765

21981

HAMILTON COUNTY TREASURER
PO BOX 740857
CINCINNATI OH 45274-0857

0100015246257002600028001000303271 2

Dusty Rhodes, Hamilton County Auditor

generated on 1/27/2017 11:04:24 AM EST

Property Report

Parcel ID	Address	Index Order	Tax Year
444-0009-0050-00		Parcel Number	2016 Payable 2017

Payment Information

ROBERT A. GOERING, TREASURER

Mail Payments to:	Hamilton County Treasurer 138 E. Court Street, Room 402 Cincinnati, Ohio 45202
Tax District:	221 - MIAMI TWP-3 RIVERS LSD

Current Owner(s)	DUKE ENERGY KENTUCKY INC
Tax Bill Mail Address	DUKE ENERGY KENTUCKY INC 550 S TRYON ST P O BOX 1321 (DEC41B) CHARLOTTE NC 28201

Tax Overview

Tax Lien Pending	No
Tax Lien Sold	No
Full Rate 76.21	0.000000
Effective Rate	0.000000
Non Business Credit	0.000000
Owner Occupancy Credit	0.000000
Certified Delinquent Year	
Delinquent Payment Plan	No
TOP (Treasurer Optional Payment) Note: May represent multiple parcels	$0.00

Taxable Value	
Land	0
Improvements	257,740
Total	257,740

Current Year Tax Detail

	Prior Delinquent	Adj. Delinquent	1st Half	Adj. 1st Half	2nd Half	Adj. 2nd Half
Real Estate			$11,109.88		$11,109.88	
Credit			$0.00		$0.00	
Subtotal			$11,109.88		$11,109.88	
Non Business Credit			$0.00		$0.00	
Owner Occupancy Credit			$0.00		$0.00	
Homestead			$0.00		$0.00	
Sales CR			$0.00		$0.00	
Subtotal	**$0.00**	**$0.00**	**$11,109.88**	**$0.00**	**$11,109.88**	**$0.00**
Interest/Penalty	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Real Estate Paid	$0.00		$0.00		$0.00	
Real Estate Owed	$0.00		$11,109.88		$11,109.88	
Special Assess Paid	$0.00		$0.00		$0.00	
Special Assess Owed	$0.00		$0.00		$0.00	
Total Due	$0.00		$11,109.88		$11,109.88	
Total Paid	$0.00		$0.00		$0.00	
Unpaid Delq Contract	$0.00		$0.00		$0.00	
Total Owed	**$0.00**		**$11,109.88**		**$22,219.76**	

Payment Information for Current And Prior Year

Date	Half	Prior	1st Half	2nd Half	Surplus
6/24/2016	2 - 2015	$0.00	$0.00	$253,361.69	$0.00
2/1/2016	1 - 2015	$0.00	$253,361.71	$0.02	$0.00
6/19/2015	2 - 2014	$0.00	$0.00	$253,105.26	$0.00
2/2/2015	1 - 2014	$0.00	$253,105.26	$0.00	$0.00

Information believed accurate but not guaranteed. Treasurer disclaims liability for any errors or omissions

Nancy Nix, CPA
Butler County Treasurer
Government Services Center
315 High Street, 10th Floor
Hamilton, Ohio 45011

Real Estate Property Tax
First Half Tax Year 2016
March 9, 2017

www.butlercountytreasurer.org
513-887-3181

DUKE ENERGY KENTUCKY INC
PROPERTY TAX DIVISION
550 S TRYON ST # DEC41B
CHARLOTTE NC 28202-4200

Parcel No. E2310-007-000-002

Taxing District MADISON TWP EDGEWOOD

Parcel Location WOODSDALE RD

Owner Name UNION LIGHT HEAT & POWER CO

Legal Description 4 1 17 W SIDE

Gross Tax Rate	68.060000	Non Business Credit Factor	0.098039	Acres	29.0370
Reduction Factor	0.100602	Owner Occupancy Credit Factor	0.024509	Class	C
Effective Tax Rate	**61.213054**			Code	830

100% Appraised Value

Land	377,010
Bldg/Improv	0
Total	**377,010**

35% Taxable Value

Land	131,950
Bldg/Improv	0
Total	**131,950**

Calculation of Taxes

Gross Taxes	8,980.56
Reduction Factor	-903.46
Subtotal	8,077.10
Current Net Real EstateTaxes	8,077.10
Current Special Assessments	5,669.62
Current Net Taxes & Asmts(YEAR)	13,746.72
Current Net Taxes & Asmts(HALF)	6,873.36

Annual Tax Distribution

General Fund	253.34
Developmental Disabilities	395.85
Midpointe Library Systems	98.91
Mental Health	177.65
Children Services	263.90
Senior Citizens	171.54
Edgewood Csd	5,711.96
Butler Tech Jvs	254.66
Madison Twp Exc Trenton Fire Dist	656.93
Metroparks Of Butler County	92.36
Assessments	5,669.62
Total	13,746.72

Special Assessments

	Delq.	Current Yr.
16001-STORMWATER-NPDES PH II	0.00	5,655.00
51900-MIAMI CONSERVANCY	0.00	11.02
51902-DAM SAFETY INITIATIVE	0.00	3.60
Assessment Totals	**0.00**	**5,669.62**

Stub No. 194194

Full Year Total	13,746.72
Half Year Total	6,873.36
Payments	0.00
Other Credits	0.00

To Avoid Penalty
Pay On Or Before

March 9, 2017

Homestead Reduction in Value	CAUV Value
0	0

For information on monthly payment plans, please contact the Treasurer's Office at (513) 887-3181. Please save top portion of bill for income tax purposes.

Nancy Nix, CPA
Butler County Treasurer
Government Services Center
315 High Street, 10th Floor
Hamilton, Ohio 45011

Real Estate Property Tax
First Half Tax Year 2016
March 9, 2017

www.butlercountytreasurer.org
513-887-3181

DUKE ENERGY KENTUCKY INC
PROPERTY TAX DIVISION
550 S TRYON ST # DEC41B
CHARLOTTE NC 28202-4200

Parcel No. E2310-008-000-015

Taxing District MADISON TWP EDGEWOOD

Parcel Location 2100 WOODSDALE RD

Owner Name UNION LIGHT HEAT & POWER CO

Legal Description 4 1 18 CTR & NE COR

Gross Tax Rate	68.060000	Non Business Credit Factor	0.098039	Acres	192.2210
Reduction Factor	0.100602	Owner Occupancy Credit Factor	0.024509	Class	C
Effective Tax Rate	**61.213054**			Code	830

100% Appraised Value

Land	3,449,030
Bldg/Improv	4,023,700
Total	**7,472,730**

35% Taxable Value

Land	528,590
Bldg/Improv	1,408,300
Total	**1,936,890**

Calculation of Taxes

Gross Taxes	131,824.78
Reduction Factor	-13,261.80
Subtotal	118,562.98
Current Net Real EstateTaxes	118,562.98
Current Special Assessments	160.38
Current Net Taxes & Asmts(YEAR)	118,723.36
Current Net Taxes & Asmts(HALF)	59,361.68

Annual Tax Distribution

General Fund	3,718.82
Developmental Disabilities	5,810.68
Midpointe Library Systems	1,451.92
Mental Health	2,607.65
Children Services	3,873.78
Senior Citizens	2,517.97
Edgewood Csd	83,845.26
Butler Tech Jvs	3,738.17
Madison Twp Exc Trenton Fire Dist	9,642.96
Metroparks Of Butler County	1,355.77
Assessments	160.38
Total	118,723.36

Special Assessments	**Delq.**	**Current Yr.**
16001-STORMWATER-NPDES PH II	0.00	13.00
51900-MIAMI CONSERVANCY	0.00	111.04
51902-DAM SAFETY INITIATIVE	0.00	36.34
Assessment Totals	**0.00**	**160.38**

Stub No. 170566

Full Year Total	118,723.36
Half Year Total	59,361.68
Payments	0.00
Other Credits	0.00

To Avoid Penalty
Pay On Or Before

March 9, 2017

Homestead Reduction in Value	**CAUV Value**
0	1,510,260

For information on monthly payment plans, please contact the Treasurer's Office at (513) 887-3181. Please save top portion of bill for income tax purposes.

Nancy Nix, CPA
Butler County Treasurer
Government Services Center
315 High Street, 10th Floor
Hamilton, Ohio 45011

Real Estate Property Tax
First Half Tax Year 2016
March 9, 2017

www.butlercountytreasurer.org
513-887-3181

DUKE ENERGY KENTUCKY INC
PROPERTY TAX DIVISION DEC41B
550 S TRYON ST PO BOX 1321
CHARLOTTE NC 28202

Parcel No. E2310-999-010-400

Taxing District MADISON TWP EDGEWOOD

Parcel Location

Owner Name DUKE ENERGY KENTUCKY INC

Legal Description FEIN# 31-0473080
P.U.P.P.TANG.
ELECTRIC COMPANY

Gross Tax Rate	68.060000	Non Business Credit Factor	0.000000	Acres	
Reduction Factor	0.000000	Owner Occupancy Credit Factor	0.000000	Class	U
Effective Tax Rate	**68.060000**			Code	880

100% Appraised Value

Land	0
Bldg/Improv	94,685,800
Total	**94,685,800**

35% Taxable Value

Land	0
Bldg/Improv	33,140,030
Total	**33,140,030**

Calculation of Taxes

Gross Taxes	2,255,510.46
Subtotal	2,255,510.46
Current Net Real EstateTaxes	2,255,510.46
Current Net Taxes & Asmts(YEAR)	2,255,510.46
Current Net Taxes & Asmts(HALF)	1,127,755.23

Annual Tax Distribution

General Fund	70,745.94
Developmental Disabilities	110,540.87
Midpointe Library Systems	27,620.98
Mental Health	49,607.18
Children Services	73,693.80
Senior Citizens	47,901.13
Edgewood Csd	1,595,049.63
Butler Tech Jvs	71,113.99
Madison Twp Lxa Trenton Fire Dist	183,445.18
Metroparks Of Butler County	25,791.76
Assessments	0.00
Total	

Special Assessments	**Delq.**	**Current Yr.**

Stub No. 136159

Homestead Reduction in Value	**CAUV Value**
0	0

Full Year Total	2,255,510.46
Half Year Total	1,127,755.23
Payments	0.00
Other Credits	0.00

To Avoid Penalty
Pay On Or Before

March 9, 2017

For information on monthly payment plans, please contact the Treasurer's Office at (513) 887-3181. Please save top portion of bill for income tax purposes.

AG-DR-01-087

REQUEST:

Property Tax Expense

Refer to the Direct Testimony of Mr. Panizza at pages 10-11. Provide the most current and the after increase property tax rates related to the anticipated tax rate increases and explain how each were determined.

RESPONSE:

See AG-DR-01-086 Attachment 1.

PERSON RESPONSIBLE: John R. Panizza
Robert H. "Beau" Pratt

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-088

REQUEST:

Property Tax Expense

Refer to the Direct Testimony of Mr. Panizza at pages 10-11. Quantify the projected increase amounts for property tax expense associated with the "anticipated property tax rate increases" as opposed to all other causes of projected property tax expense increases.

RESPONSE:

See AG-DR-01-086 Attachment 1.

PERSON RESPONSIBLE: John R. Panizza
Robert H. "Beau" Pratt

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

PUBLIC AG-DR-01-089
(As to Attachments Only)

REQUEST:

Pension and OPEB Expenses

Provide the two most recent pension and OPEB actuarial reports for Duke Energy, DEO, and the Company.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachments Only)

See the following attachments for the two most recent pension and actuarial reports:

- AG-DR-01-089 Confidential Attachment 1 (2017 actuarial report)
- AG-DR-01-089 Confidential Attachment 2 (2016 actuarial report)

These confidential attachments are being filed under the seal of a Petition for Confidential Treatment and will be provided to all parties upon the execution of a Confidentiality Agreement. Please note that Duke Energy, DEO, and the Company are referred to with the following column headings of "All plans total," "Duke Energy Ohio 503," and "Duke Energy Kentucky 536," respectively.

PERSON RESPONSIBLE: Renee H. Metzler

AG-DR-01-089 CONFIDENTIAL ATTACHMENT 1 IS BEING FILED UNDER THE SEAL OF A PETITION FOR CONFIDENTIAL TREATMENT

AG-DR-01-089 CONFIDENTIAL ATTACHMENT 2 IS BEING FILED UNDER THE SEAL OF A PETITION FOR CONFIDENTIAL TREATMENT

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-090

REQUEST:

Pension and OPEB Expenses

Provide the pension and OPEB actuarial reports for Duke Energy, DEO, and the Company and/or other support for the test year pension expense and OPEB expense included in the test year.

RESPONSE:

See AG-DR-01-090 Attachment.

PERSON RESPONSIBLE: Jeffrey R. Setser

AG-DR-01-090
ATTACHMENT
IS BEING FILED
ELECTRONICALLY
AND PROVIDED ON
CD

Duke Energy Corporation
PENSION
04/01/2019 - 03/31/2020

Question:

90. Provide the pension and OPEB actuarial reports for Duke Energy, DEO, and the Company and/or other support for the test year pension expense and OPEB expense included in the test year.

Response:

See below tables for test year pension expense for Duke Energy, DEO and the Company

		Total
Duke Energy Ohio		
- Service Cost	$	2,912,780
- Other		(5,036,799)
- Settlement Charge		-
- Total Net Periodic Benefit Cost	$	(2,124,018)
Duke Energy Kentucky		
- Service Cost	$	1,320,733
- Other		(1,210,129)
- Settlement Charge		-
- Total Net Periodic Benefit Cost	$	110,605
Duke Energy Corporation		
- Service Cost	$	163,582,751
- Other		(187,974,907)
- Settlement Charge		-
- Total Net Periodic Benefit Cost	$	(24,392,156)
		0

Key Assumptions

Measurement Date	January 1, 2019
Discount Rate	4.20%
Interest Crediting Rate	4.00%/4.25%
Expected Return on Assets - Fair Value of Assets and Union VEBA	6.75%
Actual Rate of Return on Assets	6.75%

Duke Energy Corporation
OPEB
Test Period
04/01/2019 - 03/31/2020

Question:

90. Provide the pension and OPEB actuarial reports for Duke Energy, DEO, and the Company and/or other support for the test year pension expense and OPEB expense included in the test year.

Response:

See below tables for test year OPEB expense for Duke Energy, DEO and the Company

		Total
Duke Energy Ohio		
- Service Cost	$	242,391
- Other		1,703,368
- Settlement Charge		-
- Total Net Periodic Benefit Cost	$	1,945,759
Duke Energy Kentucky		
- Service Cost	$	150,231
- Other		214,591
- Settlement Charge		-
- Total Net Periodic Benefit Cost	$	364,822
Duke Energy Corporation		
- Service Cost	$	4,530,692
- Other		11,236,156
- Settlement Charge		-
- Total Net Periodic Benefit Cost	$	15,766,847
		-

Key Assumptions	
Measurement Date	January 1, 2019
Discount Rate	4.20%
Interest Crediting Rate	4.00%/4.25%
Expected Return on Assets - 401(h) and Union VEBA	6.75%
Expected Return on Assets - VEBA I and Non-Union VEBA	5.00%/4.388%
Actual Rate of Return on Assets - 401(h) and Union VEBA	6.75%
Actual Rate of Return on Assets - VEBA I and Non-Union VEBA	5.00%/4.388%

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-091

REQUEST:

Pension and OPEB Expenses

For employees who participate in a defined benefit plan, provide the total and jurisdictional amount of matching contributions made on behalf of employees who also participate in any 401(k) retirement savings account.

RESPONSE:

For the Test period, the jurisdictional cost of company match for individuals with a defined contribution and defined benefit plan is expected to be the following:

Kentucky	$	991,325
Allocated from Affiliates	$	588,436
Total	**$**	**1,579,761**

PERSON RESPONSIBLE: Renee H. Metzler

AG-DR-01-092

REQUEST:

Income Tax Expense

Refer to the Direct Testimony of Ms. Lawler at 11 wherein she discusses tax savings associated with the Tax Cuts and Jobs Act of 2017 ("TCJA") in the Company's ASRP and the proposal to amortize the savings amount over five years to reduce test period operating expenses by $34,380.

a. Provide an accounting by FERC account of all 2018 income tax savings deferrals related to the ASRP, to base rates, and to all other riders effective during 2018. If none for base rates and all other riders, explain why.

b. Describe the methodology proposed by the Company for its gas customers to return the 2018 savings, and through the period when rates are reset, to customers and explain why.

c. Describe the methodology set for all other DEK affiliates, and for the electric operations, to return the 2018 savings to customers and provide citations for all cases providing these authorities.

RESPONSE:

a. See AG-DR-01-092 Attachment 1. The calculations underlying the income tax savings deferrals are currently based on estimates. Specifically for ASRP, please see AG-DR-01-092 Attachment 2 which is the calculation of currently in effect 2018 Rider ASRP rates updated to reflect a lower 21% federal income tax (FIT) rate. This

calculation shows that rider rates collected in 2018 will result in $171,902 of over-collections related to the change in FIT rate. Rider ASRP will only be overstated for the twelve months of 2018 because rider rates proposed to be effective beginning January 1, 2019, already reflect the lower FIT rate.

b. As it relates to the savings for ASRP, the Company's proposal is to include $34,380 as a credit to test year revenue requirement, flowing back to customers the 2018 benefit of the lower FIT over five years beginning with the effective date of new base rates.

As it relates to "base rates," see direct testimony of William Don Wathen Jr., pages 17-18, for a discussion of the Company's proposal for incorporating the impacts of the Tax Cuts and Jobs Act of 2017. Additionally, the Company reached a settlement with the Kentucky Industrial Utility Customers (KIUC), in Case No. 2018-0036, which is pending approval before the Commission. The settlement with KIUC provides there would be no refunds necessary related to the lower FIT for the period January 1, 2018, through March 31, 2019.

The Company has no other rider for its gas service that includes an income tax component.

c. Objection. Irrelevant, not likely to lead to the discovery of any relevant or admissible evidence. How other regulatory jurisdictions have addressed the impacts of the TCJA are irrelevant to this proceeding and are based upon laws in those jurisdictions. Responding further, to the extent this information is publicly available, it is equally accessible to the Attorney General. Without waiving said objection and to the extent

discoverable, information regarding the TCJA is reported in Duke Energy's 10-Q as follows:

Duke Energy Florida

Pursuant to Duke Energy Florida's 2017 Revised and Restated Settlement Agreement, on May 31, 2018, Duke Energy Florida filed a petition related to the Tax Act, which included annual tax savings of $84 million and annual amortization of EDIT of $67 million for a total of $151 million. The pretax revenue requirement impact is $201 million, of which $50 million will be offset with accelerated depreciation of Crystal River 4 and 5 coal units and $151 million will be offset by Hurricane Irma storm cost recovery as explained in the Storm Restoration Cost Recovery section above. The petition is subject to review and approval by the FPSC. Duke Energy Florida cannot predict the outcome of this matter.

Duke Energy Ohio

On July 25, 2018, Duke Energy Ohio filed an application to establish a new rider to implement the benefits of the Tax Act for electric distribution customers. Duke Energy Ohio requested commission approval to implement the rider effective October 1, 2018, as a credit to all distribution customers based upon a percent reduction to Duke Energy Ohio's distribution rates. The new rider will flow through to customers the benefit of the lower statutory federal tax rate from 35 to 21 percent since January 1, 2018, all future benefits of the lower tax rates and a full refund of deferred income taxes collected at the higher tax rates in prior years. Deferred income taxes subject to normalization rules will be refunded consistent with federal law and deferred income taxes not subject to normalization rules will be refunded over a 10-year period. An order is expected during

the fourth quarter of 2018. Duke Energy Ohio's transmission rates reflect lower federal income tax but guidance from FERC on amortization of both protected and unprotected transmission-related EDITs is still pending. Options for Duke Energy Ohio gas customers are still being evaluated. Duke Energy Ohio cannot predict the outcome of this matter.

Duke Energy Indiana

On June 27, 2018, Duke Energy Indiana, the Indiana Office of Utility Consumer Counselor, the Indiana Industrial Group and Nucor Steel – Indiana filed testimony consistent with their Stipulation and Settlement Agreement (Settlement Agreement) in the federal tax act proceeding with the IURC. The Settlement Agreement outlines how Duke Energy Indiana will implement the impacts of the Tax Act. Material components of the Settlement Agreement were as follows:

- Riders to reflect the change in the statutory federal tax rate from 35 to 21 percent as they are filed in 2018;
- Base rates to reflect the change in the statutory federal tax rate from 35 to 21 percent upon IURC approval, but no later than September 1, 2018;
- Duke Energy Indiana to continue to defer protected federal EDIT until January 1, 2020, at which time it will be returned to customers according to the Average Rate Assumption Method (ARAM) required by the Internal Revenue Service over approximately 26 years; and
- Duke Energy Indiana to begin returning unprotected federal EDIT upon IURC approval, expected by September 1, 2018, over 10 years. In order to mitigate the negative impacts to cash flow and credit metrics, the Settlement Agreement

allows Duke Energy Indiana to return $7 million per year over the first five years, with a step up to $35 million per year in the following five years.

The settlement was subject to the review and approval of the IURC. An evidentiary hearing was held on July 13, 2018. On August 22, 2018, the IURC approved the settlement and rates have been adjusted effective September 1, 2018.

Piedmont SC (South Carolina Rate Stabilization Adjustment Filing)

On June 15, 2018, Piedmont filed with the PSCSC under the South Carolina Rate Stabilization Act its quarterly monitoring report for the 12-month period ending March 31, 2018. The filing included a revenue deficiency calculation and tariff rates in order to permit Piedmont the opportunity to earn the rate of return on common equity established in its last general rate case. The filing also incorporated the impacts of the Tax Act by lowering the income tax component of the revenue requirement, refunding protected EDIT under allowable normalization rules, unprotected EDIT and amounts over collected from the customers from January 1, 2018, through the end of the review period for this proceeding. A settlement agreement reached between Piedmont and ORS was filed with the PSCSC on September 14, 2018, and approved by the PSCSC on October 2, 2018. Terms of the settlement include implementation of rates for the 12-month period beginning November 2018 with a return on equity of 10.2 percent.

In addition, the North Carolina Commission has entered two recent orders that resolve this issue for Duke Energy Progress and Duke Energy Carolinas. Links to these orders can be found here:

1) https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=80a5a760-f3e8-4c9a-a7a6-282d791f3f23

and

2) https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=5cadbd2d-1876-43c7-a616-fe3b720663d3

PERSON RESPONSIBLE: William Don Wathen Jr. – a. and b.
Legal – c.

AG-DR-01-092

ATTACHMENT 1

IS BEING FILED ELECTRONICALLY AND PROVIDED ON CD

AG-DR-01-092

ATTACHMENT 2

IS BEING FILED ELECTRONICALLY AND PROVIDED ON CD

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-093

REQUEST:

Income Tax Expense

Refer to the Direct Testimony of Mr. Panizza at 6-7. Refer also to balances of excess ADIT contained on workpaper WPB-6b. Provide copies of the calculation of excess ADIT due to the TCJA by FERC account and by temporary difference within each FERC account, separately identified as either protected or unprotected ADIT as of December 31, 2017 and the amortization of the excess ADIT by temporary difference recorded in each month starting with January 2018 through the most recent month for which actual accounting entries are available and projected for each remaining month in 2018, each month in 2019, and each month in 2020.

RESPONSE:

See AG-DR-01-093 Attachment.

PERSON RESPONSIBLE: John R. Panizza

AG-DR-01-093

ATTACHMENT

IS BEING FILED ELECTRONICALLY AND PROVIDED ON CD

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-094

REQUEST:

Income Tax Expense

Indicate whether DEK is a C corporation for federal income tax purposes. If not, then describe DEK's entity status for federal income tax purposes.

RESPONSE:

DEK is a C corporation for federal income tax purposes.

PERSON RESPONSIBLE: John R. Panizza

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-095

REQUEST:

Income Tax Expense

Indicate whether DEO is a C corporation for federal income tax purposes. If not, then describe DEO's entity status for federal income tax purposes.

RESPONSE:

Objection. Irrelevant. Not likely to lead to the discovery of relevant or admissible evidence. Without waiving said objection, and to the extent discoverable, DEO is a C corporation for federal income tax purposes.

PERSON RESPONSIBLE: Legal- as to objection
John R. Panizza

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

PUBLIC AG-DR-01-096
(As to Attchments only)

REQUEST:

Income Tax Expense

Provide a copy of DEK's 2016 and 2017 federal income tax returns.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachments)

See Confidential AG-DR-01-096 Attachments 1 & 2. These confidential attachments are being filed under the seal of a Petition for Confidential Treatment and will be provided to all parties upon the execution of a Confidentiality Agreement.

PERSON RESPONSIBLE: John R. Panizza

AG-DR-01-096

CONFIDENTIAL ATTACHMENT 1 IS BEING FILED UNDER THE SEAL OF A PETITION FOR CONFIDENTIAL TREATMENT

AG-DR-01-096

CONFIDENTIAL ATTACHMENT 2 IS BEING FILED UNDER THE SEAL OF A PETITION FOR CONFIDENTIAL TREATMENT

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-097

REQUEST:

Income Tax Expense

Provide a copy of DEO's 2016 and 2017 federal income tax returns.

RESPONSE:

Objection. Overbroad and irrelevant. This request is beyond the scope of reasonable discovery and is not likely to lead to the discovery of admissible or relevant evidence. The tax returns of Duke Energy Ohio have no bearing on Duke Energy Kentucky's application. Without waiving said objection, and to the extent discoverable, the Company would agree to make the tax returns of Duke Energy Ohio available for inspection at the Company's offices in Frankfort at a mutually agreeable and reasonable time and date.

PERSON RESPONSIBLE: John R. Panizza

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-098

REQUEST:

Income Tax Expense

Provide a copy of Duke Energy's 2016 and 2017 federal income tax returns.

RESPONSE:

Objection. Overbroad and irrelevant. This request is beyond the scope of reasonable discovery and is not likely to lead to the discovery of admissible or relevant evidence. The tax returns of Duke Energy have no bearing on Duke Energy Kentucky's application. Without waiving said objection, and to the extent discoverable, the Company would agree to make the tax returns of Duke Energy Ohio available for inspection at the Company's offices in Frankfort at a mutually agreeable and reasonable time and date.

PERSON RESPONSIBLE: Legal- as to objection
John R. Panizza

AG-DR-01-099

REQUEST:

Income Tax Expense

Provide a copy of Duke Energy, DEO, and DEK's income tax allocation agreement(s).

RESPONSE:

See AG-DR-01-099 Attachment.

PERSON RESPONSIBLE: John R. Panizza

DUKE ENERGY CORPORATION AND CONSENTING MEMBERS OF ITS CONSOLIDATED GROUP

FOURTH AMENDED AGREEMENT FOR FILING CONSOLIDATED INCOME TAX RETURNS AND FOR ALLOCATION OF CONSOLIDATED INCOME TAX

Duke Energy Corporation, a Delaware corporation ("Duke Energy"), and its Members hereby agree as of January 1, 2016 to join annually in the filing of a consolidated Federal income tax return and to allocate the consolidated Federal income tax liabilities and benefits among the Members of the Consolidated Group in accordance with the provisions of this Agreement ("Agreement"). This Fourth Amended Agreement supersedes and replaces in its entirety the Third Amended Agreement for Filing Consolidated Income Tax Returns and for Allocation of Consolidated Income and Tax Liabilities and Benefits dated July 2, 2012, to clarify certain terms and reflect changes in parties to the agreement.

1. DEFINITIONS

"Affiliate" means a corporation, or a company that is treated as a corporation or a company wholly owned by an entity treated as a corporation that is disregarded for purposes of U.S. federal income taxation, other than the common parent which is a Member of the Affiliated Group.

"Affiliated Group" means a group of corporations, or companies that are treated as corporations or disregarded for purposes of U.S. federal income taxation, as defined in Internal Revenue Code[1] section 1504 and the regulations enacted thereunder.

"Consolidated Group" means a group filing (or required to file) consolidated returns for the tax year.

"Consolidated tax" is the aggregate current Federal income tax liability for the Consolidated Group for a tax year shown on the consolidated Federal income tax return, including any adjustments thereto, or as described in section 5 hereof.

"Corporate taxable income" is the positive taxable income of an Affiliate for a tax year, computed as though such company had filed a separate return on the same basis as used in the consolidated return, except that dividend income from Affiliates shall be disregarded, and other intercompany transactions, eliminated in consolidation, shall be given appropriate effect.

[1] All references to the "Internal Revenue Code" or "IRC" are to the Internal Revenue Code of 1986, as amended.

"Corporate taxable loss" is the taxable loss of an Affiliate for a tax year, computed as though such entity had filed a Separate return on the same basis as used in the consolidated return, except that dividend income from Affiliates shall be disregarded, and other intercompany transactions, eliminated in consolidation, shall be given appropriate effect.

"Corporate tax credit" is a negative separate regular tax of an Affiliate for a tax year, equal to the amount by which the consolidated regular tax is reduced by including the Corporate taxable loss of such Affiliate in the consolidated tax return.

"Group" means a group of Affiliates as defined in IRC section 1504.

"Separate return" is the tax liability calculated on the taxable income or loss of an Affiliate as though such entity were not a Member of a Consolidated Group.

"Member" is an Affiliate, including any Regulated Business as indicated in section 3 herein, which is part of the Affiliated Group as defined in IRC section 1504 that files consolidated tax returns and agrees to be subject to this Agreement.

These definitions shall apply, as appropriate, in the context of the regular income tax and the Alternative Minimum Tax ("AMT") unless otherwise indicated in the Agreement.

2. FILING OF RETURNS

A U.S. consolidated federal income tax return shall be filed by Duke Energy as the common parent for the tax year ended December 31, 2016, and for each subsequent taxable period for which the Affiliated Group is required or permitted to do so. Each Member of the Affiliated Group consents to the filing by Duke Energy of consolidated federal income tax returns for all taxable periods in which it is eligible to be a member of the Affiliated Group. Duke Energy and each Member of the Affiliated Group agrees to execute and file such consents, elections and other documents, and to take such other action as may be necessary, required or appropriate for the proper filing of such returns. Duke Energy will timely pay the Affiliated Group's federal income tax liability for each taxable year.

3. REGULATED BUSINESSES OPERATING IN LLC OR LP FORM

For purposes of allocating the consolidated federal and state tax liabilities and tax benefits under this Agreement, each business operating as a LLC, or LP that is subject to the rules and regulations of the Federal Energy Regulatory Commission or state utilities commissions (hereinafter, a "Regulated Business") shall be considered a Member of the Consolidated Group, and shall be responsible for tax due on its allocable share of taxable income (or shall be entitled to a credit for its allocable share of tax loss), as set forth in Sections 4 through 7 hereof. For purposes of this Agreement, the determination of a Regulated Business's allocable share shall be made (i) as if such Regulated Business was a taxable or regarded entity for U.S. federal income tax purposes and (ii) utilizing the separate "taxable income" method.

4. ALLOCATION PROCEDURES FOR CONSOLIDATED FEDERAL INCOME TAXES

For all taxable periods, Duke Energy shall calculate the consolidated federal income tax liability (including, if applicable, alternative minimum tax liability) of the Affiliated Group for the period. The Members agree that their respective shares of the Consolidated tax liability for each year shall be an amount equal to the amount determined under the taxable income method in accordance with IRC section 1552(a)(1)[1], with the absorption of tax benefits determined under the percentage method in accordance with Treas. Reg. section 1.1502-33(d)(3)[2], using 100% as the applicable percentage for allocation of any excess of a member's Separate return liability over that determined under the income method. To the extent that the Consolidated Group federal income tax liability is reduced by a loss or tax credit available to it as a result of the inclusion of a Member in the consolidated federal income tax return, Duke Energy shall make a payment or an inter-company account adjustment for the amount of the benefit to the Member as determined in accordance with this section.

To illustrate the above, the Consolidated tax liability shall be allocated among the Members of the Group utilizing the separate return "taxable income" allocation method attributable to each Member, in the following manner:

a) Each Member, which has a Corporate taxable loss, will be entitled to a Corporate payment or intercompany credit equal to the amount by which the consolidated regular income tax is reduced by including the corporate tax loss of such Member in the consolidated tax return.

[1] Under IRC section 1552(a)(1), tax liability is apportioned to each member of the group in accordance with the ratio of the consolidated taxable income attributable to each member bears to the consolidated taxable income .

[2] The percentage method under this regulation "allocates tax liability based on the absorption of tax attributes, without taking into account the ability of any member to subsequently absorb its own tax attributes. The allocation under this method is in addition to the allocation under section 1552."

The Members having corporate taxable income will be allocated an amount of regular income tax liability equal to the sum of the consolidated regular tax liability and the Corporate tax credits allocated to the Members having corporate tax losses based on the ratio that each such Member's Corporate taxable income bears to the total corporate taxable income of all Members having Corporate taxable income.

If the aggregate of the Members' Corporate taxable losses are not entirely utilized on the current year's consolidated return, the consolidated carryback or carryforward of such losses to the applicable taxable year(s) will be allocated to each Member having a Corporate taxable loss in the ratio that such Member's separate Corporate tax loss bears to the total corporate tax losses of all Members having Corporate taxable losses.

b) The consolidated AMT will be allocated among the Members in accordance with the procedures and principles set forth in Proposed Treasury Regulation section 1.1502-55 in the form such Regulation existed on the date on which this Agreement was executed.

c) Tax benefits such as general business credits, foreign tax benefits, or other tax credits shall be apportioned directly to those Members whose investments or contributions generated the credit or benefit.

If the credit or benefit cannot be entirely utilized to offset current Consolidated tax, the consolidated credit carryback or carryforward shall be apportioned to those Members whose investments or contributions generated the credit or benefit in proportion to the relative amounts of credits or benefits generated by each Member.

d) If the amount of Consolidated tax allocated to any Member under this Agreement, as determined above, exceeds the separate return tax of such Member, such excess shall be reallocated among those Members whose allocated tax liability is less than the amount of their respective separate return tax liabilities. The reallocation shall be proportionate to the respective reductions in separate return tax liability of such Members. Any remaining unallocated tax liability shall be assigned to Duke Energy. The term "tax" and "tax liability" used in the subsection shall include regular tax and AMT.

5. TAX PAYMENTS AND COLLECTIONS FOR ALLOCATIONS

Duke Energy shall make any calculations on behalf of the Members necessary to comply with the estimated tax provisions of the Internal Revenue Code of 1986 as amended. Based on such calculations, Duke Energy shall charge or refund to the Members appropriate amounts at intervals consistent with the dates indicated by IRC section 6655. Duke Energy shall be responsible for paying to the Internal Revenue Service

the consolidated current Federal income tax liability.

After filing the consolidated Federal income tax return and allocating the Consolidated tax liability among the Members, Duke Energy and the Members agree to settle between them the difference, if any, between the allocable federal income tax liability as determined under this Agreement and the sum of all payments or inter-company adjustments previously made relating to that tax year no later than ninety (90) days after the filing of the consolidated Federal income tax return.

6. ALLOCATION OF STATE TAX LIABILITIES OR BENEFITS

State and local income tax liabilities will be allocated, where appropriate, among Members in accordance with principles similar to those employed in the Agreement for the allocation of consolidated Federal income tax liability.

7. TAX RETURN ADJUSTMENTS

In the event the consolidated tax return is subsequently adjusted by the Internal Revenue Service, state tax authorities, amended returns, claims for refund, or otherwise, such adjustments shall be reflected in the same manner as though they had formed part of the original consolidated return. Interest paid or received, and penalties imposed on account of any adjustment will be allocated to the responsible Member.

8. NEW MEMBERS

If, at any time, a corporation becomes a Member of the affiliated group, the parties hereto agree that such new Member shall become a party to this Agreement and execute a duplicate copy of this Agreement. Unless otherwise specified, such new Member shall have similar rights and obligations of all other Members under this Agreement, effective as of the day they become a member of the Affiliated Group that elects to file a consolidated return.

9. MEMBERS LEAVING THE AFFILIATED GROUP

In the event that any Member of the Affiliated Group at any time leaves the Group and, under any applicable statutory provision or regulation, that Member is assigned and is deemed to take with it all or a portion of any of the tax attributes (including, but not limited to, net operating losses, credit carryforwards, and Minimum Tax Credit carryforwards) of the Affiliated Group, then, to the extent the amount of the attributes so assigned differs from the amount of such attributes previously allocated to such Member under this Agreement, the leaving Member shall appropriately settle with the Group. Such settlement shall consist of payment on a dollar-for-dollar basis for all differences in credits and, in the case of net operating loss differences, in an amount computed by reference to the highest marginal

corporate tax rate. The settlement amounts shall be allocated among the remaining Members of the Group in proportion to the relative level of attributes possessed by each Member and the attributes of each Member shall be adjusted accordingly.

10. SUCCESSORS, ASSIGNS

The provisions and terms of the Agreement shall be binding on and inure to the benefit of any successor or assignee by reason of merger, acquisition of assets, or otherwise, of any of the Members hereto.

11. AMENDMENTS AND TERMINATION

This Agreement may be amended at any time by the written agreement of the parties hereto at the date of such amendment and may be terminated at any time by the written consent of all such parties.

12. GOVERNING LAW

This Agreement is made under the law of the State of Delaware, which law shall be controlling in all matters relating to the interpretation, construction, or enforcement hereof.

13. EFFECTIVE DATE

This Agreement is effective for the allocation of the current Federal income tax liabilities of the Members for the consolidated tax year 2016 and all subsequent years until this Agreement is revised in writing.

The above procedure for apportioning the consolidated annual net current federal and state tax liabilities and tax benefits of Duke Energy and consenting Members of its Consolidated Group have been agreed to by each of the below listed Members of the Consolidated Group as evidenced by the signature of an officer of each entity.

IN WITNESS WHEREOF, each of the parties hereto has caused this Agreement to be executed on its behalf by an appropriate officer thereunto duly authorized.

DUKE ENERGY CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY CORP.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY BUSINESS SERVICES LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY OHIO, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY INDIANA, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

SOUTH CONSTRUCTION COMPANY, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY KENTUCKY, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY CAROLINAS, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

MIAMI POWER CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

TRI-STATE IMPROVEMENT COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

KO TRANSMISSION COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY TECHNOLOGY, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY COMMERCIAL ENTERPRISES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY GLOBAL POWER, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY GLOBAL RESOURCES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE TECHNOLOGIES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DE NUCLEAR ENGINEERING, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DETMI MANAGEMENT, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY MARKETING AMERICA, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY REGISTRATION SERVICES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY SERVICES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKENET VENTURECO, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

EASTOVER MINING COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY CHINA CORP.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY CORPORATE SERVICES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PROGRESS ENERGY, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY PROGRESS, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY FLORIDA, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CAROFUND, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CAPITAN CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PROGRESS ENERGY ENVIROTREE, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

STRATEGIC RESOURCE SOLUTIONS CORP.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

FLORIDA PROGRESS FUNDING CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PROGRESS CAPITAL HOLDINGS, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIH, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIH TAX CREDIT FUND III, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIH TAX CREDIT FUND IV, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIH TAX CREDIT FUND V, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PROGRESS TELECOMMUNICATIONS CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PROGRESS FUELS CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PROGRESS SYNFUEL HOLDINGS, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY RENEWABLES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE-CADENCE, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY-CENTRUS COMMUNICATIONS, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY-CENTRUS, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY GLOBAL HOLDINGS, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DEGS OF TUSCOLA, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY ONE, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE-RELIANT RESOURCES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY GENERATION SERVICES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY CLIMATE CHANGE INVESTMENTS, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CINERGY SOLUTIONS – UTILITY, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CALDWELL POWER COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CATAWBA MANUFACTURING AND ELECTRIC POWER COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CLAIBORNE ENERGY SERVICES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DIXILYN-FIELD DRILLING COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY MARKETING CORP.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

EASTOVER LAND COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

ENERGY PIPELINES INTERNATIONAL COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

GREENVILLE GAS AND ELECTRIC LIGHT AND POWER COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

SOUTHERN POWER COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

WESTERN CAROLINA POWER COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

WATEREE POWER COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY TRANSMISSION HOLDING COMPANY, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CATAMOUNT ENERGY CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CATAMOUNT RUMFORD CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CATAMOUNT SWEETWATER CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CEC UK1 HOLDING CORP.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

CEC UK2 HOLDING CORP.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

EQUINOX VERMONT CORPORATION

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE PROJECT SERVICES, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PANENERGY CORP.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

BISON INSURANCE COMPANY LIMITED

By:_____
Nancy M. Wright
Assistant Corporate Secretary

NORTHSOUTH INSURANCE COMPANY LIMITED

By:_____
Nancy M. Wright
Assistant Corporate Secretary

FOREST SUBSIDIARY, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY INTERNATIONAL, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

DUKE ENERGY GLOBAL INVESTMENTS, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

RE SFCITY1, LP
(BY ITS PARENT, DUKE ENERGY RENEWABLES, INC.)

By:_____
Nancy M. Wright
Assistant Corporate Secretary

RP-ORLANDO, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIEDMONT NATURAL GAS COMPANY, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIEDMONT ENERGY PARTNERS, INC.

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIEDMONT ENCNG COMPANY, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIEDMONT INTERSTATE PIPELINE COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIEDMONT INTRASTATE PIPELINE COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIEDMONT ENERGY COMPANY

By:_____
Nancy M. Wright
Assistant Corporate Secretary

PIEDMONT CONSTITUTION PIPELINE COMPANY, LLC

By:_____
Nancy M. Wright
Assistant Corporate Secretary

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-100

REQUEST:

Income Tax Expense

Reference the testimony of John R. Panizza, pages 9 and 10, wherein he provides the combined statutory federal and state income tax rates because, in his opinion, DEK should use the statutory tax rate. Provide the effective Kentucky income tax rate when combined with the statutory federal tax rate.

RESPONSE:

5 percent. The "effective" Kentucky income tax rate is equal to the "statutory" income tax rate.

PERSON RESPONSIBLE: John R. Panizza

AG-DR-01-101

REQUEST:

Weather Normalization Adjustment ("WNA") Mechanism

Reference the application, page 5, paragraph 10, wherein DEK states that it is proposing a new WMA *(sic)* mechanism, "similar to those that have been in effect for other Kentucky natural gas utilities for many years." Reference is also made to footnote 2 on page 5. Provide the principal similarities and differences between DEK's proposed WNA rider and the WNA riders specifically cited in footnote 2.

RESPONSE:

	Duke Energy Kentucky (DEK)	**Atmos**	**Columbia Gas of Kentucky (CGK)**	**Louisville Gas & Electric (LGE)**
Parameter				
Weather	CGK and LGE convert usage to weather-normalized usage. Atmos and DEK's proposal convert the delivery rate to result in weather normalized delivery charges. All use "normal" HDDs and "actual" HDDs			
Rate Classes	All apply only to weather sensitive rate classes			
Period	All except CGK apply only from November through April; CGK applies from December through April			
Formula	Base Load & Heat Sensitivity Factor calculated for each rate class		Base Load calculated for individual customers	
Updates	All update the formula parameters annually			

PERSON RESPONSIBLE: Bruce L. Sailers

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-102

REQUEST:

Weather Normalization Adjustment ("WNA") Mechanism

Reference the application, page 12, paragraph 25, wherein DEK states that its "proposed WNA mechanism will be applicable to customers served under Rate Schedules Residential Service (RS) and General Service (GS)." Explain why the WNA mechanism will not be applicable to DEK's other Rate Schedules.

RESPONSE:

Rate FT-L, Firm Transportation, and Rate IT, Interruptible Transportation, are rate schedules primarily comprised of large commercial and industrial customers that typically exhibit far less, if any, weather sensitive natural gas usage as compared to customers on Rates RS and GS. Variations in natural gas consumption by larger customers is not necessarily driven by weather conditions and therefore makes the application of the WNA mechanism inappropriate for these customers.

PERSON RESPONSIBLE: Bruce L. Sailers

AG-DR-01-103

REQUEST:

Rate of Return

Reference the application, page 6, paragraph 11. Describe in detail specific instances where DEK's earned rate of return on rate base made it "extremely difficult for the Company to continue providing safe, reasonable and reliable service to its customers."

RESPONSE:

The application, page 6, paragraph 11, simply refers to the fact that the Company's projected earned return on rate base of 4.66% in the forecasted test period is well below the 7.19% approved in the settlement in Case No. 2009-00202. See FR 16(1)(b)(1) for a statement explaining the reason the adjustment in rates is necessary.

PERSON RESPONSIBLE: William Don Wathen Jr.

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-104

REQUEST:

Rate of Return

Are costs that are incurred above the line, but are otherwise not included for ratemaking (e.g. charitable contributions, social and service club dues, initiation fees and country club expenses not charged below the line), included in the calculation of test year/base period ROR calculation?

RESPONSE:

No.

PERSON RESPONSIBLE: William Don Wathen Jr.

AG-DR-01-105

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, generally.

a. Confirm that Dr. Morin provided expert testimony on Return on Equity ("ROE") in DEK's most recent electric rate case, Case No. 2017-00321.

b. Confirm that in Case No. 2017-00321, Dr. Morin's ROE recommendation provided in direct testimony fell "in the upper half of a range between 9.0% and 10.7%, that is 9.9% - 10.7%," with a mid-point of that upper half of 10.3%.

c. Confirm that in Case No. 2017-00321 the Commission found an ROE of 9.725% to be reasonable.

RESPONSE:

a. As a party to Case No. 2017-00321, the Attorney General is already aware that Dr. Morin provided expert testimony in that proceeding.

b. As a party to Case No. 2017-00321, the Attorney General is already aware that Dr. Morin provided expert testimony in that proceeding.

c. The Commission's order in Case No. 2017-00321 speaks for itself.

PERSON RESPONSIBLE: Legal

AG-DR-01-106

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, pages 3-4. Provide documentation of all instances since the Commission's April 13, 2018 Order providing DEK with a 9.725% ROE that Dr. Morin is aware of in which:

a. DEK was unable to attract the capital needed for infrastructure and reliability investments on reasonable terms; or

b. DEK was unable to maintain its financial integrity.

RESPONSE:

a. Dr. Morin did not investigate such a scenario and is unaware of such instances.

b. Dr. Morin did not investigate such a scenario and is unaware of such instances.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-107

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, pages 4 & 61.

a. Confirm that Dr. Morin's recommendations can be summarized as follows:

i. The Commission approve an ROE of 9.9%, only if the Commission approves the Company's requested weather adjustment clause (referred to as the "WNA"); or

ii. Approve an ROE in the upper half of a ROE range of 9.9% - 10.6%.

b. Provide the case number, jurisdiction and date of the last three instances where Dr. Morin has recommended an ROE for a regulated utility that is below the midpoint of the range of his ROE results/approaches.

i. If Dr. Morin is able to identify any instance where he has recommended an ROE for a regulated utility that is below the midpoint of the range of his ROE results/approaches, how many of these instances were contingent on the jurisdictional regulator approving a distinct cost-recovery mechanism or clause, such as the WNA-contingent proposal in the instant Application?

RESPONSE:

a. It is confirmed.

b. Dr. Morin does not recall or possess in his archives the details of the 230 cases in which he has participated in the last 35 years.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

AG-DR-01-108

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, pages 5-7.

a. Provide documentation of a single instance that Dr. Morin is aware in which the Kentucky Public Service Commission adopted an ROE lower than a utility-sponsored ROE expert recommended and the direct or indirect result was "increase costs for ratepayers."

b. Confirm that Duke Energy's stock price (traded as "DUK") has trended upward since Duke Energy began operating under the Kentucky Public Service Commission's jurisdiction in Kentucky in approximately 2006.

RESPONSE:

a. Dr. Morin did not investigate such a scenario.

b. As is evident from the graph of Duke Energy's stock price attached as AG-DR-01-108 Attachment, the trend has been indeed upward. But to say that this is attributable to the Company's operating under the KPSC's jurisdiction since 2014 is farfetched and speculative. Duke Energy's stock price is influenced by a myriad factors including interest rates, the overall macroeconomy's performance, events in the Company's multiple jurisdictions where it operates, utility industry trends and events, to name some. As a matter of fact, as the graph indicates, Duke Energy's stock price has

not kept pace with the Dow Utility Index and has in fact substantially underperformed that index. But again, it is impossible to trace or attribute Duke Energy's lackluster stock price performance to the Commission's various decisions since 2014, especially given Duke Energy Kentucky's small size.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.


Full scree
Indicators
Comparison
Jan 06, 2014 - Oct 08, 2018
1D
5D
1M
3M
6M
YTD
1Y
2Y
5Y
Max
Interval 1W
Line
Draw
Settings
Share
Rese
DUK 78.43
^GSPC 1886.76
60.00%
50.23%
40.00%
30.00%
20.64%
10.00%
17.69M
-10.00%
14
Jul
2015
Jul
2016
Jul
2017
Jul
2018
Jul

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

PUBLIC AG-DR-01-109
(As to Attachment only)

REQUEST:

Rate of Return

Provide all work papers and supporting documentation used and relied upon by Dr. Morin in the preparation of his Direct Testimony and exhibits, which have not already been provided. Provide all spreadsheets in Excel format with cell formulas intact.

RESPONSE:

See AG-DR-01-109 Attachment. Also, see response to STAFF-DR-02-039. The confidential attachment is being file under the seal of a Petition for Confidential Treatment and will be provided to all parties upon the execution of a Confidentiality Agreement.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

AG-DR-01-109

CONFIDENTIAL

ATTACHMENT

IS BEING FILED

UNDER THE SEAL

OF A PETITION FOR

CONFIDENTIAL

TREATMENT

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-110

REQUEST:

Rate of Return

Provide Excel spreadsheet versions of Dr. Morin's exhibits with cell formulas intact, if not already provided.

RESPONSE:

See response to AG-DR-01-109.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

PUBLIC AG-DR-01-111
(As to Attachment Only)

REQUEST:

Rate of Return

Provide all bond rating agency reports (Standard and Poor's, Moody's, Fitch) on Duke Energy from 2014 through the most recent month in 2018.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment Only)

See AG-DR-01-111 Confidential Attachments 1 through 3 for requested rating agency reports. These confidential attachments are being filed under the seal of a Petition for Confidential Treatment and will be provided to all parties upon the execution of a Confidentiality Agreement.

PERSON RESPONSIBLE: Robert H. "Beau" Pratt

AG-DR-01-111

CONFIDENTIAL ATTACHMENT 1 IS BEING FILED UNDER THE SEAL OF A PETITION FOR CONFIDENTIAL TREATMENT

AG-DR-01-111

CONFIDENTIAL ATTACHMENT 2 IS BEING FILED UNDER THE SEAL OF A PETITION FOR CONFIDENTIAL TREATMENT

AG-DR-01-111

CONFIDENTIAL ATTACHMENT 3 IS BEING FILED UNDER THE SEAL OF A PETITION FOR CONFIDENTIAL TREATMENT

REQUEST:

Rate of Return

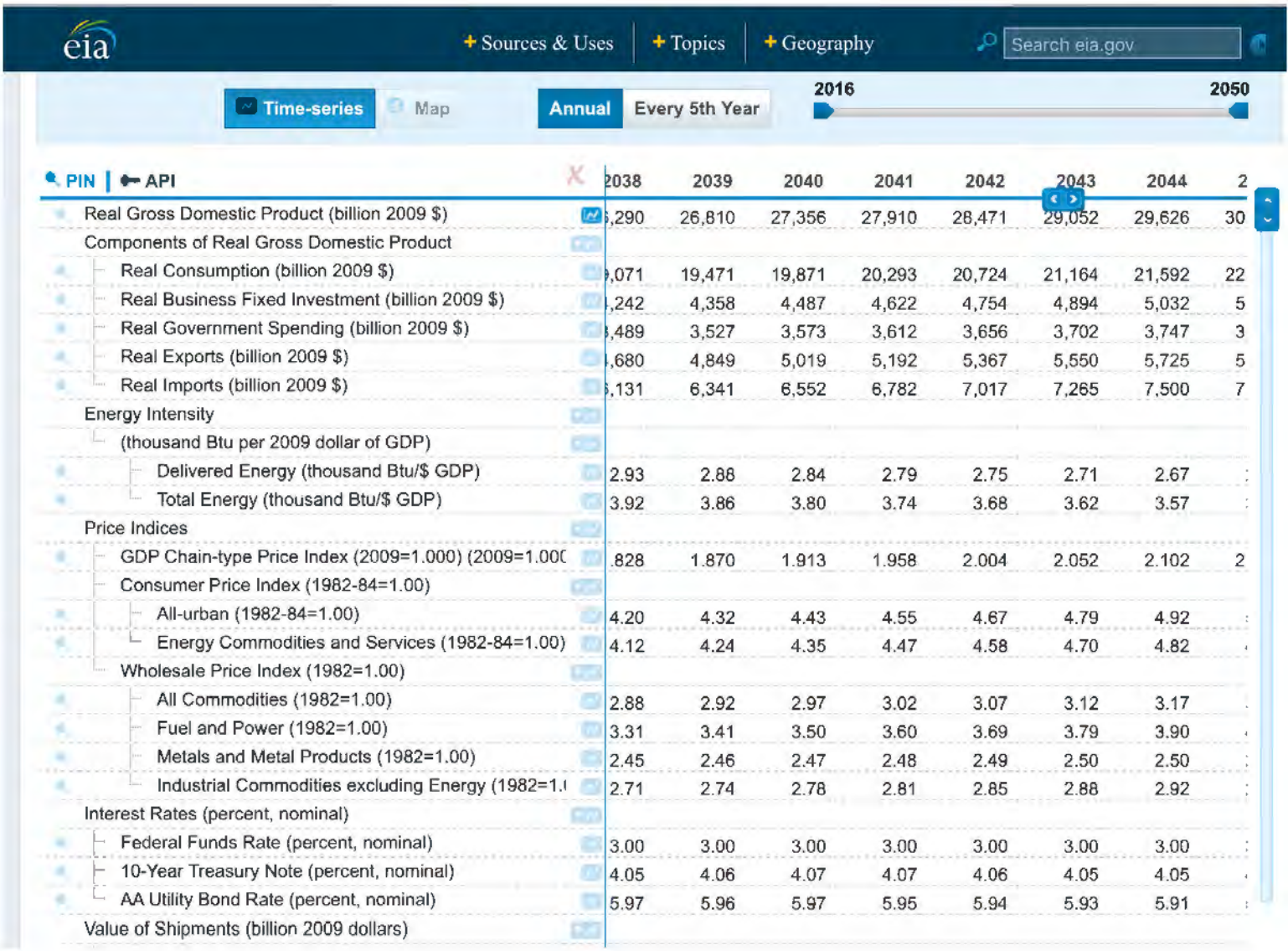
Provide copies of all articles and publications cited by Dr. Morin in his Direct Testimony.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachments Only)

See AG-DR-01-112 Public Attachment 1 and AG-DR-01-112 Confidential Attachment 1 and 2. The confidential attachments are being filed under the seal of a Petition for Confidential Treatment and will be provided to all parties upon the execution of a Confidentiality Agreement. Also, chapters from Dr. Morin's textbooks are available from the publisher PUR Utility Reports Inc. or from Amazon and cannot be reproduced electronically in cyberspace. The Duff & Phelps Valuation Yearbook is proprietary and cannot be disseminated without violating copyright laws.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.



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Time-series | Map | Annual | Every 5th Year | 2016 — 2050

PIN | API	2038	2039	2040	2041	2042	2043	2044	2
Real Gross Domestic Product (billion 2009 $)	,290	26,810	27,356	27,910	28,471	29,052	29,626	30
Components of Real Gross Domestic Product								
Real Consumption (billion 2009 $)	,071	19,471	19,871	20,293	20,724	21,164	21,592	22
Real Business Fixed Investment (billion 2009 $)	,242	4,358	4,487	4,622	4,754	4,894	5,032	5
Real Government Spending (billion 2009 $)	,489	3,527	3,573	3,612	3,656	3,702	3,747	3
Real Exports (billion 2009 $)	,680	4,849	5,019	5,192	5,367	5,550	5,725	5
Real Imports (billion 2009 $)	,131	6,341	6,552	6,782	7,017	7,265	7,500	7
Energy Intensity								
(thousand Btu per 2009 dollar of GDP)								
Delivered Energy (thousand Btu/$ GDP)	2.93	2.88	2.84	2.79	2.75	2.71	2.67	
Total Energy (thousand Btu/$ GDP)	3.92	3.86	3.80	3.74	3.68	3.62	3.57	
Price Indices								
GDP Chain-type Price Index (2009=1.000) (2009=1.00(	.828	1.870	1.913	1.958	2.004	2.052	2.102	2
Consumer Price Index (1982-84=1.00)								
All-urban (1982-84=1.00)	4.20	4.32	4.43	4.55	4.67	4.79	4.92	
Energy Commodities and Services (1982-84=1.00)	4.12	4.24	4.35	4.47	4.58	4.70	4.82	
Wholesale Price Index (1982=1.00)								
All Commodities (1982=1.00)	2.88	2.92	2.97	3.02	3.07	3.12	3.17	
Fuel and Power (1982=1.00)	3.31	3.41	3.50	3.60	3.69	3.79	3.90	
Metals and Metal Products (1982=1.00)	2.45	2.46	2.47	2.48	2.49	2.50	2.50	
Industrial Commodities excluding Energy (1982=1.(	2.71	2.74	2.78	2.81	2.85	2.88	2.92	
Interest Rates (percent, nominal)								
Federal Funds Rate (percent, nominal)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	
10-Year Treasury Note (percent, nominal)	4.05	4.06	4.07	4.07	4.06	4.05	4.05	
AA Utility Bond Rate (percent, nominal)	5.97	5.96	5.97	5.95	5.94	5.93	5.91	
Value of Shipments (billion 2009 dollars)								

ARTICLE

DECEMBER 2013

The U.S. economy to 2022: settling into a new normal

No one could have predicted the length of time that the economy has required to recover. A variety of economic headwinds have battered the recovery, causing output growth to be somewhat slower than was expected in prior projections. Over the coming decade, growth is expected to be gradual but persistent, bringing the unemployment rate down and returning the macroeconomy to a more stable position.

Given the depth of the "Great Recession" and the economic troubles that the financial crisis has caused, few people were under the illusion that recovery would be immediate. However, many may not have anticipated the protracted time it has taken for the economy to strengthen. Since the end of the recession, the U.S. gross domestic product (GDP) has grown at a rate of only 2.1 percent annually.[1] A variety of economic headwinds have battered the recovery, keeping the growth of jobs and output slow. Tight credit conditions and high-risk aversion have prevented consumers and businesses alike from acting definitively. Interim solutions for the federal budget and the debt ceiling added further uncertainty to the economic climate, and substantial budget cuts acted as a drag on growth.[2] Only recently have rebounds in home prices and construction, factors in prior recoveries, been evident. The Federal Reserve System continues to pursue bond-buying programs and is holding interest rates at the lower bound in response to low inflation rates and high unemployment. Based on historical standards, the current economy seems much less robust than would be expected 4 years after the official end of a recession.[3]

Moving forward, there are reasons to believe that growth will continue to be slower than was originally hoped. Annual U.S. GDP growth exceeding 3.0 percent, as experienced in the mid- to late 1990s and mid-2000s, is not expected to be attainable over the coming decade. The length and nature of the recession have left lasting scars on the economy.[4] With the persistent high levels of long-term unemployment, a concern exists that individuals' skills will deteriorate or the individuals will become permanently discouraged from job seeking. High unemployment likely inhibited the usual churn that helps create better matches between worker skills and employer needs, hurting economic efficiency. Furthermore, restrained investment during the recession could be hindering growth prospects. A reluctance to grow capital stocks, implement new technologies, or fund new enterprises during the downturn can prevent businesses from reaping productivity gains in the subsequent years. Combined, these impacts may have lowered the growth rate of potential GDP. Following a downturn, a period of above-average growth is often expected to ensue, as output returns to its potential level. Instead of a few booming periods followed by average sustainable growth, growth is more reasonably expected to remain continually below prerecession rates.

Looking forward to 2022, the U.S. Bureau of Labor Statistics (BLS, the Bureau) expects slower GDP growth to become the "new normal." In addition to the recession's impact on potential growth, the economy faces a number of hurdles. As the nation's demographic shift continues, with the baby-boom generation moving into retirement, the labor force participation rate will continue to decline,

ABOUT THE AUTHOR

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Maggie Woodward is an economist in the Office of Occupational Statistics and Employment Projections, U.S. Bureau of Labor Statistics.

RELATED CONTENT

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Overview of projections to 2022, *Monthly Labor Review*, December 2013.

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Industry employment and output projections to 2022, *Monthly Labor Review*, December 2013.

Occupational employment projections to 2022, *Monthly Labor Review*, December 2013.

Related Subjects

Projections
Foreign trade
Unemployment
Gross Domestic product

moderating growth. The need to keep the debt-to-GDP ratio under control will weigh heavily on fiscal decisions. Continued reductions to federal spending will slow growth[5] and cap discretionary spending on projects that could create jobs or research and spawn technological progress. Housing remains one bright spot in the projections: even at slow rates, population growth implies a need to create homes for additional people, spurring activity in the construction sector.

From 2012–2022, BLS expects GDP to grow at a rate of 2.6 percent per year, reaching $17.6 trillion in the target year of the projections. The unemployment rate is projected to gradually decrease to 5.4 percent, accompanied by a gain in household employment of 12.3 million jobs. Productivity growth is expected to remain strong at 2.0 percent per year, helping boost output growth, despite the expected slow growth in the labor force. Housing starts are estimated to average 1.6 million per year as construction accelerates, satisfying demand for new homes and replacements for aging structures. Export growth in excess of that of imports will help narrow the trade deficit, with real net exports equal to –179.1 billion in 2022.

The object of BLS macroeconomic projections is to develop a reasonable picture of the long-term economy that can be used as a framework for the Bureau's more detailed industry output and employment projections. As such, the focus is on the long-run economic trends, not transitory economic phenomena, such as business cycle dynamics. Presented here are the primary assumptions made in the macro model, major trends for the decade encompassing 2012–2022, and an evaluation of uncertainty in the projections.

The macro model

BLS macroeconomic projections are produced by using the MA/US model, licensed from Macroeconomic Advisers (MA), LLC.[6] The 2012–2022 projections are the first to employ the new model, which was introduced in late 2012; previously, the Bureau relied on MA's Washington University Macro Model (WUMM). MA/US has the same foundations as WUMM: consumption follows a life-cycle model and investment is based on a neoclassical model. Foreign sector estimates rely on forecasts from Oxford Economics. However, many improvements were made; most notably, the model is explicitly designed to reach a full-employment solution in the target years. Within MA/US, a submodel calculates an estimate of potential output from the nonfarm business sector, based upon full-employment[7] estimates of the sector's hours worked and output per hour. Error correction models are embedded into MA/US to align the model's solution with the full-employment submodel.

Foundations of the model

Certain critical variables set the parameters for the nation's economic growth and determine in a large part the trend that GDP will follow. In developing the macroeconomic projections, BLS elects to externally determine these critical variables through research and modeling and then supplies them to the MA/US model as exogenous variables. Table 1 provides a list of key assumptions made in the model.

Table 1. Major assumptions affecting aggregate projections, 1992, 2002, 2012, and projected 2022

Exogenous variables	Billions of chained 2005 dollars (unless otherwise noted)				Annual rate of change		
	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Monetary policy related:							
Federal funds rate (percent)	3.5	1.7	0.1	4.6	-7.2	-21.9	41.8
Ninety-day Treasury bill rate (percent)	3.5	1.6	.1	4.4	-7.4	-25.5	48.1
Yields on 10-year Treasury notes (percent)	7.0	4.6	1.8	5.3	-4.1	-9.0	11.3
Fiscal policy, tax related:							
Effective federal marginal tax rate on wages and salaries (percent)	21.3	22.5	21.4	21.4	.6	-.5	.0
Effective federal marginal tax rate on interest income (percent)	22.0	24.5	23.0	25.0	1.1	-.6	.8
Effective federal marginal tax rate on dividend income (percent)	25.1	28.0	22.5	28.0	1.1	-2.1	2.2
Effective federal marginal tax rate on capital							

industry
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gains (percent)	25.7	18.8	15.0	20.0	-3.1	-2.2	2.9
Maximum federal corporate rate (percent)	34.0	35.0	35.0	35.0	.3	.0	.0
Fiscal policy, government outlays related:							
Defense intermediate goods and services purchased	160.0	182.7	259.1	171.8	1.3	3.6	-4.0
Defense gross investment	67.9	59.6	97.0	75.1	-1.3	5.0	-2.5
Nondefense Intermediate goods and services purchased	72.9	94.5	127.7	90.2	2.6	3.1	-3.4
Nondefense gross investment	28.6	34.2	46.8	44.0	1.8	3.2	-.6
Federal grants-in-aid, Medicaid and other (billions of current dollars)	149.1	304.1	468.0	646.9	7.4	4.4	3.3
Federal transfer payments, Medicare (billions of current dollars)	132.6	259.2	562.0	980.3	6.9	8.0	5.7
Energy related:							
Price of West Texas Intermediate crude oil (nominal dollars per barrel)	20.6	26.1	94.2	129.2	2.4	13.7	3.2
Price of Brent crude oil (nominal dollars per barrel)	19.3	24.9	111.7	131.5	2.6	16.2	1.6
Price of natural gas (nominal dollars per million Btu)	1.8	2.7	2.6	5.3	4.3	-.4	7.5
Domestic oil product	2.6	2.1	2.4	3.5	-2.2	1.2	3.9
Demographic related:							
Total population, including overseas Armed Forces (millions)	256.9	287.9	315.0	339.2	1.1	.9	.7
Population ages 16 and older (millions)	192.8	217.6	243.3	265.3	1.2	1.1	.9

Sources: Historical data, U.S. Federal Reserve Board, U.S. Bureau of Economic Analysis, U.S. Census Bureau; projected data, U.S. Bureau of Labor Statistics, U.S. Energy Information Administration, U.S. Census Bureau.

Demographics and the labor force. Growth in the labor force is the primary constraint on economic growth. At the beginning of the BLS projections process, detailed projections for the labor force participation rates of 136 demographic groups are modeled in-house and combined with the U.S. Census Bureau's midrange population projections.[8] The resulting labor force levels and age composition affect many key outputs of the model, such as housing starts, prices, and savings rate.

Growth in the civilian noninstitutional population ages 16 and over will continue to slow over the next decade, increasing at a compound annual rate of 0.9 percent from 243.3 million individuals in 2012 to 265.3 million in 2022. The U.S. labor force participation rate peaked at 67.1 percent from 1997–2000 and then began to drift downward, falling by about 1.0 percent before the onset of the 2007 recession. As the recession took hold, the decline in the participation rate accelerated, reaching 63.0 percent in November 2013, the most recent data available at the time of publication. As more of the baby-boom generation moves into retirement, the labor force participation rate is projected to decline another 1.4 percentage points by 2022, dropping to 61.6 percent. Coupled with the slowing population growth, the participation declines translate into slow growth of the labor force. From 2012–2022, the labor force is expected to grow from 155.0 million people to 163.5 million, an annual rate of 0.5 percent.

The nonaccelerating inflation rate of unemployment. The objective of the BLS projections is to provide a reasonable outlook on the nation's potential economic future. Fluctuations in the business cycle are short term and hard to foresee, particularly on a 10-year horizon. Therefore, the projections are made by assuming a full-employment economy in the target year. In constructing such a scenario, a value for the nonaccelerating inflation rate of unemployment (NAIRU) needs to be supplied to the model. BLS estimate of the NAIRU is based on an assessment of historical trends and an extensive literature review. Although unemployment has remained high in the wake of the 2007–2009 recession, the forces keeping it elevated are expected to abate over time. Temporary elevations could be attributed to several factors, including structural changes leading to increased skills mismatch in the labor force, extensions of unemployment benefits, general uncertainty in the current economic climate, and a cyclical lack of demand for labor. By 2022, the unemployment rate is projected to equal the NAIRU, at 5.4 percent.

Fiscal and monetary policy. In recent years, fiscal policy in the United States has transitioned from expansionary to contractionary. During the recession, large-scale spending programs designed to

stimulate the economy, primarily the American Recovery and Reinvestment Act of 2009 (ARRA), led to record budget deficits and sharp increases in the national debt. In response, measures to cut federal budgets were laid out in the Budget Control Act of 2011 (BCA), the stipulations of which specified that if lawmakers could not agree to a plan to reduce federal deficits over the coming decade, automatic spending cuts would go into effect across the board. These cuts have been popularly referred to as "the sequester." After being postponed by the American Taxpayer Relief Act of 2012, the sequester went into effect in March 2013, enforcing cuts in both mandatory and discretionary spending. These cuts will cause a large decrease in outlays in the initial projection years, but spending is anticipated to accelerate in the latter years of the projection period to meet the needs of the nation's aging population and fund the expansions to health insurance programs offered under the Patient Protection and Affordable Care Act.[9] Without further reductions in outlays or increases in revenue, federal deficits would climb again, rapidly adding to the national debt and thereby maintaining the debt-to-GDP ratio at historically high levels. The MA/US model incorporates the cuts mandated by the BCA and assumes that spending restraint sufficient to keep the national debt at a manageable level will be exercised.

In response to the weak economy, the Federal Reserve has held interest rates at the lower bound since December 2008. In addition, the Federal Reserve has employed less traditional monetary policy. Three rounds of large-scale asset purchases were pursued, the last of which is currently anticipated to finish in mid-2014.[10] Beginning December 2012, the Federal Open Market Committee began issuing explicit forward guidance outlining their expectations as to when a hike in the federal funds rate would occur and which levels of unemployment and inflation would likely trigger such a hike.[11] Monetary policy is determined endogenously in the MA/US model through a vector autoregression (VAR). The VAR is designed to estimate the federal funds rate for each period according to the Federal Reserve's dual mandate of maximizing employment while controlling inflation. For each period the model is run, the VAR forecasts the expected funds rate over 2- and 10-year horizons, ensuring that the resulting estimates are consistent with the model results as a whole.

Energy prices. The introduction of MA/US incorporated a greater variety of energy prices. Previously, only one measure of imported oil costs was included within the model; with the 2012–2022 projections, nominal prices for West Texas Intermediate (WTI) crude, Brent crude, and natural gas were used. All energy price projections come from the Energy Information Agency (EIA) *Annual Energy Outlook (AEO) 2013*.[12] The *AEO* takes a long-run look at fuel production and consumption and incorporates the assumption that current energy regulations will remain unchanged. Because of advances in technology and increased fuel prices that make accessing previously unprofitable oil reserves possible, EIA anticipates that domestic oil production will rise, peaking in 2019. The nominal price of WTI is expected to increase from $94.20 per barrel in 2012 to $129.16 per barrel in 2022, while Brent crude is expected to increase from $111.74 per barrel in 2012 to $131.55 per barrel in 2022. Simultaneously, the burgeoning natural gas industry continues to benefit from increasing shale gas extractions, with the United States becoming a net exporter of natural gas by 2020 when domestic production is expected to outpace consumption. Nominal natural gas prices are expected to grow from $2.58 per million British thermal units (Btu) in 2012 to $5.35 per million Btu in 2022, a compound annual rate of 7.5 percent.

GDP from the demand side

In 2012, the U.S. economy was still struggling to achieve the more rapid economic growth rates experienced prior to the 2007–2009 recession. Weak demand and economic uncertainty at home and abroad led firms to delay hiring and investment decisions, contributing to a still-elevated unemployment rate. Difficulty finding jobs, personal deleveraging, and tight credit conditions have in turn led to a slowdown in consumption. As the economy continues to struggle to return to potential growth levels, the nation finds itself facing a demographic shift and continued debt troubles. As the population ages, more workers leave the labor force and change their consumption habits accordingly, reducing consumer demand and investment in housing.[13] An older population also draws more on social resources, driving entitlement spending up. The public sector will be forced to balance the increasing requirements of the citizens with the need to stabilize the debt-to-GDP ratio. With the slow labor force growth expected over the next decade, the economy will be less able to generate sustained periods of high growth. Instead, rates of progress that are more modest will become standard.

Evidence of the impact of the demographic shift on growth rates can be seen when one examines the first half of the prior decade, the 5 years preceding the 2007–2009 recession. Overall, GDP is expected to grow at 2.6 percent per year over the coming decade. (See table 2.) This growth is slower than the 3.4 percent annual growth experienced from 1992–2002 and slightly less than the prerecession growth rate of 2.7 percent annually seen from 2002–2007. Per capita GDP will increase at a rate of 1.9 percent per year, slightly faster than the 1.8 percent annual increase seen from 2002–2007 but slower than the 2.2 percent annual growth that occurred from 1992–2002.

Table 2. Real gross domestic product by major demand category, 1992, 2002, 2012, and projected 2022

Category	Billions of chained 2005 dollars				Annual rate of change			Contribution to percent change in real GDP		
	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022	1992–2002	2002–2012	2012–2022
Gross domestic product	$8,280.0	$11,543.2	$13,593.3	$17,584.2	3.4	1.6	2.6	3.4	1.6	2.6
Personal consumption expenditures	5,503.2	8,018.3	9,603.3	12,380.1	3.8	1.8	2.6	2.5	1.3	1.8
Gross private domestic investment	983.1	1,800.4	1,914.4	3,038.2	6.2	.6	4.7	1.0	.1	.7
Exports	683.5	1,098.4	1,837.4	3,117.7	4.9	5.3	5.4	.5	.5	.8
Imports[(1)]	718.7	1,646.8	2,238.1	3,296.8	8.6	3.1	3.9	-1.0	-.5	-.7
Government consumption expenditures and gross investment	1,893.2	2,279.7	2,481.1	2,487.0	1.9	.9	.0	.3	.2	.0
Federal defense	549.8	505.3	677.2	560.0	-.8	3.0	-1.9	-.1	.2	-.1
Federal nondefense	233.3	274.0	347.1	302.1	1.6	2.4	-1.4	.0	.1	.0
State and local	1,107.6	1,500.7	1,461.7	1,615.1	3.1	-.3	1.0	.3	.0	.1
Residual[(2)]	-61.8	-6.9	-9.7	-132.1	—	—	—	—	—	—
Addenda:										
GDP per capita, chained 2005 dollars	32,226.7	40,090.9	43,152.3	51,834.7	2.2	.7	1.9	—	—	—

Notes:

(1) Imports are subtracted from the other components of gross domestic product (GDP) because they are not produced in the United States.

(2) The residual is calculated as real GDP, plus imports, less other components.

Note: Dash indicates data not computable or not applicable.

Sources: Historical data, U.S. Bureau of Economic Analysis, projected data, U.S. Bureau of Labor Statistics.

Personal consumption expenditures. The largest component of demand is personal consumption expenditures (PCE), which compose approximately 70 percent of nominal GDP of the United States. (See table 3.) PCE exhibited robust growth of 3.8 percent annually from 1992–2002 and 2.9 percent annually from 2002–2007, facilitated by a declining personal savings rate and strong economic growth, which bolstered consumer confidence. Rapid increases in home prices characteristic of the housing bubble also contributed to the virtuous cycle of spending, while homeowners perceived an increase in their home equity. Because of the credit crisis and 2007–2009 recession, growth in consumption slowed dramatically to 0.7 percent per year over the second half of the decade. Hesitant to spend when faced with job insecurity, declining home values, and volatile stock prices, consumers reacted to the downturn by increasing their savings and reducing personal debt. Further, stricter lending standards reduced consumers' access to credit, limiting their ability to spend as rapidly as in the past. From 2012 to 2022, PCE are expected to grow at the same rate as the economy as a whole, 2.6 percent annually.

Table 3. Nominal gross domestic product, by major demand category, 1992, 2002, 2012, and projected 2022

Category	Billions of dollars				Percent distribution			
	1992	2002	2012	2022	1992	2002	2012	2022
Gross domestic product	$6,342.3	$10,642.3	$15,684.8	$24,144.1	100.0	100.0	100.0	100.0
Personal consumption expenditures	4,236.9	7,439.2	11,119.6	17,025.0	66.8	69.9	70.9	70.5
Gross private domestic investment	864.8	1,646.9	2,062.3	3,742.0	13.6	15.5	13.1	15.5
Exports	635.0	1,003.0	2,184.1	4,069.6	10.0	9.4	13.9	16.9
Imports(1)	667.8	1,430.2	2,744.0	4,695.9	10.5	13.4	17.5	19.4
Government consumption expenditures and gross investment	1,273.4	1,983.3	3,062.8	4,003.4	20.1	18.6	19.5	16.6
Federal defense	376.8	437.7	809.2	833.1	5.9	4.1	5.2	3.5
Federal nondefense	156.1	243.0	405.1	428.8	2.5	2.3	2.6	1.8
State and local	740.6	1,302.7	1,848.5	2,741.5	11.7	12.2	11.8	11.4

Notes:

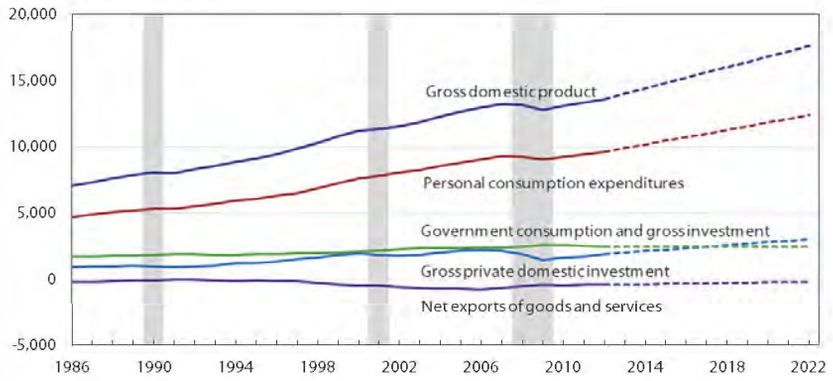
(1) Imports are subtracted from the other components of gross domestic product because they are not produced in the United States.

Sources: Historical data, U.S. Bureau of Economic Analysis, projected data, U.S. Bureau of Labor Statistics.

Of the 2.6 percentage points GDP is anticipated to gain per year, PCE are expected to contribute 1.8 points, or 67.4 percent of all economic growth. (See table 2 and figure 1.) This rate is a substantial slowdown from the previous decade, in which PCE made up 80.8 percent of all growth, and from the period 1992–2002, when PCE accounted for 75.3 percent of economic activity. Such a distributional change is usual following a recession, when resurgences in investment make the remaining components of GDP appear to be of lesser importance. (See figure 2.)

PCE can be divided into three categories: durable goods, nondurable goods, and services. The fastest growing segment is spending on durable goods, those purchases with a lifespan of 3 or more years, with an expected growth rate of 3.6 percent annually over the coming decade. (See figure 3 and table 4.) Durable goods tend to be expensive items, such as appliances, furniture, and televisions, the purchase of which consumers often elect to delay during an economic downturn. Indeed, consumption of durables grew at a rate of 8.2 percent per year from 1992–2002, 5.8 percent from 2002–2007, but dropped to 2.0 percent from 2007–2012. As the business cycle turns upward and consumers decide to reenter the market for durable goods, their contributions will be counteracted by the movement of the baby-boom generation into older age cohorts, whose changing needs redirect their spending into other sectors.

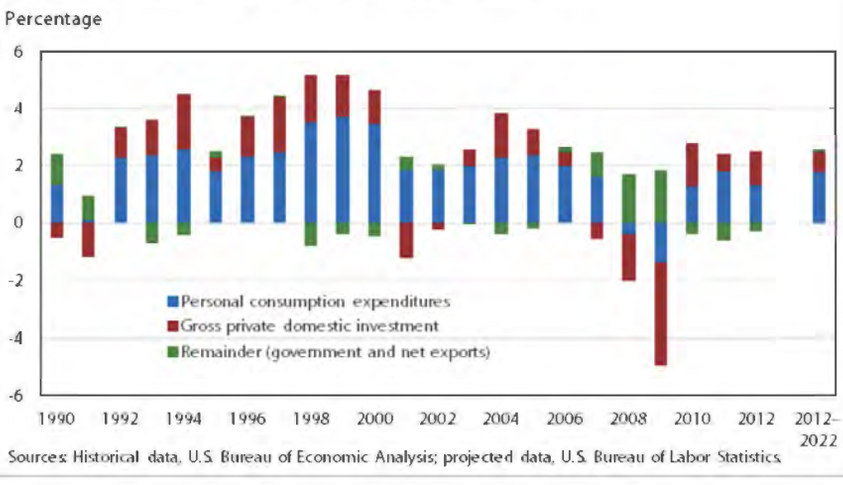
Figure 1. Nominal gross domestic product and final demand, 1986–2012 and projected 2022



Note: Shaded regions represent recessions as designated by the National Bureau of Economic Research. Turning points are quarterly.
Sources: Historical data, U.S. Bureau of Economic Analysis; projected data, U.S. Bureau of Labor Statistics.

View Chart Data

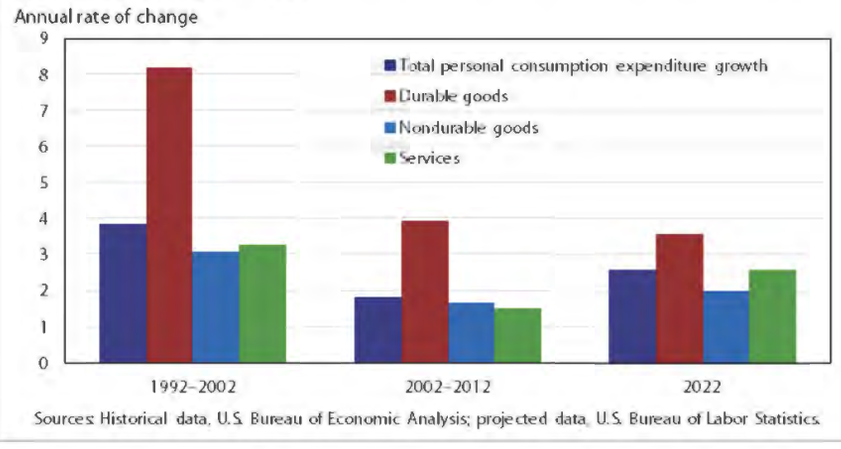
Figure 2. Contributions to growth in gross domestic product



Sources: Historical data, U.S. Bureau of Economic Analysis; projected data, U.S. Bureau of Labor Statistics.

View Chart Data

Figure 3. Growth in categories of personal consumption expenditures, 1992–2012 and projected 2022



Sources: Historical data, U.S. Bureau of Economic Analysis; projected data, U.S. Bureau of Labor Statistics.

View Chart Data

Table 4. Personal consumption expenditures, 1992, 2002, 2012, and projected 2022

Table 4. Personal consumption expenditures, 1992, 2002, 2012, and projected 2022

Category	Billions of chained 2005 dollars				Annual rate of change		
	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Personal consumption expenditures	$5,503.2	$8,018.3	$9,603.3	$12,380.1	3.8	1.8	2.6
Durable goods	423.1	927.9	1,361.0	1,935.7	8.2	3.9	3.6
Motor vehicles and parts	231.5	394.0	373.3	523.3	5.5	-.5	3.4
Other durable goods	205.5	536.2	995.5	1,439.0	10.1	6.4	3.8
Nondurable goods	1,316.8	1,780.1	2,094.5	2,556.6	3.1	1.6	2.0
Food	526.5	608.9	685.8	766.2	1.5	1.2	1.1
Gasoline	249.1	294.0	268.6	287.6	1.7	-.9	.7
Other nondurable goods	566.3	880.8	1,154.9	1,544.2	4.5	2.7	2.9
Services	3,861.6	5,318.5	6,176.6	7,973.1	3.3	1.5	2.6
Housing services	1,129.7	1,461.9	1,677.7	2,060.6	2.6	1.4	2.1
Imputed rent	678.0	933.5	1,084.3	1,365.3	3.3	1.5	2.3
Natural gas	63.5	61.2	57.4	63.2	-.4	-.6	1.0
Electricity	93.1	118.6	126.6	160.7	2.4	.7	2.4
Other housing services	299.5	348.9	408.6	471.1	1.5	1.6	1.4
Medical services	916.5	1,202.5	1,516.8	2,071.3	2.8	2.3	3.2
Other services	1,819.0	2,654.1	2,980.8	3,833.9	3.9	1.2	2.5
Residual[(1)]	-145.4	-14.6	-49.3	-145.8	—	—	—

Notes:

[(1)] The residual is the difference between the first line and the sum of the most detailed lines.

Note: Dash indicates data not computable or not applicable.

Sources: Historical data, U.S. Bureau of Economic Analysis, projected data, U.S. Bureau of Labor Statistics.

Durable goods expenditures are classified as either purchases of motor vehicles and parts or other durable goods. Motor vehicles sales were particularly hard hit by the recession; increases in automobile reliability allowed cautious consumers to continue driving their older vehicles rather than replacing them with newer models.[14] The number of units sold reached a trough of 10.4 million per year in 2009, down from a high of 16.9 in 2004 and 2005. The dramatic decline in sales resulted in consolidation and restructuring in the industry, and by 2012, sales had reached 14.4 million units. Sales of new automobiles are expected to average 14.8 million units per year over the coming decade, with higher volume in the earlier years of the projections period reflecting the conflicting pressures of pent-up demand and decreasing durable goods consumption of the elderly. With somewhat tighter lending standards than before the recession and increasing automobile lifespans, demand for new vehicles will be dampened. Total growth in consumption of motor vehicles and parts declined by 0.5 percent annually from 2002–2012, but it is expected to resume a healthy growth rate of 3.4 percent per year from 2012–2022.

The category of other durable goods is expected to reflect this conflict even more sharply. Growth in this category slowed from 10.1 percent annually from 1992–2002 to 6.4 percent annually for the period from 2002–2012 and is projected to slow even more, decreasing to 3.8 percent annually from 2012– 2022. This decline is largely attributable to consumers devoting a growing proportion of their income to nondurable goods and services. Within durable goods, digital devices continue to drive growth. The sectors that comprise the sales of televisions, personal computers, tablets, and smart phones are expected to grow at a pace that exceeds their historical trends. Sales of books, a comparatively small component of demand, will grow below trend, further reflecting a shift toward digital media.

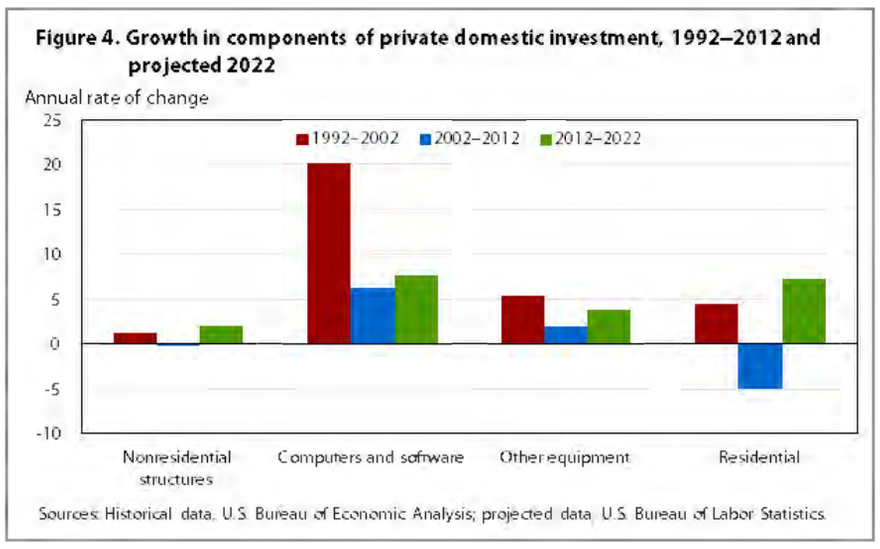
Nondurable goods include many “essentials” for life, including food, medicines, clothing, and gasoline. The necessity of these items makes delaying or reducing spending in this category more difficult. Therefore, nondurable consumption has been somewhat more stable. Growth was 3.1 percent annually from 1992–2002 and declined to 1.6 percent annually for the period from 2002–2012. Growth is expected to remain steady at a rate of 2.0 percent annually over the projections period. The

recession slightly affected spending on food, with the annual rate from 2002–2012 equal to 1.2 percent, compared with the 1.5 percent annual growth seen from 1992–2002. Growth over the next decade is expected to slow to 1.1 percent per year, as consumers make choices that are more careful and apportion more of their incomes to health needs. Gasoline expenditures fell at a rate of 0.9 percent per year from 2002–2012, largely because of rapid increases in petroleum prices and deteriorating economic conditions in the latter half of the decade. Consumption of gasoline is expected to rise again over the next 10 years, although it will be kept in check by continued rises in oil prices and shifts to renewable energy and more fuel-efficient technologies. Gasoline expenditures are forecast to continue to increase at a modest pace of 0.7 percent per year to 2022.

Services are the largest component of PCE; its share of nominal consumer spending grew steadily from 64.9 percent in 1992 to 66.0 percent in 2012 and is expected to constitute 70.2 percent by 2022. Services increased at a rate of 3.3 percent annually from 1992–2002, declining to 1.5 percent from 2002–2012, but the effects on the various categories of services were disparate, as are their paths going forward. Housing services was sharply affected, falling to an annual growth rate of 0.6 percent from 2007–2012 from a rate of 2.2 percent from 2002–2007, and 2.6 percent from 1992 through 2002. This category is largely composed of imputed rent, the estimate of what an owner-occupier would have paid in rent had they been leasing the home. With the large declines in home prices after the housing bubble burst, growth of imputed rents stalled. As home prices increase, growth in the consumption of housing services is expected to return to the prerecession trend, with a projected annual growth rate through 2022 of 2.1 percent. Medical services remained steady over the prior decade, exhibiting growth rates of 2.3 percent per year, compared with the 2.8 percent annually seen from 1992–2002. With the expansion of health insurance under the Patient Protection and Affordable Care Act, advances in medical technologies, and increasing demand from the aging population, consumption of medical services is expected to grow faster over the projections horizon at a rate of 3.2 percent per year. The grouping of “other services” includes categories of spending such as personal care and telecommunications. Like durable goods, “other services” is an area in which consumers can more easily cut back their spending. Growth in other services fell from 3.9 percent annually from 1992–2002 to 1.2 percent for the decade from 2002–2012 and is expected to remain slow, growing at 2.5 percent annually until 2022.

Residential investment. Growth in residential investment has been a key component of prior economic recoveries in the United States. Population growth inherently creates demand for housing, which creates jobs in construction and has spillover effects in other sectors as a result of home buyers furnishing their new abodes. In the wake of the housing bubble of the mid-2000s, home prices remained depressed and strict lending standards prevented some consumers from accessing the market. High foreclosure rates flooded the market with an excess supply of homes, causing many to remain on the market for extended periods. First-time home-buyer tax credits were offered in 2008–2010 but did little to boost sales. Residential investment, which grew at 4.4 percent annually from 1992–2002, shrunk at a rate of 5.0 percent per year from 2002–2012. (See figure 4 and table 5.) Single-family homes were particularly hard hit, decreasing 8.9 percent per year over the past decade, compared with multifamily units, which fell at a rate of 7.8 percent per year.

Figure 4. Growth in components of private domestic investment, 1992–2012 and projected 2022



View Chart Data

Table 5. Gross private domestic investment, 1992, 2002, 2012, and projected 2022

Category	Billions of chained 2005 dollars				Annual rate of change		
	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Gross private domestic investment	$983.1	$1,800.4	$1,914.4	$3,038.2	6.2	0.6	4.7
Fixed nonresidential investment	600.4	1,173.7	1,487.8	2,241.9	6.9	2.4	4.2
Equipment and software	347.2	824.2	1,143.9	1,868.2	9.0	3.3	5.0
Computers and software	36.9	231.2	425.8	888.1	20.1	6.3	7.6

Other equipment	352.1	595.0	725.5	1,048.2	5.4	2.0	3.7
Structures	317.9	356.6	353.6	431.5	1.2	-.1	2.0
Fixed residential structures	397.3	613.8	367.1	733.8	4.4	-5.0	7.2
Single family	218.3	327.6	128.9	405.5	4.1	-8.9	12.1
Multifamily	21.9	38.9	17.2	41.6	5.9	-7.8	9.2
Other	156.6	246.9	223.1	294.4	4.7	-1.0	2.8
Change in business inventories	17.9	12.8	43.0	45.4	-3.3	12.9	.6
Residual[(1)]	-138.6	-8.6	-2.8	-116.6	—	—	—

Notes:

(1) The residual is the difference between the first line and the sum of the most detailed lines.

Note: Dash indicates data not computable or not applicable.

Sources: Historical data, U.S. Bureau of Economic Analysis, projected data, U.S. Bureau of Labor Statistics.

In recent months, evidence of the long-awaited housing recovery has emerged.[15] Multifamily starts are back to the prerecessionary levels, and inventories of single-family homes are decreasing, causing home prices to rise. There is still reason to believe that a stronger housing recovery remains on the horizon. Household formation rates, which respond to business cycle dynamics, have been low in recent years, creating the potential for a sizable boost to the market as individuals regain economic confidence.[16] Fundamentally, the housing market is demographically driven, and new construction will be needed to house the growing population and replace aging structures. Over the coming decade, BLS expects that total residential investment will increase 7.2 percent per year, with single-family home starts growing at a rate of 12.1 percent annually and multifamily construction growing 9.2 percent annually. Housing starts will average 1.6 million per year over the decade.

Nonresidential investment. The last 10 years were particularly tumultuous for nonresidential investment. Coming off a decade of robust growth at 6.9 percent annually in the 1990s, investment suffered after the dot-com bubble burst, contributing to the recession that lasted from March to November 2001. Still, growth gradually increased, reaching 5.7 percent annual growth for the 5 years preceding the 2007–2009 recession. The recession severely limited the willingness and ability of businesses to invest in new equipment and structures. From 2007–2012, this demand component shrank at a rate of 0.8 percent per year. Over the coming decade, nonresidential investment as a whole is expected to grow at a rate of 4.2 percent.

Investment in computers and software was the only category of fixed investment that did not decline throughout the recession and recovery. Though far short of the 20.1 percent annual growth seen from 1992–2002, computers and software investment gained 6.3 percent annually over the last decade, including growth of 4.0 percent per year from 2007–2012. This growth was fed by the increased automation and network building. Robust growth, though moderate by some historical standards, is anticipated at 7.6 percent per year through 2022. Investment in nonresidential structures, which includes factories, medical facilities, schools, and offices, experienced declines that were more noticeable during the recession. These structures have long service lives, and as such, construction is based upon long-run growth forecasts.[17] Strong economic performance in the mid-2000s and optimism about the future led to the rapid construction, which in turn led to an excess of structures when the recession hit. After growing at 4.2 percent annually from 2002–2007, trends were reversed, with net growth over the decade equal to –0.1 percent annually. Because of the long lifespan of these structures, the excess supply takes particularly long to absorb as compared with other forms of investment. Going forward, nonresidential structures are expected to grow at 2.0 percent annually, gaining momentum in the latter years of the projections period.

Foreign trade in goods and services and the current account. Foreign trade represents an area of considerable uncertainty in the macroeconomic projections, especially because of the global nature of the recent economic slowdown. As nations recover at different rates or experience other crises, the precise path of global trade is difficult to anticipate, although generally the sector will be of ever-growing importance. The past two decades have seen a rapid increase in globalization, with rising volumes of both imports into and exports out of the United States. Increasing integration has acted as a

double-edged sword, bringing Americans access to cheaper goods from overseas, while simultaneously leading to the offshoring of many labor-intensive industries. The accession of China to the World Trade Organization in 2001 was milestone in the progression of globalization, opening new arenas for investment while dramatically increasing the availability of Chinese exports in world markets. Going forward, the United States can expect to be increasingly affected by changes in foreign economies. Gradual factor price equalization will limit the gains firms can achieve by outsourcing production. The anticipated slowdown of growth in China and other emerging markets can potentially limit imports to the United States.[18] Many of the structural changes that globalization brought to the nation are expected to persist. The United States has long had a positive balance of trade for services and a substantial trade deficit for goods, both of which are expected to continue as the U.S. economy remains largely service based.

During the decade leading up to the 2007–2009 recession, the trade deficit deepened considerably. Net exports grew at an annual rate of 20.8 percent, widening the trade deficit to $729.4 billion in 2006. As economies worldwide felt the effects of the financial crisis, both imports and exports slowed, though imports fell faster than exports, leading to a narrowing of the trade deficit. This tightening is expected to continue, with the real trade deficit shrinking from $400.7 billion in 2012 to $179.1 billion in 2022, while the personal savings rate stabilizes and federal deficits decline. (See table 6.) Export growth is expected to be slightly faster than the historical trend of the last two decades, while imports grow more slowly.

Table 6. Exports and imports of goods and services, 1992, 2002, 2012, and projected 2022

Category	Billions of chained 2005 dollars				Annual rate of change		
	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Exports of goods and services	$683.5	$1,098.4	$1,837.4	$3,117.7	4.9	5.3	5.4
Goods	454.2	762.7	1,300.4	2,231.5	5.3	5.5	5.5
Nonagricultural	401.7	698.1	1,215.8	2,138.5	5.7	5.7	5.8
Agricultural	52.6	64.4	86.5	115.2	2.0	3.0	2.9
Services	233.4	335.6	537.5	889.9	3.7	4.8	5.2
Residual(1)	-4.2	.3	-2.5	-25.9	—	—	—
Imports of goods and services	718.7	1,646.8	2,238.1	3,296.8	8.6	3.1	3.9
Goods	563.1	1,372.2	1,858.2	2,786.2	9.3	3.1	4.1
Nonpetroleum	456.6	1,157.6	1,687.9	2,732.2	9.8	3.8	4.9
Petroleum	146.4	217.1	204.9	197.5	4.0	-.6	-.4
Services	162.4	274.5	381.9	514.3	5.4	3.4	3.0
Residual(2)	-46.7	-2.4	-36.7	-147.2	—	—	—
Trade surplus/deficit	-35.2	-548.5	-400.7	-179.1	31.6	-3.1	-7.7

Notes:

(1) The residual is the difference between the aggregate for “exports of goods and services” and its detailed components.

(2) The residual is the difference between the aggregate for “imports of goods and services” and its detailed components.

Note: Dash indicates data not computable or not applicable.

Sources: Historical data, U.S. Bureau of Economic Analysis, projected data, U.S. Bureau of Labor Statistics.

The current account balance (CAB) measures income flows into and out of the United States, in addition to net exports. The CAB has widened substantially since the 1990s, because the trade deficit grew and income payments to the rest of the world increased. The current account deficit, measured in nominal terms, grew to be $798.4 billion in 2006, before retreating during the recession. Continued rebalancing is expected through 2022, with the CAB projected to decline from $474.1 billion to $63.2 billion from 2012–2022. Income receipts from the rest of the world are projected to outpace income payments, in part, because of a differential rate of return on investments abroad. As a percentage of nominal GDP, the CAB is expected to be only 0.3 percent in 2022, down from 3.0 percent in 2012.

As a strong and stable economy, the United States is seen as a desirable destination for foreign investment, which facilitated the steep rise in the broad trade-weighted exchange rate for the U.S. dollar from the mid-1980s to the early 2000s. With pressure from the nation's increasing trade deficits and recessions in 2001 and 2007–2009, downward pressure was exerted on the dollar and the exchange rate declined by more than 20 percent from 2002–2012. Going forward, the exchange rate is expected to remain relatively stable. The United States currently presents a more sound investment possibility than the European Union (EU), which is still dealing with the aftermath of several nations' sovereign debt crises, while emerging markets provide increased competition for foreign dollars. The anticipated narrowing of the trade deficit will also alleviate pressure on the dollar. On balance, the forces will counteract each other and the expected result is a modest 4.1 percent increase in the exchange rate by 2022.

Federal government. In the coming years, the federal government will be subjected to two major, conflicting pressures: the need to meet the demands of the aging population while simultaneously stabilizing the debt-to-GDP ratio.[19] In an attempt to stimulate the economy in the wake of the 2007–2009 recession, massive spending programs were enacted, including the American Recovery and Reinvestment Act, the Troubled Asset Relief Program, bailouts for the automobile industry, and the government takeover of Fannie Mae and Freddie Mac. Coupled with low revenues stemming from the sluggish economy and extensions to the Bush-era tax cuts, federal deficits rose rapidly, with shortfalls in excess of $1 trillion for each year from 2009–2012.[20] Such large deficits rapidly added to the national debt, bringing the value of the debt held by the public to 72.5 percent of GDP at the end of 2012, the highest level seen since World War II. A sustained high level of debt-to-GDP ratio can damage economic growth because it makes investors less willing to lend to the U.S. government and risks sparking a financial crisis. Higher debts also come with increased interest payments, further adding to the government's fiscal dilemma and hampering the future flexibility of policies in the face of further economic adversity. After the sequester reduced federal government spending, federal agencies implemented the spending cuts in a variety of ways, including eliminating programs and furloughing employees. When the data presented here were finalized for publication, impacts of the sequester were only beginning to be seen in economic data. Research shows that the contractionary policies of the federal government may restrain GDP growth as much as 1 percentage point per year over the next 3 years.[21]

As the baby-boom generation reaches retirement age, outlays for entitlement programs will increase substantially. (See table 7.) More individuals will become eligible for Social Security and Medicare, and as individuals live longer and medical technologies increase, so will healthcare spending. In addition, the passage of the Patient Protection and Affordable Care Act in 2010 will gradually expand health insurance coverage to millions of citizens, in part through large federal subsidies. These dramatic increases to nondiscretionary spending are directly at odds with the aforementioned need to control federal deficits. As a result, mandatory spending is expected to crowd out spending on other programs. The Congressional Budget Office estimates that even after sequestration, under current laws, deficits will begin to rise again by 2017 because of these programs. As discussed earlier, assumptions within the MA/US model include spending cuts that go beyond those mandated by the sequester, implying that further action will be taken to control spending. Even with these additional measures, BLS projects that the national debt will remain greater than 70 percent of GDP by the end of 2022.

Table 7. Federal government receipts and expenditures, 1992, 2002, 2012, and projected 2022

Category	Billions of current dollars				Percent distribution				Annual rate of change		
	1992	2002	2012	2022	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Receipts	$1,148.0	$1,859.3	$2,675.7	$4,453.1	100.0	100.0	100.0	100.0	4.9	3.7	5.2
Tax receipts	660.0	1,073.5	1,645.5	2,652.8	57.5	57.7	61.5	59.6	5.0	4.4	4.9
Personal taxes	475.3	828.6	1,140.0	2,106.3	41.4	44.6	42.6	47.3	5.7	3.2	6.3
Corporate income taxes	118.8	150.4	372.3	357.0	10.3	8.1	13.9	8.0	2.4	9.5	-.4
Taxes on production and imports	63.3	86.8	116.0	165.6	5.5	4.7	4.3	3.7	3.2	2.9	3.6

Taxes from the rest of the world	2.7	7.6	17.3	23.8	.2	.4	.6	.5	11.1	8.6	3.2
Contributions for social insurance	444.0	739.3	935.5	1,650.7	38.7	39.8	35.0	37.1	5.2	2.4	5.8
Income receipts on assets	24.8	20.2	32.6	39.2	2.2	1.1	1.2	.9	-2.0	4.9	1.9
Interest receipts	22.3	15.4	25.7	28.9	1.9	.8	1.0	.6	-3.6	5.3	1.2
Rents and royalties	2.5	4.8	6.9	10.3	.2	.3	.3	.2	6.7	3.6	4.1
Transfer receipts	19.3	26.1	59.0	92.5	1.7	1.4	2.2	2.1	3.0	8.5	4.6
From business	15.3	15.4	38.7	65.0	1.3	.8	1.4	1.5	.1	9.7	5.3
From persons	4.1	10.8	20.3	27.5	.4	.6	.8	.6	10.1	6.6	3.1
Surplus of government enterprises	-.1	.2	-17.7	-3.0	.0	.0	-.7	-.1	—	—	-16.3
Expenditures	1,450.5	2,112.1	3,757.7	5,314.2	100.0	100.0	100.0	100.0	3.8	5.9	3.5
Consumption expenditures	444.1	590.5	1,059.7	1,126.9	30.6	28.0	28.2	21.2	2.9	6.0	.6
Transfer payments	725.4	1,252.1	2,319.1	3,438.9	50.0	59.3	61.7	64.7	5.6	6.4	4.0
Government social benefits	555.7	924.6	1,792.8	2,703.3	38.3	43.8	47.7	50.9	5.2	6.8	4.2
Social Security benefits	281.8	446.9	762.2	1,298.9	19.4	21.2	20.3	24.4	4.7	5.5	5.5
Medicare benefits	132.6	259.2	562.0	980.3	9.1	12.3	15.0	18.4	6.9	8.0	5.7
Unemployment benefits	39.6	53.5	80.9	35.0	2.7	2.5	2.2	.7	3.0	4.2	-8.0
Other benefits to persons	95.5	155.3	369.9	365.1	6.6	7.4	9.8	6.9	5.0	9.1	-.1
Benefits to the rest of the world	6.2	9.6	17.9	23.9	.4	.5	.5	.5	4.5	6.3	3.0
Other transfer payments	169.7	327.4	526.4	735.7	11.7	15.5	14.0	13.8	6.8	4.9	3.4
Grants-in-aid to state and local governments	149.1	304.1	468.0	646.9	10.3	14.4	12.5	12.2	7.4	4.4	3.3
Transfer payments to the rest of the world	20.5	23.3	58.3	88.7	1.4	1.1	1.6	1.7	1.3	9.6	4.3
Interest payments	251.3	229.1	318.5	719.3	17.3	10.8	8.5	13.5	-.9	3.4	8.5
To persons and business	212.2	154.2	188.2	329.5	14.6	7.3	5.0	6.2	-3.1	2.0	5.8
To the rest of the world	39.1	74.9	130.4	389.9	2.7	3.5	3.5	7.3	6.7	5.7	11.6
Subsidies	29.7	40.5	60.4	29.0	2.0	1.9	1.6	.5	3.2	4.1	-7.1
Less wage accruals less disbursements	.0	.0	.0	.0	—	—	—	—	—	—	—
Net federal government saving	-302.5	-252.8	-1,082.0	-861.1	—	—	—	—	-1.8	15.7	-2.3
Surplus or deficit as percentage of gross domestic product	-4.8	-2.4	-6.9	-3.6	—	—	—	—	-6.7	11.3	-6.4

Note: Dash indicates data not computable or not applicable.

Sources: Historical data, U.S. Bureau of Economic Analysis; projected data, U.S. Bureau of Labor Statistics.

Defense spending was not exempt from the sequester. Coupled with the withdrawals of troops from Iraq and Afghanistan, this category represents an area of substantial decline in government spending. Defense consumption and investment grew at a rate of 3.0 percent annually from 2002–2012 but is expected to decrease at a rate of 1.9 percent annually through 2022. (See table 8.) Military personnel and healthcare costs and along with veterans' benefits programs expanded considerably since 2001, representing a funding commitment over the next 40 years to provide for the well-being of servicemembers and their families.[22] Furthermore, costs to replace equipment used in the wars in Iraq and Afghanistan and to maintain a presence in the region will be substantial. Because of such programs, a decreasing proportion of the defense budget will be available to fund core defense

functions and fund research and development and a growing budget for the Department of Veterans Affairs will constrain the federal budget as a whole.

Table 8. Government consumption expenditures and gross investment, 1992, 2002, 2012, and projected 2022

Category	Billions of chained 2005 dollars				Annual rate of change		
	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Government consumption expenditures and gross investment	$1,893.2	$2,279.7	$2,481.1	$2,487.0	1.9	0.9	0.0
Federal government consumption and investment	783.0	779.5	1,024.1	861.6	.0	2.8	-1.7
Defense consumption and investment	549.8	505.3	677.2	560.0	-.8	3.0	-1.9
Consumption expenditures	479.7	445.8	580.5	484.1	-.7	2.7	-1.8
Compensation, military	168.7	138.7	157.9	155.9	-1.9	1.3	-.1
Compensation, civilian	95.4	65.1	81.4	78.0	-3.7	2.3	-.4
Consumption of fixed capital	71.5	65.1	87.4	80.1	-.9	3.0	-.9
Intermediate goods and services purchased	160.0	182.7	259.1	171.8	1.3	3.6	-4.0
Less own-account investment	2.8	2.5	1.9	1.7	-1.0	-2.6	-1.2
Less sales to other sectors	3.6	2.4	3.1	2.1	-3.8	2.5	-4.0
Gross investment	67.9	59.6	97.0	75.1	-1.3	5.0	-2.5
Own-account investment	2.8	2.5	1.9	1.7	-1.0	-2.6	-1.2
Other investment	65.3	57.2	95.1	73.4	-1.3	5.2	-2.6
Nondefense consumption and investment	233.3	274.0	347.1	302.1	1.6	2.4	-1.4
Consumption expenditures	205.2	239.7	300.3	259.0	1.6	2.3	-1.5
Compensation	132.3	127.1	146.1	140.9	-.4	1.4	-.4
Consumption of fixed capital	15.8	24.0	33.5	35.9	4.3	3.4	.7
Commodity credit corporation purchases	-.7	.1	.0	.0	—	-6.7	—
Other intermediate goods and services purchased	73.7	94.4	127.6	90.2	2.5	3.1	-3.4
Less own-account investment	4.3	2.7	2.5	2.8	-4.5	-.8	1.2
Less sales to other sectors	7.3	3.1	4.5	5.0	-8.3	3.9	1.1
Gross investment	28.6	34.2	46.8	44.0	1.8	3.2	-.6
Own-account investment	4.3	2.7	2.5	2.8	-4.5	-.8	1.2
Other investment	24.8	31.5	44.3	41.2	2.4	3.5	-.7
State and local government consumption and investment	1,107.6	1,500.7	1,461.7	1,615.1	3.1	-.3	1.0
Consumption expenditures	918.7	1,211.2	1,218.9	1,312.1	2.8	.1	.7
Compensation	745.9	876.7	882.8	954.6	1.6	.1	.8
Consumption of fixed capital	69.4	104.1	131.7	158.5	4.1	2.4	1.9
Intermediate goods and services purchased	326.3	535.2	532.2	565.5	5.1	-.1	.6
Less own-account investment	13.9	19.1	17.2	19.9	3.2	-1.0	1.5
Less sales to other sectors	203.7	285.3	310.4	345.1	3.4	.8	1.1
Gross investment	190.0	289.5	244.0	303.8	4.3	-1.7	2.2
Own-account investment	13.9	19.1	17.2	19.9	3.2	-1.0	1.5
Other investment	176.1	270.4	226.8	283.8	4.4	-1.7	2.3
Residual[(1)]	-16.7	-1.8	-7.0	9.5	—	—	—

Notes:

(1) The residual is the difference between the first line and the sum of the most detailed lines.

Note: Dash indicates data not computable or not applicable.

Sources: Historical data, U.S. Bureau of Economic Analysis, projected data, U.S. Bureau of Labor Statistics.

State and local governments. The vast majority of states have provisions that prevent them from running budget deficits, meaning that their fiscal decisions are forced to respond more rapidly to

economic pressures. When incomes decline, states receive less in tax revenues while facing greater demand for social assistance programs, such as unemployment insurance and Medicaid. Cutbacks in federal grants further constrain state and local government spending. Compared with the decade from 1992–2002, every major category of state and local government expenditures experienced slower or negative growth from 2002–2012. (See table 9.) As a percentage of nominal expenditures, social benefits rose from 22.7 percent to 25.2 percent, while consumption expenditures decreased 1.9 percentage points to 69.6 percent, indicating that states were spending proportionally less on infrastructure projects, education, and other state-sponsored programs.

Table 9. State and local government receipts and expenditures, 1992, 2002, 2012, and projected 2022

Category	Billions of current dollars				Percent distribution				Annual rate of change		
	1992	2002	2012	2022	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Receipts	$846.2	$1,412.7	$2,069.5	$3,315.2	100.0	100.0	100.0	100.0	5.3	3.9	4.8
Tax receipts	579.8	928.7	1,398.0	2,371.0	68.5	65.7	67.5	71.5	4.8	4.2	5.4
Personal taxes	135.3	221.8	335.8	565.9	16.0	15.7	16.2	17.1	5.1	4.2	5.4
Corporate income taxes	24.4	30.9	48.2	106.7	2.9	2.2	2.3	3.2	2.4	4.6	8.3
Taxes on production and imports	420.1	676.0	1,014.0	1,698.4	49.6	47.8	49.0	51.2	4.9	4.1	5.3
Sales taxes and other	235.4	386.6	566.3	877.2	27.8	27.4	27.4	26.5	5.1	3.9	4.5
Property taxes	184.7	289.4	447.7	821.1	21.8	20.5	21.6	24.8	4.6	4.5	6.3
Contributions for social insurance	13.1	15.9	17.5	25.6	1.6	1.1	.8	.8	1.9	.9	3.9
Income receipts on assets	64.8	79.7	85.4	104.9	7.7	5.6	4.1	3.2	2.1	.7	2.1
Interest receipts	59.6	71.5	72.1	85.8	7.0	5.1	3.5	2.6	1.8	.1	1.7
Dividends	.4	1.5	2.1	2.8	.1	.1	.1	.1	13.2	3.2	2.6
Rents and royalties	4.8	6.6	11.2	16.4	.6	.5	.5	.5	3.3	5.4	3.9
Transfer receipts	180.3	382.3	584.9	813.8	21.3	27.1	28.3	24.5	7.8	4.3	3.4
Federal grants-in-aid	149.1	304.1	468.0	646.9	17.6	21.5	22.6	19.5	7.4	4.4	3.3
From business (net)	9.3	32.5	45.7	71.1	1.1	2.3	2.2	2.1	13.4	3.4	4.5
From persons	21.9	45.7	71.2	95.7	2.6	3.2	3.4	2.9	7.6	4.5	3.0
Surplus of government enterprises	8.3	6.1	-16.3	.0	1.0	.4	-.8	.0	-3.0	—	—
Expenditures	847.6	1,466.8	2,198.5	3,248.1	100.0	100.0	100.0	100.0	5.6	4.1	4.0
Consumption expenditures	606.2	1,049.4	1,530.8	2,226.8	71.5	71.5	69.6	68.6	5.6	3.8	3.8
Government social benefit payments to persons	180.0	333.0	554.2	852.4	21.2	22.7	25.2	26.2	6.3	5.2	4.4
Medicaid	121.8	258.6	430.4	698.5	14.4	17.6	19.6	21.5	7.8	5.2	5.0
Other	58.2	74.4	123.9	153.9	6.9	5.1	5.6	4.7	2.5	5.2	2.2
Interest payments	61.0	83.5	113.0	168.3	7.2	5.7	5.1	5.2	3.2	3.1	4.1
Subsidies	.4	.9	.5	.6	.0	.1	.0	.0	8.7	-6.0	1.8
Less wage accruals less disbursements	.0	.0	.0	.0	.0	.0	.0	.0	—	—	—
Net state and local government saving	-1.4	-54.1	-128.9	67.1	—	—	—	—	—	—	—

Note: Dash indicates data not computable or not applicable.

Sources: Historical data, U.S. Bureau of Economic Analysis; projected data, U.S. Bureau of Labor Statistics.

As the economy improves in the coming decade, state and local government receipts are expected to increase, gaining 4.8 percent annually from 2012–2022. Property taxes in particular will boost revenues as home prices rebound. As the federal government works to cut its spending, growth in grants is expected to slow to 3.3 percent annually from 2012–2022, compared with 4.4 percent

annually in the prior decade. The expansion of Medicaid in some states as a part of the Patient Protection and Affordable Care Act will increase expenditures at the same time, making Medicaid payments 21.5 percent of total state and local expenditures, up from 17.6 percent in 2002 and 19.6 percent in 2012. This increase in spending will further crowd out other government programs, with other consumption decreasing to 68.6 percent of expenditures. Payments for social benefit programs other than Medicaid are expected to decrease to 4.7 percent of total expenditures, down from 5.6 percent, as fewer individuals qualify for unemployment insurance, food stamps, and other countercyclical spending programs.

On balance, total spending by governments will have a largely neutral impact on GDP over the coming decade. (See table 2.) Federal consumption and gross investment is anticipated to decline at a rate of 1.7 percent annually from 2012–2022, restraining GDP growth by a cumulative 0.1 percentage point over the period. Simultaneously, state and local consumption and investment will grow by 1.0 percent annually, boosting GDP growth by 0.1 percentage point annually. These opposing forces result in a net contribution of government activity to GDP growth from 2012–2022 of –0.03 percentage points, a drag of 1.3 percent.

GDP from the income side

By definition, purchases in the various categories of final demand generate an equal amount of income, in the form of payments for labor, interest, and rents in addition to profits.[23] Examining GDP in this way allows for trends in the sources of income to be observed. After strong growth of 5.4 percent annually from 1992–2002 and 5.6 percent annually from 2002–2007, personal income slowed to a growth rate of 2.4 percent annually from 2007–2012. (See table 10.) Rising unemployment rates and increasing numbers of retirees and discouraged workers led to employee compensation composing a smaller share of personal income, 63.9 percent in 2012, down from 67.4 in 2002. A slight rebound is expected as the economy improves; employee compensation is projected to grow at 4.9 percent annually, increasing their share of personal income to 65.9 percent in 2022. Contributions to social insurance as a share of personal income were down in 2012 compared with historical levels, in part because of the payroll tax holiday that granted a 2.0 percent reduction in employee's Social Security contributions. With the expiration of that tax break, contributions are expected to rise to 8.0 percent of personal income by 2022.

Table 10. Personal income, 1992, 2002, 2012, and projected 2022

Category	Billions of current dollars				Percent distribution				Annual rate of change		
	1992	2002	2012	2022	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Sources:											
Personal income	$5,347.3	$9,060.1	$13,407.2	$20,946.8	100.0	100.0	100.0	100.0	5.4	4.0	4.6
Compensation of employees	3,647.2	6,110.8	8,565.8	13,799.9	68.2	67.4	63.9	65.9	5.3	3.4	4.9
Wage and salary disbursements	2,973.6	4,997.3	6,880.7	11,103.9	55.6	55.2	51.3	53.0	5.3	3.2	4.9
Supplements to wages and salary	673.7	1,113.5	1,685.1	2,696.0	12.6	12.3	12.6	12.9	5.2	4.2	4.8
Proprietors' income	414.9	890.3	1,202.3	1,528.9	7.8	9.8	9.0	7.3	7.9	3.1	2.4
Rental income	84.6	218.8	462.6	607.0	1.6	2.4	3.5	2.9	10.0	7.8	2.8
Personal income on assets	909.7	1,309.6	1,749.6	3,076.6	17.0	14.5	13.1	14.7	3.7	2.9	5.8
Personal interest income	722.2	911.9	992.6	2,013.5	13.5	10.1	7.4	9.6	2.4	.9	7.3
Personal dividend income	187.6	397.7	757.0	1,063.0	3.5	4.4	5.6	5.1	7.8	6.6	3.5
Personal current transfer receipts	745.8	1,282.2	2,375.1	3,603.3	13.9	14.2	17.7	17.2	5.6	6.4	4.3
Federal social benefits	549.5	914.9	1,774.9	2,679.3	10.3	10.1	13.2	12.8	5.2	6.9	4.2
State and local social benefits	180.0	333.0	554.2	852.4	3.4	3.7	4.1	4.1	6.3	5.2	4.4
Other, from	16.3	34.2	45.9	71.6	.3	.4	.3	.3	7.7	3.0	4.5

business (net)											
Less social insurance contribution	457.1	755.2	952.9	1,676.2	8.5	8.3	7.1	8.0	5.1	2.4	5.8
Uses:											
Personal income	5,347.3	9,060.1	13,407.2	20,946.8	100.0	100.0	100.0	100.0	5.4	4.0	4.6
Personal consumption	4,236.9	7,439.2	11,119.6	17,025.0	79.2	82.1	82.9	81.3	5.8	4.1	4.4
Personal taxes	610.6	1,050.4	1,475.8	2,672.2	11.4	11.6	11.0	12.8	5.6	3.5	6.1
Personal interest payments	111.3	191.3	172.7	354.4	2.1	2.1	1.3	1.7	5.6	-1.0	7.5
Personal transfer payments	40.5	97.0	168.0	226.6	.8	1.1	1.3	1.1	9.1	5.6	3.0
To government	26.0	56.4	91.5	123.2	.5	.6	.7	.6	8.1	5.0	3.0
Federal	4.1	10.8	20.3	27.5	.1	.1	.2	.1	10.1	6.6	3.1
State and local	21.9	45.7	71.2	95.7	.4	.5	.5	.5	7.6	4.5	3.0
To the rest of the world (net)	14.5	40.6	76.4	103.4	.3	.4	.6	.5	10.9	6.5	3.1
Personal savings	348.1	282.2	471.1	668.5	6.5	3.1	3.5	3.2	-2.1	5.3	3.6
Addenda:											
Disposable personal income	4,736.7	8,009.7	11,931.4	18,274.5	—	—	—	—	5.4	4.1	4.4
Disposable personal income, chained 2005 dollars	6,152.5	8,633.4	10,304.3	13,288.7	—	—	—	—	3.4	1.8	2.6
Per capita disposable income	18,435.8	27,818.6	37,876.5	53,869.6	—	—	—	—	4.2	3.1	3.6
Per capita disposable income, chained 2005 dollars	23,946.1	29,984.9	32,711.3	39,172.4	—	—	—	—	2.3	.9	1.8
Savings rate (percent)	7.3	3.5	3.9	3.7	—	—	—	—	-7.1	1.1	-.5

Note: Dash indicates data not computable or not applicable.

Sources: Historical data, U.S. Bureau of Economic Analysis; projected data, U.S. Bureau of Labor Statistics.

Transfer receipts from unemployment insurance, Social Security, Medicare and Medicaid, and other social programs offset the declines in wages as a share of personal income. Transfers jumped to 17.7 percent of income receipts in 2012, from 14.2 percent in 2002 and 13.9 percent in 1992. Some of this elevation will be temporary as the job market improves and as individuals no longer qualify for jobless benefits and food and nutrition assistance programs. Counter to that trend is the increasing number of individuals who will begin to draw retirement benefits as the baby-boom generation moves into older age cohorts. Thus, transfers will decline only slightly as a percentage of total personal incomes, with a projected value of 17.2 percent in 2022.

As interest rates rise over the coming decade, personal interest income will too. Growth in this income category fell to 0.9 percent annually for 2002–2012 but is expected to rise substantially, achieving growth of 7.3 percent annually through 2022. As a share of income, interest will increase to 9.6 percent in 2022, closer to the share seen before the recession. Of lesser importance will be proprietors' and rental income. Growth rates on proprietors' income are expected to decrease to 2.4 percent per year from 2012 to 2022, causing a corresponding decrease in its share of total personal income. Rental income will slow over the coming decade, at a rate of 2.8 percent annually compared with the 7.8 percent annual growth seen from 2002–2012. As a share of personal income, rents will fall to 2.9 percent in 2022, from 3.5 percent in 2012.

The overall distribution of the uses of personal income is somewhat less variable than its sources. As incomes increase and individuals move into higher tax brackets, taxes will increase slightly as a share of personal income, from 11.0 percent in 2012 to 12.8 percent in 2022. Personal taxes will grow at a rate of 6.1 percent annually, faster than both the 3.5 percent growth seen from 2002–2012 and the 5.6 percent annual growth seen from 1992–2002.

The proportion of income that is not consumed or paid in tax, interest, or transfer payments is personal

savings. From the late 1980s to the mid-2000s, the personal savings rate decreased as household net worth increased, fed by rising asset prices. Looser lending standards also allowed consumers to rely on credit rather than savings. After the financial crisis, increased caution and tighter lending standards caused individuals to begin deleveraging. The personal savings rate, which was as low as 1.5 percent in 2005, rebounded, reaching 5.4 percent in 2008 before drifting slightly downward to 3.9 percent by 2012. Consumers are projected to maintain more savings over the coming decade, with a personal savings rate of 3.7 percent anticipated for 2022.

Increases in real disposable income per capita can be interpreted as increases in real standards of living. From 2012–2022, real disposable personal income is expected to rise at a rate of 1.8 percent per year, double the growth rate seen in the prior decade. Though strong, this growth falls short of the 2.3 percent annual gains achieved from 1992–2002.

Employment

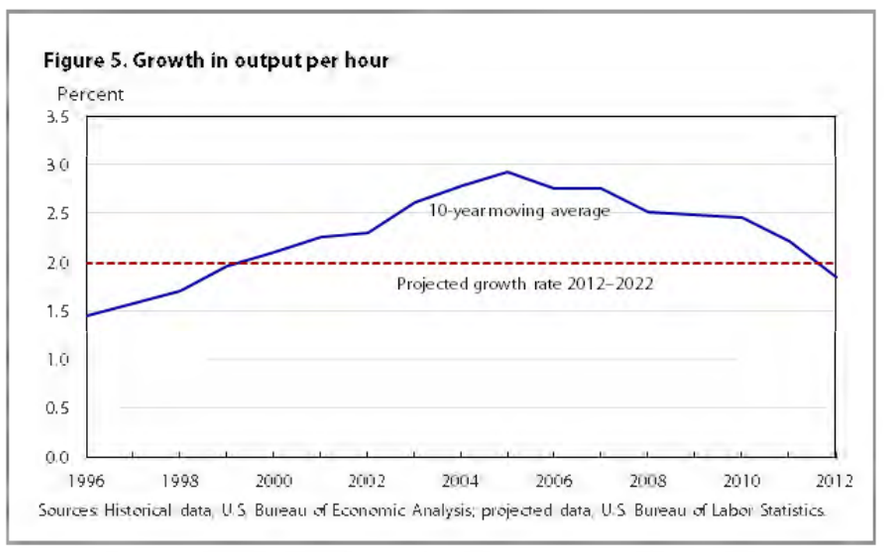
Employment levels suffered as a result of the 2001 recession, and job growth never returned to the previous trend prior to the onset of the 2007–2009 recession. The interaction of numerous forces resulted in total nonfarm payroll employment growth of only 0.2 per year over the previous decade. Slowing population growth and an aging population contribute to slower growth of the labor force, which in turn contributes to slower growth in employment.[24] Perhaps more importantly, structural changes occurred in the economy, eliminating many jobs for skilled workers.[25] Increased integration in global markets led to low-skilled jobs moving overseas, where labor is less expensive. Technological gains enabled the automation of many jobs, leading to increased productivity and output without generating employment growth. This hollowing-out trend is expected to continue, although not as dramatically, because many of the most easily offshored or automated jobs have already been lost.

Over the next 10 years, increasing demand in labor-intensive industries, such as construction and health care, will help stimulate job growth. However, recovery in the labor market will be contrasted with increased retirement rates as the baby boomers age. Nonfarm payroll employment is expected to grow at a rate of 1.1 percent per year through 2022. Household employment, which had slightly stronger growth of 0.4 percent annually from 2002–2012, is expected to grow 0.8 percent per year from 2012–2022.

Productivity

Labor productivity is a measure of efficiency in the nonfarm business sector, calculated as the value of output generated per hour worked. Productivity increases can come from a variety of sources, including increases in workers' skill or education, advances in technology, and improvements in management practices or business organization. Such advances enable firms to increase their output without needing to hire additional workers, allowing GDP to grow at a rate that exceeds growth in the labor force, which in turn translates into increases in wages and standards of living. Productivity growth is highly volatile, however, making it difficult to predict. In addition to the procyclical variations that occur in productivity, the utility of future technologies is hard to estimate.

Healthy productivity growth will be important to the economy going forward if the nation is to continue to sustain economic growth despite a declining rate of labor force participation. Total factor productivity, the component of structural productivity growth not accounted for by increases in labor quality or the ratio of capital to labor, is expected to grow at a rate of 1.1 percent per year, about equal to its long-run average. Output per hour is anticipated to increase at a rate of 2.0 percent per year from 2012–2022. This growth rate is slightly faster than the 1.9 percent annual growth experienced the prior decade but is still well in line with historical trends. (See figure 5 and table 11.)



View Chart Data

Table 11. Labor supply and factors affecting productivity, 1992, 2002, 2012, and projected 2022

Category	Levels				Annual rate of change		
	1992	2002	2012	2022	1992–2002	2002–2012	2012–2022
Labor supply (in millions, unless noted):							
Total population	256.9	287.9	315.0	339.2	1.1	0.9	0.7
Civilian noninstitutional population ages 16 and older	192.8	217.6	243.3	265.3	1.2	1.1	.9
Civilian labor force	128.1	144.9	155.0	163.5	1.2	.7	.5
Civilian household employment	118.5	136.5	142.5	154.8	1.4	.4	.8
Nonfarm payroll employment	108.7	130.4	133.7	149.1	1.8	.2	1.1
Unemployment rate (percent)	7.5	5.8	8.1	5.4	-2.6	3.4	-4.0
Productivity:							
Private nonfarm business output per hour (billions of chained 2005 dollars)	36.9	46.4	55.7	67.8	2.3	1.9	2.0

Sources: Historical data, U.S. Bureau of Economic Analysis, U.S. Bureau of Census, U.S. Bureau of Labor Statistics; projected data, U.S. Bureau of Labor Statistics.

Uncertainty in the model

When projecting over a 10-year horizon, economists must balance prior trends with expectations for the future. Some areas of the economy behave less regularly than other areas, making them more difficult to predict. Often, exogenous assumptions must be made (such as those presented earlier), some of which can significantly influence the outcome of the model.

For the 2022 projections, one source of uncertainty comes from the projected labor force. As women entered the workforce in the 1960s, the labor force participation rate rose steadily, peaking in the late 1990s. As the nation's demographic shift took hold, participation rates declined as more individuals left the labor force for retirement, a trend that sped up rapidly during the recession. During a recession, a cyclical drop in participation rates is typical, since unemployed workers may be discouraged by the poor labor market conditions and may elect to stop their job search in favor of returning to school, staying at home to care for children or relatives, or engaging in other nonlabor activities. As labor markets improve, these individuals gradually return to work and the labor force participation rate improves. A great deal of debate exists regarding what portion of the recent declines in the participation rate could be attributed to cyclical dynamics and what portion are driven by the compositional effect of the aging of the baby-boom generation.[26] BLS expects that demographics will precipitate a continued decline in the labor force participation rate. If this assumption is incorrect or if the recovery proves strong enough to lure retirees and discouraged workers back into the labor force, stronger than anticipated growth could result.

Instabilities in the global economy continually present a great deal of risk in the model. Beginning in 2009, a sovereign debt crisis emerged in several nations belonging to the Eurozone—namely Spain, Greece, Ireland, Portugal, and Cyprus—in which governments accrued massive levels of debt and were no longer able to borrow at reasonable rates or pay interest on their existing loans. Because of their shared currency, these nations' options were limited and the risk of contagion to other nations was high. Eurozone nations were able to maintain the integrity of the currency by providing bailouts and financial support to some governments while the European Central Bank offered several long-term refinancing options to central banks.[27] The Euro area recovery is nascent, and further debt crises could upset the balance that has been struck.[28] Unemployment remains high in many nations, and the forecast for growth is weak. Though the situation has stabilized in recent months, it is still of concern to the projections since, as a unit, the EU is the largest trading partner of the United States. A declining situation in the EU would slow U.S. exports and hamper growth possibilities.

Fiscal policy uncertainty at home remains a substantial risk in the projections as well. When the 2022 projections were finalized for publication, the nation was only beginning to feel the effects of the sequester. Even with the reductions in spending resulting from the BCA, deficits are projected to rise again in the latter half of the coming decade on the basis of current legislation. Meaningful reform to entitlement programs, further cuts to discretionary spending, or increased revenues will be needed to keep deficits under control. The MA/US model assumes spending cuts that ultimately exceed those laid out in the BCA, but the likelihood and timing of further cuts are highly unpredictable. In recent

years, Congress has relied on a series of temporary solutions to remedy issues with the federal budget, tax rates, and the debt ceiling. The additional uncertainty created by short-term solutions to these problems may have hampered businesses and consumer activity and could continue to do so in the future.

A final area of uncertainty in the projections is the assumption that future productivity growth will be strong. Productivity growth sank in the late 2000s. A spike followed the 2007–2009 recession, characteristic of economic downturns as firms attempt to maintain production levels while cutting back labor hours. In the years since, growth in output per hour has remained less than 1.0 percent per year. In a working paper for the National Bureau of Economic Research, Robert Gordon argues that the Web and computer revolution may have already realized its greatest benefits—nearly all businesses have a Web presence now, and many of the aspects of life that can be automated already have been.[29] Rather than technology creating more efficient ways of working or replacing human labor with machines, the focus has shifted to making things smaller and more portable, which does not produce tremendous gains in productivity. It may take a new technological revolution to return to the growth rates seen in prior decades. Without meaningful growth in productivity, growth in output will be hindered.

Sensitivity analysis

To assess the degree to which varying areas of uncertainty pose risks to the projections, BLS performed a sensitivity analysis on several components. The impacts on the model results vary but are in line with what would be predicted by theory.

Projected labor force growth is forecasted at 0.5 percent per year over the next decade. To reach the expected unemployment rate of 5.4 percent in 2022, an increase in household employment of 102,500 people per month is needed. If the labor force were to grow 0.1 percent faster across the forecast period, an additional 12,500 employed people per month—1.5 million additional employed people over the decade—would be required to achieve the same unemployment rate. Faster labor force growth would also increase the GDP growth rate by 0.1 percentage point and would result in a personal savings rate of 2.7 percent, a full point lower than the baseline forecast.

A decrease in productivity would result in slower GDP growth and a lower unemployment rate. All else equal, a decrease of 0.1 percentage points in the growth of output per hour, attributable to slower growth in total factor productivity, lowers annual GDP growth to 2.5 percent from 2.6 percent in the baseline forecast. With lower productivity, more workers are needed to maintain output levels. Therefore, household employment growth rises to 12.7 million people over the decade, a difference of 0.5 million people from the baseline scenario, resulting in an unemployment rate of 5.1 percent. A lower unemployment rate drives the expected federal funds rate 0.6 percentage points higher, to 5.2 percent. The personal savings rate in 2022 increases 0.5 percentage points, resulting in a rate of 4.2 percent.

If the average federal personal tax rate is increased by 1.0 percent across the projections period, annual GDP growth falls by 0.1 percentage points as compared with the baseline. Growth in PCE also declines by 0.1 percentage point, to an annual rate of 2.5 percent. The unemployment rate in 2022 rises to 6.0 percent, 0.6 point higher than the baseline. The federal deficit is much smaller, at 2.7 percent of nominal GDP, compared with 3.6 percent of nominal GDP in the baseline projections. Interest-bearing debt held by the public declines accordingly to 71.7 percent of GDP, 4.6 percentage points lower than the baseline estimate of 76.3 percent.

STRUCTURAL CHANGES TO THE ECONOMY and the nation’s on-going demographic shift will be the driving forces in GDP growth over the next decade. In this set of projections, output growth will be somewhat slower than was estimated in prior publications. Resurgence in investment will be important to boosting productivity and counteracting the impacts of slow labor force growth and cuts in federal spending. Patterns of consumption will shift as the needs of an aging population dominate purchasing decisions. The recovery is expected to be gradual but persistent, bringing the unemployment down and returning the macroeconomy to a more stable position.

SUGGESTED CITATION:

Maggie C. Woodward, "The U.S. economy to 2022: settling into a new normal," *Monthly Labor*

Review, U.S. Bureau of Labor Statistics, December 2013, https://doi.org/10.21916/mlr.2013.43.

Notes

[1] Historical data come from the National Income and Product Accounts as of June 26, 2013, and are published by the Bureau of Economic Analysis. Data are available online at http://www.bea.gov/. Because the projections data are finalized well before publication, revised historical data, including changes made during the 2013 NIPA (National Income and Product Accounts) Comprehensive Revision, were not incorporated prior to publication. Unless noted, levels cited are measured in chain-weighted 2005 dollars. For a discussion of the uses and limitations of chain-type indexes, see J. Steven Landefeld and Robert P. Parker, "BEA's chain indexes, time series, and measures of long-term economic growth," *Survey of Current Business*, May 1997, http://www.bea.gov/scb/account_articles/national/0597od/maintext.htm.

[2] See Sylvain Leduc and Zheng Liu, "Uncertainty and the slow labor market recovery," *Economic Letter*, no. 2013-21 (Federal Reserve Bank of San Francisco, July 22, 2013), http://www.frbsf.org/economic-research/publications/economic-letter/2013/july/us-labor-market-uncertainty-slow-recovery/.

[3] The National Bureau of Economic Research is responsible for determining the official start and end dates of recessions in the United States. The most recent recession began in December 2007 and lasted through June 2009.

[4] See speech by Ben S. Bernanke, "The economic recovery and economic policy," given at the New York Economic Club, November 20, 2012.

[5] See Brian Lucking and Daniel Wilson, "U.S. fiscal policy: Headwind or tailwind?" *Economic Letter*, no. 2012-20 (Federal Reserve Bank of San Francisco, July 2, 2012), http://www.frbsf.org/economic-research/publications/economic-letter/2012/july/us-fiscal-policy/.

[6] For more information, see the Macroeconomic Advisers website, http://www.macroadvisers.com/.

[7] In a full-employment economy, the unemployment rate is equal to the nonaccelerating inflation rate of unemployment (NAIRU). Labor supply and labor demand are in equilibrium; any existing unemployment is frictional.

[8] For more information on BLS labor force projections, see accompanying article, "Labor force projections to 2022: the labor force participation rate continues to fall," by Mitra Toossi, in this projections series of the *Monthly Labor Review*.

[9] The Congressional Budget Office (CBO) prepares semiannual budget forecasts based on current laws. The most recent estimates available at the time of this writing were CBO "Updated budget projections: fiscal years 2013 to 2023," May 14, 2013, http://cbo.gov/publication/44172.

[10] See transcript of Chairman Bernanke's Press Conference, June 19, 2013, http://www.federalreserve.gov/mediacenter/files/FOMCpresconf20130619.pdf.

[11] For more information, see "Press Release" (Board of Governors of the Federal Reserve System, December 12, 2012), http://www.federalreserve.gov/newsevents/press/monetary/20121212a.htm.

[12] Price projections for 2013–2022 are incorporated into the model. See *Annual Energy Outlook 2013* (U.S. Energy Information Administration, April 15, 2013), http://www.eia.gov/forecasts/aeo/index.cfm.

[13] See Dowell Myers and SungHo Ryu, "Aging baby boomers and the generational housing bubble: foresight and mitigation of an epic transition," *Journal of the American Planning Association*, vol. 74, February 8, 2008, pp. 17–33, http://dx.doi.org/10.1080/01944360701802006.

[14] See IHS Automotive: Polk, company news reported, "Polk finds average age of light vehicles continues to rise," August 6, 2013, https://www.polk.com/company/news/polk_finds_average_age_of_light_vehicles_continues_to_rise.

[15] See Kyle Fee and Daniel Hartley, "Housing recovery?" *Economic Trends (*Federal Reserve Bank of Cleveland, May 22, 2013), http://www.clevelandfed.org/research/trends/2013/0613/ET_jun13.pdf.

[16] See Andrew D. Paciorek, "The long and the short of household formation" (Finance and Economics Discussion Series, Federal Reserve Board, April 1, 2013), no. 2013-26, http://www.federalreserve.gov/pubs/feds/2013/201326/201326pap.pdf.

[17] See Margaret Jacobson and Filippo Occhino, "The delayed recovery of investment in nonresidential structures," *Economic Trends* (Federal Reserve Bank of Cleveland, May 6, 2013), http://www.clevelandfed.org/research/trends/2013/0513/core.cfm.

[18] For more information, see "World economic outlook update: growing pains," Annual Report (Washington, DC: International Monetary Fund, July 9, 2013), http://www.imf.org/external/pubs/ft/weo/2013/update/02/index.htm.

[19] Receipts and expenditures for the federal government and for state and local governments are measured in

current dollars.

[20] Deficits are measured in current dollars. See "The budget and economic outlook: fiscal years 2013 to 2023" (Congressional Budget Office, February 5, 2013), http://cbo.gov/publication/43907.

[21] See Brian Lucking and Daniel Wilson, "Fiscal headwinds: Is the other shoe about to drop?" *Economic Letter*, no. 2013-16 (Federal Reserve Board of San Francisco, June 3, 2013), http://www.frbsf.org/economic-research/publications/economic-letter/2013/june/fiscal-headwinds-federal-budget-policy/.

[22] See Linda J. Bilmes, "The financial legacy of Iraq and Afghanistan: how wartime spending decisions will constrain future national security budgets," Working Paper RWP13-006 (Harvard Kennedy School Faculty, Cambridge, Massachusetts, March 2013), http://research.hks.harvard.edu/publications/workingpapers/citation.aspx?PubId=8956.

[23] Personal income and its components are measured in current dollars.

[24] See Daniel Aaronson and Scott Brave, "Estimating the trend in employment growth" *Chicago Fed Letter,* no. 312 (Federal Reserve Bank of Chicago, July 2013), http://www.chicagofed.org/digital_assets/publications/chicago_fed_letter/2013/cfljuly2013_312.pdf.

[25] See A. Michael Spence, "The evolving structure of the American economy and the employment challenge," Working Paper (Council on Foreign Relations, March 2011), http://www.cfr.org/industrial-policy/evolving-structure-american-economy-employment-challenge/p24366; Nir Jaimovich and Henry E. Siu, "The trend is the cycle: job polarization and jobless recoveries," Working Paper 18334 (National Bureau of Economic Research, August 2012), http://www.nber.org/papers/w18334; and Robert B. Reich, "Manufacturing jobs are never coming back," *Forbes*, May 2009, http://www.forbes.com/2009/05/28/robert-reich-manufacturing-business-economy.html.

[26] For more information, see Leila Bengali, Mary Daly, and Rob Valletta, "Will labor force participation bounce back?" *Economic Letter*, no. 2013-14 (Federal Reserve Board of San Francisco, May 13, 2013), http://www.frbsf.org/economic-research/publications/economic-letter/2013/may/will-labor-force-participation-bounce-back/.

[27] See *The Economist* Free exchange blog, "Draghi strikes back II," February 29, 2012, http://www.economist.com/blogs/freeexchange/2012/02/europes-central-bank-and-euro-crisis.

[28] See "Euro-zone economies: Mirabile dictu," *The Economist*, August 15, 2013, http://www.economist.com/news/finance-and-economics/21583650-recovery-last-no-revelation-mirabile-dictu.

[29] See Robert J. Gordon, "Is U.S. economic growth over? Faltering innovation confronts the six headwinds," Working Paper 18315 (National Bureau of Economic Research, August 2012), http://www.nber.org/papers/w18315, and Erik Brynjolfsson and Andrew McAfee, "Jobs, productivity and the great decoupling," *New York Times*, December 11, 2012, http://www.nytimes.com/2012/12/12/opinion/global/jobs-productivity-and-the-great-decoupling.html?_r=1&.

CONGRESS OF THE UNITED STATES
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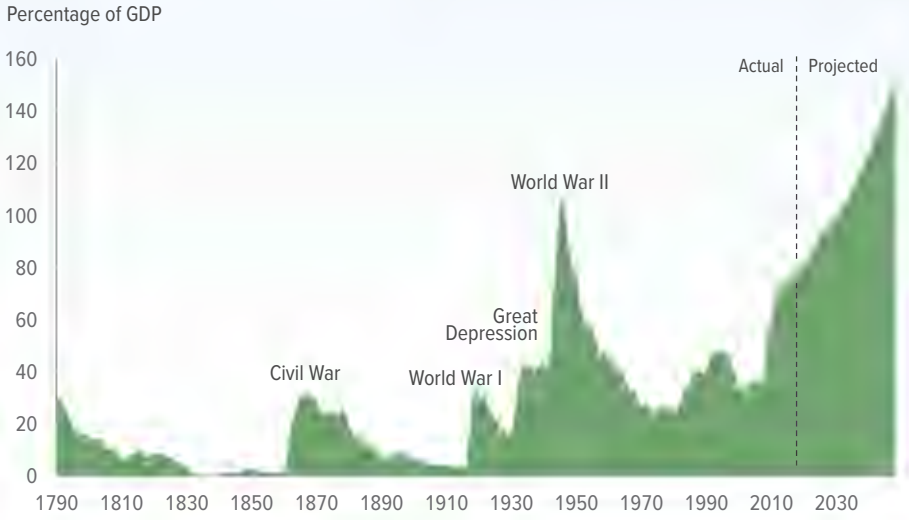
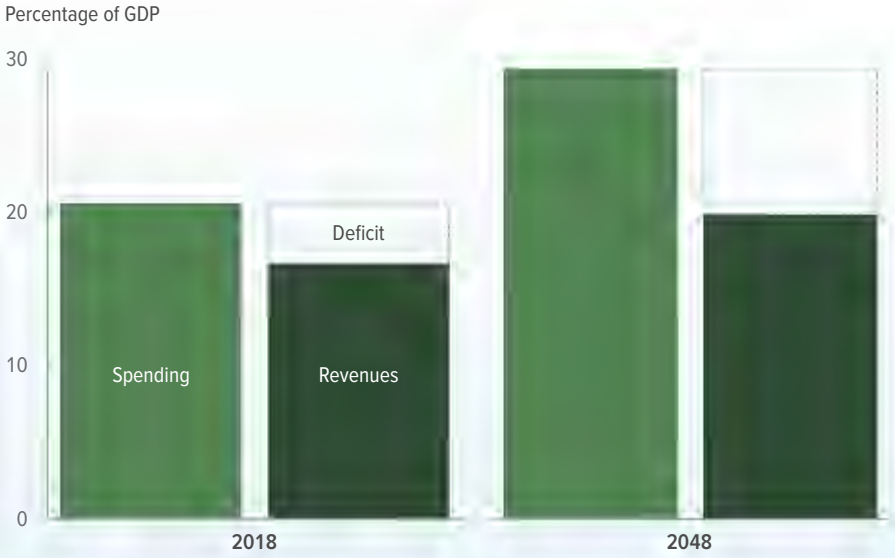
CBO

The 2018 Long-Term Budget Outlook



Under current law, federal debt held by the public is projected to increase sharply over the next 30 years…

…as spending grows more quickly than revenues do. Driving that spending growth are interest payments on the debt, major health care programs, and Social Security.



JUNE 2018

At a Glance

Each year, the Congressional Budget Office issues a set of long-term budget projections—that is, projections of what federal spending, revenues, deficits, and debt would be for the next 30 years if current laws generally did not change. This report is the latest in the series.

- In CBO's projections, the federal budget **deficit**, relative to the size of the economy, grows substantially over the next several years, stabilizes for a few years, and then grows again over the rest of the 30-year period, leading to federal **debt** held by the public that would approach 100 percent of gross domestic product (GDP) by the end of the next decade and 152 percent by 2048. Moreover, if lawmakers changed current laws to maintain certain policies now in place—preventing a significant increase in individual income taxes in 2026, for example—the result would be even larger increases in debt.

- The federal government's **net interest costs** are projected to climb sharply as interest rates rise from their currently low levels and as debt accumulates. Such spending would about equal spending for Social Security, currently the largest federal program, by the end of the projection period.

- **Noninterest spending** is projected to rise from 19 percent of GDP in 2018 to 23 percent in 2048, mainly because of increases in spending for Social Security and the major health care programs (primarily Medicare). Much of the spending growth for Social Security and Medicare results from the aging of the population. Growth in spending for Medicare and the other major health care programs is also driven by rising health care costs per person.

- **Revenues,** in contrast, are projected to be roughly flat over the next few years relative to GDP, rise slowly, and then jump in 2026. Thereafter, revenues would continue to rise relative to the size of the economy—although they would not keep pace with growth in spending. The projected growth in revenues is largely attributable to increases in individual income tax receipts.

- **Compared with last year's projections,** debt as a percentage of GDP is larger, but only modestly so, through 2041 and then lower thereafter. Deficits are higher as a percentage of GDP through 2025 and lower thereafter. That change is largely driven by changes in revenues and net interest costs. Revenues are initially lower as a share of GDP, but ultimately are higher because individual income taxes are now projected to grow more quickly as a result of provisions of Public Law 115-97 (originally called the Tax Cuts and Jobs Act and called the 2017 tax act in this report).

[redacted]

Contents

Notes

The Congressional Budget Office's extended baseline shows the budget's long-term path under most of the same assumptions that the agency uses, in accordance with statutory requirements, in constructing its 10-year baseline. Both baselines incorporate the assumptions that current law generally remains unchanged but that some mandatory programs are extended after their authorizations lapse and that spending for Medicare and Social Security continues as scheduled even if their trust funds are exhausted.

Unless this report indicates otherwise, the years that it refers to are federal fiscal years, which run from October 1 to September 30 and are designated by the calendar year in which they end. Budgetary values, such as the ratio of debt or deficits to gross domestic product, are calculated on a fiscal year basis; economic variables, such as gross national product or interest rates, are calculated on a calendar year basis.

Numbers in the text, tables, and figures may not sum to totals because of rounding.

Unless the report specifies otherwise, Medicare outlays are presented net of offsetting receipts, which reduce outlays for the program.

As referred to in this report, the Affordable Care Act comprises the Patient Protection and Affordable Care Act; the health care provisions of the Health Care and Education Reconciliation Act of 2010; and the effects of subsequent judicial decisions, statutory changes, and administrative actions.

Data and supplemental information files—the data underlying the figures in this report, supplemental budget projections, and the demographic and economic variables underlying those projections—are posted along with the report on CBO's website.

[redacted]

The 2018 Long-Term Budget Outlook

Summary

At 78 percent of gross domestic product (GDP), federal debt held by the public is now at its highest level since shortly after World War II. If current laws generally remained unchanged, the Congressional Budget Office projects, growing budget deficits would boost that debt sharply over the next 30 years; it would approach 100 percent of GDP by the end of the next decade and 152 percent by 2048 (see Table 1). That amount would be the highest in the nation's history by far. Moreover, if lawmakers changed current law to maintain certain policies now in place—preventing a significant increase in individual income taxes in 2026, for example—the result would be even larger increases in debt.[1] The prospect of large and growing debt poses substantial risks for the nation and presents policymakers with significant challenges.

In this report, CBO presents its projections of federal spending, revenues, deficits, and debt for the next three decades and describes some possible consequences of those budgetary outcomes. This report's projections are consistent with the 10-year baseline budget and economic projections that CBO published in the spring of 2018.[2] They extend most of the concepts underlying those projections for an additional 20 years, and they reflect the macroeconomic effects of projected fiscal policy over that 30-year period. All together, they constitute the agency's *extended baseline* projections.

CBO's 10-year and extended baseline projections are not predictions of budgetary outcomes. Rather, they represent the agency's best assessment of future spending, revenues, deficits, and debt under the assumption that current laws generally remain unchanged. They also give lawmakers a point of comparison from which to measure the effects of proposed legislation.

Why Are Projected Deficits Rising?

In CBO's projections, the federal budget deficit, relative to the size of the economy, would grow substantially over the next several years, stabilize for a few years, and then grow again over the rest of the 30-year period. In total, deficits would rise from 3.9 percent of GDP in 2018 to 9.5 percent in 2048. (Adjusted to exclude the effects of timing shifts that occur because fiscal year 2018 began on a weekend, the budget deficit in 2018 would be higher, at 4.2 percent of GDP).[3] Those large budget deficits would arise because spending would grow steadily under current law, and revenues would not keep pace with that spending growth (see Figure 1).

In particular, over the next 30 years, spending as a share of GDP would increase for Social Security, the major health care programs (primarily Medicare), and interest on the government's debt. In CBO's projections, most of the spending growth for Social Security and Medicare results from the aging of the population: As members of

1. CBO will analyze the effects of alternative fiscal scenarios in a forthcoming report.

2. CBO bases its long-term projections on its most recent 10-year budget projections. Typically, those projections are from the *Budget and Economic Outlook*; however, CBO made a number of relatively small changes to its baseline projections since the publication of that report in April. As a result, the long-term budget projections in this report are based on CBO's adjusted April 2018 baseline. For information on those underlying budget projections, see Congressional Budget Office, *An Analysis of the President's 2019 Budget* (May 2018), www.cbo.gov/publication/53884. For information on CBO's most recent economic projections, see Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), www.cbo.gov/publication/53651.

3. When the first day of the fiscal year (October 1) falls on a weekend, certain monthly payments (mostly for mandatory benefit programs such as Medicare, Supplemental Security Income, and certain programs for veterans) normally made on that day are shifted to the preceding fiscal year. Accordingly, for those benefit programs, only 11 months of payments will be made in that fiscal year rather than the usual 12, and the previous year will have one more payment. October 1 fell on a weekend in 2017, and that will happen again in 2022, 2023, and 2028. The resulting shifts in payments noticeably boost projected spending and deficits in 2022 and 2028; they reduce spending and the deficit in 2018 and 2024.

Table 1.

Key Projections in CBO's Extended Baseline

Percentage of Gross Domestic Product

		Projected Annual Average		
	2018	2019–2028	2029–2038	2039–2048
Revenues				
Individual income taxes	8.2	8.9	10.1	10.7
Payroll taxes	5.9	5.9	6.0	6.0
Corporate income taxes	1.2	1.5	1.4	1.4
Other[a]	1.4	1.2	1.3	1.5
Total Revenues	**16.6**	**17.5**	**18.8**	**19.5**
Outlays				
Mandatory				
Social Security	4.9	5.5	6.2	6.3
Major health care programs[b]	5.2	6.0	7.4	8.7
Other	2.6	2.5	2.3	2.1
Subtotal	12.6	13.9	15.9	17.2
Discretionary	6.3	5.7	5.4	5.5
Net interest	1.6	2.7	3.6	5.3
Total Outlays	**20.6**	**22.4**	**24.9**	**27.9**
Deficit	**-3.9**	**-4.9**	**-6.1**	**-8.4**
Debt Held by the Public at the End of the Period	**78**	**96**	**118**	**152**
Memorandum:				
Social Security				
Revenues[c]	4.4	4.5	4.6	4.5
Outlays[d]	4.9	5.5	6.2	6.3
Contribution to the Federal Deficit[e]	-0.4	-1.0	-1.6	-1.9
Medicare				
Revenues[c]	1.4	1.5	1.6	1.6
Outlays[d]	3.5	4.3	5.7	6.8
Offsetting Receipts	-0.6	-0.8	-1.0	-1.3
Contribution to the Federal Deficit[e]	-1.5	-2.1	-3.0	-3.9
Gross Domestic Product at the End of the Period (Trillions of dollars)	20.1	29.8	44.1	65.0

Source: Congressional Budget Office.

This table satisfies a requirement specified in section 3111 of S. Con. Res. 11, the Concurrent Resolution on the Budget for Fiscal Year 2016.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.

b. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

c. Includes all payroll taxes for the program other than those paid by the federal government on behalf of its employees (which are intragovernmental transactions). Also includes income taxes paid on Social Security benefits, which are credited to the trust funds. Excludes interest credited to the trust funds.

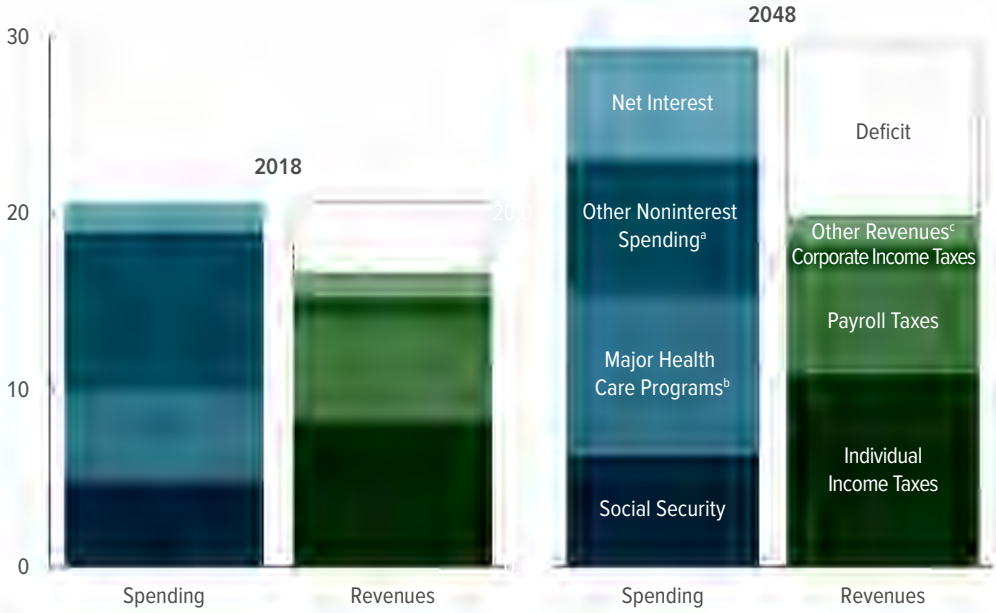
d. Excludes discretionary outlays related to administration of the program.

e. The contribution to the deficit shown here differs from the change in the trust fund balance for the program because it excludes intragovernmental transactions, interest earned on balances, and outlays related to administration of the program.

Figure 1.

The Federal Budget in CBO's Extended Baseline

Percentage of Gross Domestic Product



If current laws generally remained unchanged, the federal budget deficit would grow substantially over the next 30 years. Those large budget deficits would arise because spending would grow steadily and revenues would not keep pace with that spending growth.

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.

b. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

c. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.

the baby-boom generation (people born between 1946 and 1964) age and as life expectancy continues to rise, the percentage of the population age 65 or older will grow sharply, boosting the number of beneficiaries of those programs. Growth in spending on Medicare and the other major health care programs is also driven by rising health care costs per person. In addition, the federal government's net interest costs are projected to climb sharply as a percentage of GDP as interest rates rise from their currently low levels and as debt accumulates.

That spending growth would be only partially offset by declining spending for other programs. Mandatory spending other than that for Social Security and the major health care programs—such as spending for federal employees' pensions and for various income security programs—is projected to decrease as a percentage of GDP. Discretionary spending is projected to decline in most years over the next decade and then roughly stabilize as a percentage of GDP. (Mandatory spending is generally governed by provisions of permanent law, whereas discretionary spending is controlled by annual appropriation acts.)

Revenues, in contrast, would take a different path. They are projected to be roughly flat over the next few years relative to GDP, rise slowly, and then jump in 2026. Revenues would sharply increase that year because most of the provisions of Public Law 115-97 (originally called the Tax Cuts and Jobs Act and called the 2017 tax act in this report) that directly affect the individual income tax rate are set to expire at the end of calendar year 2025. (The 2017 tax act lowered individual income taxes beginning in 2018.) Thereafter, revenues would continue

to rise relative to the size of the economy—although they would not keep pace with spending growth.

The projected growth in revenues beyond 2028 is largely attributable to increases in individual income tax receipts. Those receipts are projected to grow mainly because income would rise more quickly than the price index that is used to adjust tax brackets and other parameters of the tax system. As a result, more income would be pushed into higher tax brackets over time. (Because of provisions of the 2017 tax act, the effect of real bracket creep in this year's projections is slightly greater than the effect that CBO projected in prior years.) Combined receipts from all other sources are projected to increase slightly as a percentage of GDP.

What Might Happen If Current Laws Remained Unchanged?

Large and growing federal debt over the coming decades would hurt the economy and constrain future budget policy. The amount of debt that is projected under the extended baseline would reduce national saving and income in the long term; increase the government's interest costs, putting more pressure on the rest of the budget; limit lawmakers' ability to respond to unforeseen events; and increase the likelihood of a fiscal crisis. (In that event, investors would become unwilling to finance the government's borrowing unless they were compensated with very high interest rates.)

How Does CBO Make Its Long-Term Budget Projections?

CBO's extended baseline, produced once a year, shows the budget's long-term path under most of the same assumptions that the agency uses in constructing its 10-year baseline. Both baselines incorporate these assumptions: current laws will generally remain unchanged, mandatory programs will be extended after their authorizations lapse, and spending for Medicare and Social Security will continue as scheduled even if their trust funds are exhausted. CBO makes those assumptions to conform to statutory requirements.

Some projections, such as those for Social Security spending and collections of individual income taxes, incorporate detailed estimates of how people would be affected by particular elements of programs or by the tax code. Other projections reflect past trends and CBO's assessments of how those trends would evolve if current laws generally remained unchanged.[4]

CBO's budget projections are built on its demographic and economic projections. CBO estimates that the population will grow more slowly than it has in the past and will be older, on average. CBO also anticipates that if current laws generally did not change, real GDP—that is, GDP with the effects of inflation removed—would increase by 1.9 percent per year, on average, over the next 30 years. That rate is nearly 1 percentage point lower than the annual average growth rate of real GDP over the past 50 years. That expectation of slower economic growth in the future is attributable to several factors—most notably, slower growth of the labor force. Projected growth in output is also held down by the effects of changes in fiscal policy under current law—above all, by the reduction in private investment that is projected to result from rising federal deficits.

How Uncertain Are Those Projections?

If current laws governing taxes and spending remained generally the same, debt would rise as a percentage of GDP over the next 30 years, according to CBO's central estimate (the middle of the distribution of potential outcomes). That projection is very uncertain, however, so the agency examined in detail how debt would change if four key factors were higher or lower than their levels in the extended baseline. Those four factors are labor force participation, productivity in the economy, interest rates on federal debt, and health care costs per person. Other factors—such as an economic depression, a major war, or unexpected changes in rates of fertility, immigration, or mortality—also could affect the trajectory of debt. Taking into account a range of uncertainty around CBO's central projections of those four key inputs, CBO concludes that despite the considerable uncertainty of long-term projections, debt as a percentage of GDP would probably be greater—in all likelihood, much greater—than it is today if current laws remained generally unchanged.

How Large Would Changes in Spending or Revenues Need to Be to Reach Certain Goals for Federal Debt?

CBO estimated the size of changes that would be needed to achieve a chosen goal for federal debt. For example, if lawmakers wanted to reduce the amount of debt in 2048 to 41 percent of GDP (its average over the past 50 years), they might cut noninterest spending, increase revenues, or take a combination of both approaches to make changes

4. For more information about how CBO makes long-term projections about the economy and federal budget, see Congressional Budget Office, *An Overview of CBOLT: The Congressional Budget Office Long-Term Model* (April 2018), www.cbo.gov/publication/53667.

that equaled 3.0 percent of GDP each year starting in 2019. (In dollar terms, that amount would total about $630 billion in 2019.) If, instead, policymakers wanted debt in 2048 to equal its current share of GDP (78 percent), the necessary changes would be smaller (although still substantial), totaling 1.9 percent of GDP per year (or about $400 billion in 2019). The longer lawmakers waited to act, the larger the policy changes would need to be to reach any particular goal for federal debt.

How Have CBO's Projections Changed Over the Past Year?

Compared with last year's projections, CBO's current projections of debt as a share of GDP are higher through 2041 and lower thereafter. CBO now projects that debt measured as a share of GDP would be 3 percentage points lower in 2047 than it projected last year. (The previous edition of this volume showed projections through 2047.)[5] The increase in debt through 2041 stems primarily from tax and spending legislation enacted since then that boosted projected deficits through 2025—especially the 2017 tax act, the Bipartisan Budget Act of 2018 (P.L. 115-123), and the Consolidated Appropriations Act, 2018 (P.L. 115-141). In particular, the budgetary effects of the tax act are expected to peak during the middle of the next decade. In later years, the effects are expected to be modest, although their precise magnitudes are uncertain.

Deficits are smaller after 2025 than CBO projected last year because of lower projections as a share of GDP of noninterest spending and because of projections of revenues that are the same or higher than CBO estimated last year. The smaller deficits result in lower debt as a share of GDP after 2041 than CBO projected last year.

The Budget Outlook for the Next 30 Years

CBO's extended baseline shows a substantial imbalance in the federal budget over the next three decades. Growing budget deficits would lead to rising amounts of federal debt, which in turn would increase pressures on the federal budget and dampen economic growth.

Rising Budget Deficits

If current laws generally remained unchanged, the federal budget deficit would grow substantially over the next few years. It would rise to 4.2 percent of GDP this year (up from 3.5 percent last year) and then climb to 5.1 percent by 2022 (adjusted to exclude shifts in timing). The deficit would then continue to rise in dollar terms but stabilize as a percentage of GDP for the rest of the 10-year baseline period—although it would remain much higher than its 50-year average of 2.9 percent. In the following two decades, deficits would become notably larger again relative to the size of the economy as the gap between spending and revenues grew (see Figure 2). As a result, the deficit would rise from 4.8 percent of GDP in 2028 (adjusted to exclude shifts in timing) to 9.5 percent in 2048.

CBO projects that mandatory spending would rise significantly as a percentage of GDP under current law, driving up spending relative to revenues. The aging of the population will lead to increased outlays for Social Security and Medicare, mandatory programs that primarily benefit people 65 or older. Medicare outlays would also climb as a result of rising health care costs per person, in CBO's estimation. By 2048, under current law, federal spending through those two programs as well as Medicaid—the federal health care program for people with limited income and resources—for people age 65 or older would account for about half of all federal noninterest spending, compared with about two-fifths today. Moreover, because federal debt is projected to grow and interest rates are expected to rise from their currently low levels, interest payments on the government's debt would rise sharply.

All told, under CBO's extended baseline, federal spending would increase from today's 21 percent of GDP to 23 percent in 2028 (adjusted to exclude shifts in timing; that spending would be 24 percent if timing shifts were included) and to 29 percent by 2048. (Federal spending has averaged 20 percent of GDP over the past 50 years.)

Meanwhile, if current laws generally remained unchanged, revenues would remain near 16.6 percent of GDP for a few years (their current level), rise steadily to 17.5 percent by 2025, and then increase sharply in 2026 following the scheduled expiration of many provisions of the 2017 tax act.[6] Revenues are projected to increase to 18.1 percent of GDP in that year and then rise to 18.5 percent by 2028. Beyond 2028, revenues would grow faster than the economy but more slowly

5. See Congressional Budget Office, *The 2017 Long-Term Budget Outlook* (March 2017), www.cbo.gov/publication/52480.

6. That law made many significant changes to the individual and corporate income tax systems. Those changes, on net, lowered taxes owed by most individuals and businesses beginning in calendar year 2018. Nearly all of the changes to individual income taxes are set to expire at the end of calendar year 2025.

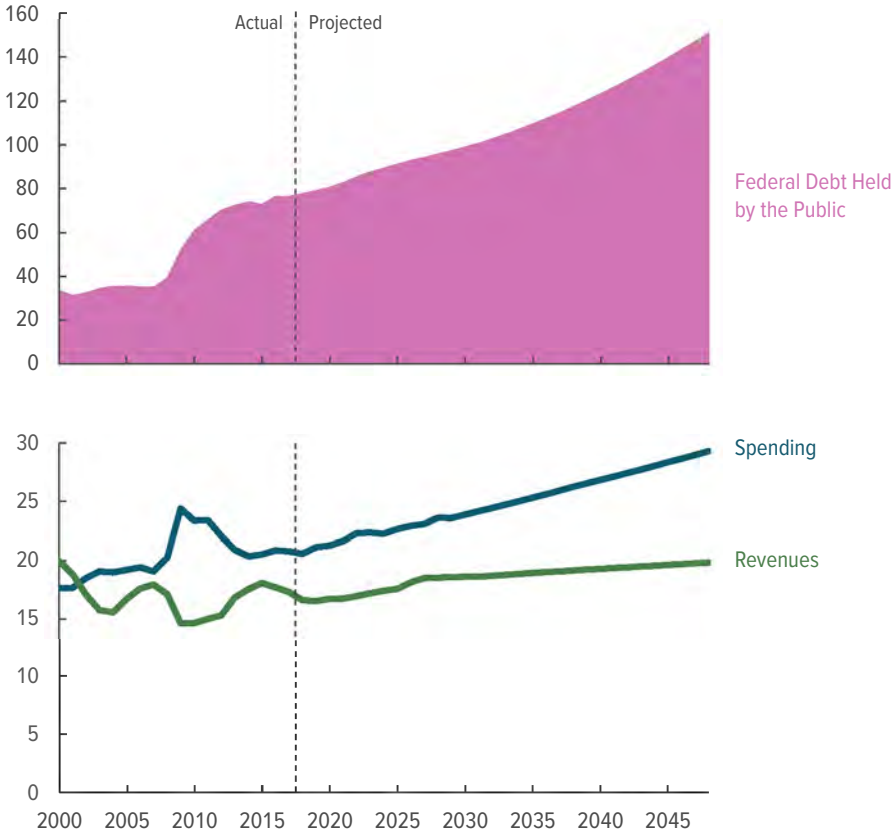
Figure 2.

Federal Debt, Spending, and Revenues

Percentage of Gross Domestic Product

In CBO's extended baseline, **federal debt held by the public** rises...

...because growth in **total spending** outpaces growth in **total revenues**, resulting in larger budget deficits.



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

GDP = gross domestic product.

Continued

than spending. In part, revenues would rise because of real bracket creep, which pushes more income into higher tax brackets as people's income rises faster than inflation. In addition, revenues would grow rapidly from a new excise tax on certain employment-based health insurance plans if that law took effect, as scheduled, in 2022. All told, CBO projects, revenues would reach 19.8 percent of GDP in 2048. Although that share would exceed the 50-year average of about 17 percent, it would still fall short of projected spending.

Greater Accumulation of Federal Debt

Debt held by the public represents the amount that the federal government has borrowed in financial markets by issuing Treasury securities to pay for its operations and activities.[7] Measuring debt as a percentage of GDP is useful for comparing amounts of debt in different

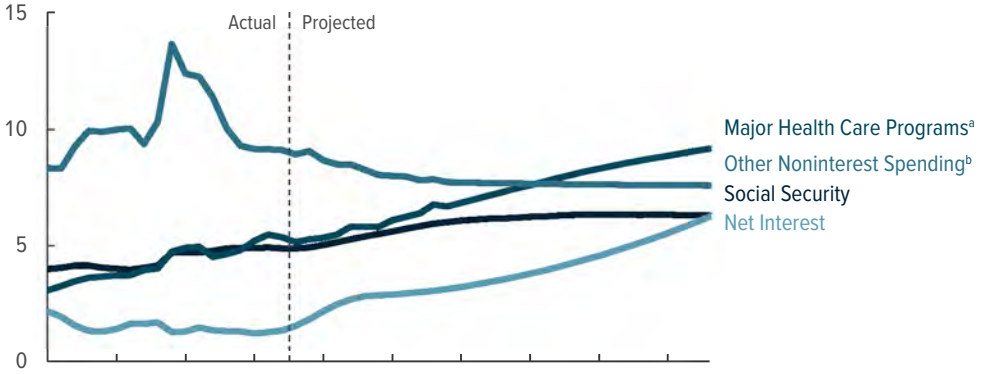
7. When the federal government borrows in financial markets, it competes with other participants for financial resources and, in the long term, crowds out private investment, thus reducing economic output and income. By contrast, federal debt held by trust funds and other government accounts represents internal transactions of the government and does not directly affect financial markets. (Together, that debt and debt held by the public make up gross federal debt.) For more discussion, see Congressional Budget Office, *Federal Debt and Interest Costs* (December 2010), www.cbo.gov/publication/21960. Several factors not directly included in the budget totals also affect the government's need to borrow from the public. They include fluctuations in the government's cash balance, as well as the cash flows of the financing accounts used for federal credit programs.

Figure 2. Continued

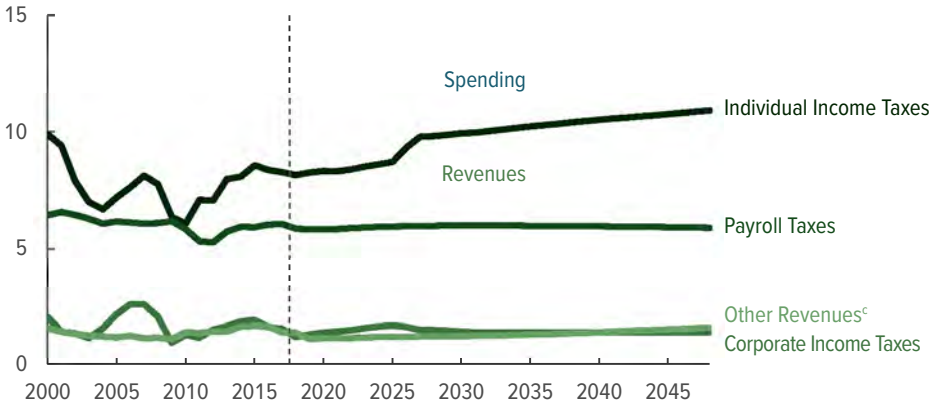
Federal Debt, Spending, and Revenues

Percentage of Gross Domestic Product

Spending on certain components of the budget—Social Security, the major health care programs, and net interest—is projected to rise relative to GDP; other spending, in total, is projected to decline.



Increases in individual income taxes account for most of the rise in total **revenues** relative to GDP. Receipts from all other sources, taken together, are projected to be slightly higher in 2048 than they are today.



a. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

b. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.

c. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.

years because it accounts for changes in price levels, population, output, and income—all of which affect the nation's ability to finance the debt. The ratio of debt to GDP places the effects of potential adjustments to the budget within the context of the nation's resources. Examining whether debt as a percentage of GDP is increasing is therefore a simple and meaningful way to assess the budget's sustainability.

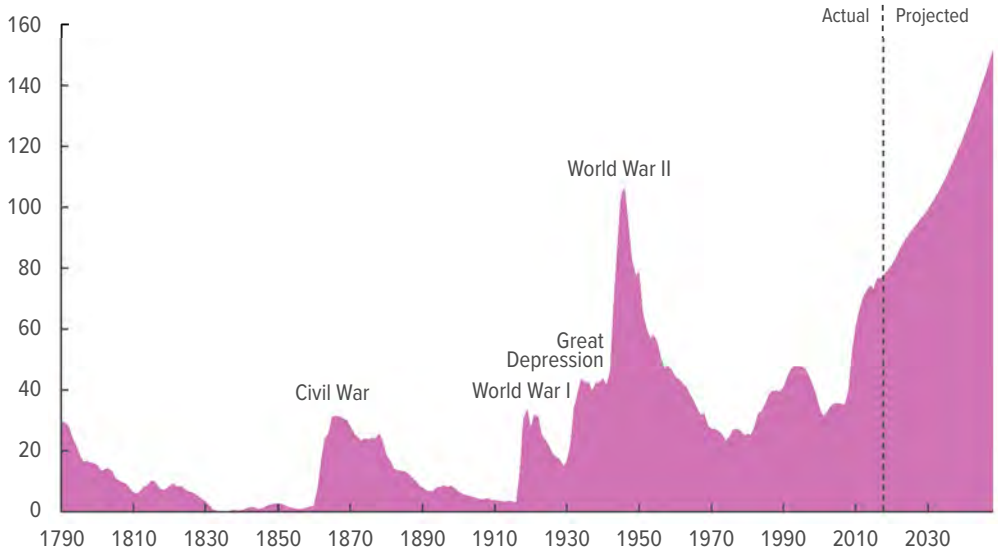
Federal debt held by the public has ballooned over the past decade. At the end of 2007, that debt stood at 35 percent of GDP, but deficits arising from the 2007–2009 recession and the resulting policy responses caused it to grow sharply over the next five years. By the end of 2012, debt as a share of GDP had doubled to 70 percent. Since then, the upward trajectory has generally continued, and debt is projected to reach 78 percent of GDP by the end of this year—a very high amount by historical standards. (For comparison, such debt has averaged 41 percent of GDP over the past 50 years.) During only one other period in U.S. history—from 1944 through 1950, because of the surge in federal spending during World War II—has that debt exceeded 70 percent of GDP (see Figure 3).

If current laws generally remained unchanged, the gap between spending and revenues would grow substantially through 2022, stabilize for a few years, and then continue to widen. As a result, federal debt as a percentage of GDP would reach unprecedented levels. CBO projects that debt

Figure 3.

Federal Debt Held by the Public

Percentage of Gross Domestic Product



High and rising federal debt would reduce national saving and income, boost the government's interest payments, limit lawmakers' ability to respond to unforeseen events, and increase the likelihood of a fiscal crisis.

Source: Congressional Budget Office.

would rise to 96 percent of GDP by 2028, and six years later, in 2034, it would surpass the peak of 106 percent recorded in 1946. By 2048, federal debt would reach 152 percent of GDP—significantly larger than the average of the past five decades—and would be on track to grow even larger. Moreover, if lawmakers changed current laws to maintain certain policies now in place—preventing a significant increase in individual income taxes in 2026, for example—the result would be even larger increases in debt.

Consequences of a Large and Growing Federal Debt

The burgeoning federal debt over the coming decades would have these effects:

- Reduce national saving and income in the long term;
- Increase the government's interest costs, putting more pressure on the rest of the budget;
- Limit lawmakers' ability to respond to unforeseen events; and
- Increase the likelihood of a fiscal crisis, a situation in which the interest rate on federal debt rises abruptly, dramatically increasing the cost of government borrowing.

Less National Saving and Lower Income

Large federal budget deficits over the long term would reduce investment, resulting in lower national income and higher interest rates than would otherwise be the case. If the government borrowed more money, a greater amount of household and business saving would be used to buy Treasury securities, thus crowding out private investment. Both the government and private borrowers would face higher interest rates to compete for savings. Although those higher rates would strengthen the incentive to save, the increased government borrowing would exceed the rise in saving by households and businesses. As a result, total saving by all sectors of the economy (national saving) would be lower, as would private investment and economic output. (Private investment would be affected less than national saving because higher interest rates tend to attract more foreign capital to the United States and induce U.S. savers to keep more of their money at home.) With less investment in capital goods—such as factories and computers—workers would be less productive. Because productivity growth is the main driver of growth in people's real compensation, decreased investment also would reduce average compensation per hour, making people less inclined to work. CBO's extended baseline incorporates those economic effects as well as the feedback to the budget from negative effects on the economy.

Greater Pressure on the Budget From Higher Interest Costs

Current net interest costs are relatively small because interest rates have been so low. Under CBO's extended baseline, however, rising interest rates and increased federal borrowing boost net interest costs substantially. By 2045, those costs would surpass discretionary spending for the first time since 1962 (the earliest year for which relevant data are available).

Over the next few years, the unemployment rate is expected to decline and inflation is projected to rise. CBO expects the Federal Reserve to respond to those developments by continuing to raise the federal funds rate to keep inflation close to the central bank's long-term goal.[8] In addition, long-term interest rates are projected to rise gradually relative to short-term rates as the term premium (the premium paid to bondholders for the extra risk associated with holding longer-term bonds) moves up from its recent low levels. The term premium is projected to rise as investors gain more confidence in global economic growth, the demand for long-term Treasury securities as a hedge against unexpected declines in inflation dissipates, and the Federal Reserve reduces its holdings of long-term assets. CBO projects that interest rates would eventually settle at levels consistent with factors such as productivity growth, the demand for investment, and federal deficits. Under the extended baseline, interest costs are much higher than they would be if deficits were smaller and interest rates were lower.

The higher the government's interest costs, the more difficult it would be to achieve any particular target for deficit reduction. That is because, in order to reduce the deficit, tax increases, spending reductions, or both would have to be greater. Such policy changes could affect the economy and people's well-being. If, for example, policy changes included an increase in marginal tax rates (the rates that apply to an additional dollar of income), people's incentives to work and save would diminish as tax rates rose.[9] Alternatively, if policy changes included a reduction in federal spending for investment, both output and income would be lower than they would have been if that spending had not been reduced.[10] In contrast, if reductions in, say, Social Security benefits were made to lessen spending, people might feel compelled to work more to replace that lost income, thus increasing output.

Reduced Ability to Respond to Unforeseen Events

When outstanding debt is relatively small, the federal government is able to borrow money at lower rates to cover unexpected costs, such as those that arise from recessions, financial crises, natural disasters, or wars. By contrast, when outstanding debt is large, the government has less flexibility to address financial and economic crises. A large debt also can compromise a country's national security by constraining military spending in times of international crisis or by limiting the government's ability to prepare for (or respond to) such a crisis.

At the outset of the 2007–2009 recession, when federal debt held by the public was below 40 percent of GDP, lawmakers had the flexibility necessary to respond to the financial crisis. The recession resulted in lower output and income, which caused sharp declines in tax revenues and increases in mandatory spending. The policy responses included increases in federal spending to stabilize the financial sector, boost investment in infrastructure, and add to income security programs, along with temporary decreases in business and payroll taxes. As a result, by 2012, federal debt as a percentage of GDP had doubled from its 2007 level.

If another recession or fiscal crisis occurred and if federal debt was at its current level or higher, the government might have a more difficult time implementing similar costly actions in response. As a result, such events could have larger negative effects on the economy and on people's well-being. Moreover, the reduced financial flexibility and increased dependence on foreign investors that would accompany high and rising debt could weaken U.S. international leadership.

Greater Chance of a Fiscal Crisis

A large and growing federal debt would increase the chance of a fiscal crisis in the United States—a situation in which it would become increasingly difficult to finance federal borrowing and investors would have to be compensated with continuously increasing interest

8. The federal funds rate is the interest rate financial institutions charge each other for overnight loans of their monetary reserves.

9. See Congressional Budget Office, *How the Supply of Labor Responds to Changes in Fiscal Policy* (October 2012), www.cbo.gov/publication/43674.

10. For more information, see Congressional Budget Office, *The Macroeconomic and Budgetary Effects of Federal Investment* (June 2016), www.cbo.gov/publication/51628.

rates.[11] Those concerns could perpetuate a cycle: Higher interest rates would increase concerns over repayment, which would continue to raise interest rates even further. Even in the absence of a full-blown crisis, such risks would lead to higher rates and borrowing costs for the U.S. government and the private sector.

In a fiscal crisis, dramatic increases in Treasury rates would reduce the market value of outstanding government securities, and the resulting losses—for mutual funds, pension funds, insurance companies, banks, and other holders of government debt—could be large enough to cause some financial institutions to fail. Because the United States currently benefits from the U.S. dollar being the world's reserve currency and because the federal government borrows in dollars, it is less likely that a sudden fiscal crisis would lead to a catastrophic financial crisis similar to those that befell Argentina, Greece, or Ireland. As one example, in the event of a dramatic increase in interest rates, the Federal Reserve could buy Treasury securities and thereby limit losses to bondholders. However, such moves, if extensive, would ultimately lead to high inflation, a sharp depreciation in the value of the dollar, or both.[12] Those developments would reduce the value of U.S. assets.

No one can accurately predict whether or when a fiscal crisis might occur in the United States or how it would unfold. In particular, the debt-to-GDP ratio has no identifiable tipping point to indicate that a crisis is likely or imminent. Nonetheless, a large and rising federal debt would almost certainly increase the risk of a fiscal crisis.

The likelihood of a fiscal crisis also depends on economic conditions. If investors anticipate continued economic growth and low interest rates, they are generally less concerned about the government's debt burden. Conversely, substantial debt can reinforce a more generalized concern about the economy. Thus, fiscal crises around the world often have begun during recessions and, in turn, have exacerbated them.

If a fiscal crisis occurred in the United States, policymakers would have limited—and unappealing—options for responding. The government would need to undertake some combination of three approaches: restructure the debt (that is, seek to modify the contractual terms of existing obligations), use monetary policy to raise inflation above expectations, or implement large and abrupt spending cuts or tax increases.

Demographic and Economic Trends That Underlie CBO's Long-Term Projections

Demographic and economic projections are key determinants of the long-term budget outlook. Through 2028, the projections in this report are the same as those that underlie CBO's 10-year baseline; for later years, the agency projects conditions according to its assessment of long-term trends. (Appendix A describes CBO's demographic and economic projections.) In addition, the economic projections take into account the effects that projected fiscal policies—in particular, increased federal borrowing and rising effective marginal tax rates—would have on the economy. Such effects would result in a smaller labor supply, a smaller stock of capital, and lower output than would otherwise be the case.

Demographic Projections

The size and age profile of the U.S. population affect the federal budget and the nation's economy. For example, the composition of the population influences the size of the labor force and the number of beneficiaries of Social Security and other federal programs. In CBO's projections, the U.S. population increases from 332 million at the beginning of this year to 392 million in 2048, expanding by 0.6 percent per year, on average. That annual rate of growth is slower than the rate of the past 50 years (0.9 percent). The share of the population age 65 or older also rises over the coming decades, maintaining a long-standing historical trend. By 2048, 22 percent of the population would be age 65 or older, compared with 16 percent today (see Figure 4).

To estimate growth in the U.S. population, CBO projects rates of fertility, immigration, and mortality. The total fertility rate is calculated as the sum of fertility rates for women between 15 and 49 in a given year and represents the average number of children that a woman would have in her lifetime.[13] In general, that rate tends to decline during recessions and rebound during recoveries. Instead of rebounding after the

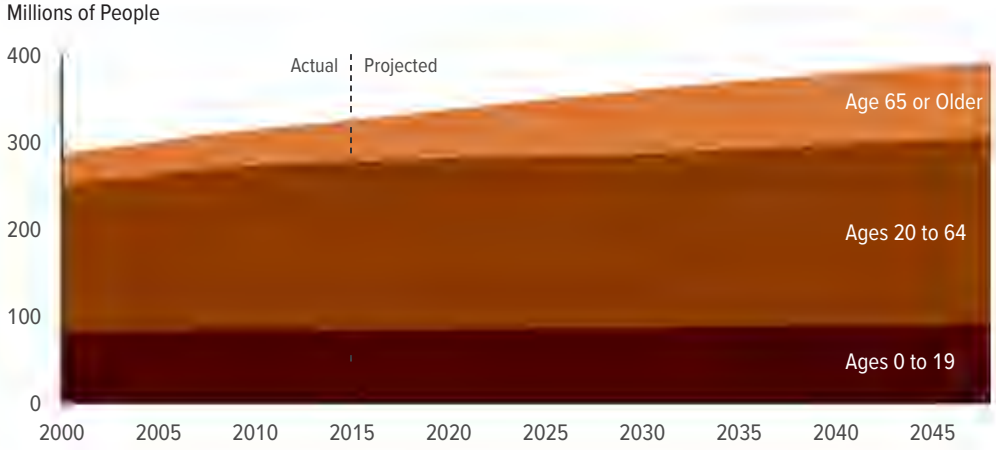
11. For more information, see Congressional Budget Office, *Federal Debt and the Risk of a Fiscal Crisis* (July 2010), www.cbo.gov/publication/21625. That report points out, for example, that during past fiscal crises, Argentina, Greece, and Ireland were forced to make difficult choices in the face of sharp increases in interest rates on government debt.

12. Over time, such currency debasement would erode the status of the U.S. dollar as the world's reserve currency.

13. The total fertility rate can also be defined as the average number of children that a woman would have if, in each year of her life, she experienced the birth rates observed or assumed for that year and if she survived her entire childbearing period.

Figure 4.

Population, by Age Group



The share of the population age 65 or older is projected to rise over the coming decades, maintaining a long-standing historical trend.

Source: Congressional Budget Office.

This figure shows actual data through calendar year 2015, the most recent year for which such data are available.

2007–2009 recession, however, the fertility rate fell. In 2007, the rate was 2.1 births per woman, but it declined to 1.9 by 2010 and has remained below that point since then. CBO expects the total fertility rate to be 1.9 for the next 30 years.[14]

Under current law, the rate of net annual immigration to the United States is expected to rise slightly over the next three decades. CBO projects that rate would inch up from an average of 3.1 per thousand people in the U.S. population over the next decade to 3.2 in 2048. That rate, which accounts for anyone who either enters or leaves the United States in any year, is slightly higher than the average net annual immigration rates since the end of the 2007–2009 recession. On balance, CBO projects that the increase in net annual immigration over the next decade would be mostly driven by higher numbers of legal permanent residents. The annual increase in the number of legal temporary and unauthorized immigrants is projected to be relatively steady over the next 10 years. Beyond 2028, the annual average rate of growth is the same for different categories of immigrants in CBO's projections. Using that simplified approach, CBO projects that net annual immigration would grow at an average rate of 0.6 percent annually through 2048, slightly faster than the average rate of growth in the U.S. population overall.[15]

Mortality rates are projected to improve over the next 30 years, on average. Those rates, which measure the number of deaths per thousand people in the population, are projected to decline at the same rates that were recorded for each age and sex group from 1950 to 2014. Improved, or lower, mortality rates mean higher life expectancy. CBO projects an average life expectancy at birth of 82.8 years in 2048, compared with 79.2 years in 2018.[16] Similarly, CBO projects life expectancy at age 65 in 2048 to be 21.7 years, or 2.2 years longer than life expectancy at age 65 in 2018.

Economic Projections

The performance of the U.S. economy in coming decades will affect the federal government's spending, revenues, and debt accumulation. CBO makes its economic projections by projecting trends in key economic

14. Recent data show that low total fertility rates have persisted since the recession, remaining below 1.9. See Brady E. Hamilton and others, *Births: Provisional Data for 2017*, Vital Statistics Rapid Release Report 4 (National Center for Health Statistics, May 2018), www.cdc.gov/nchs/nvss/vsrr/reports.htm.

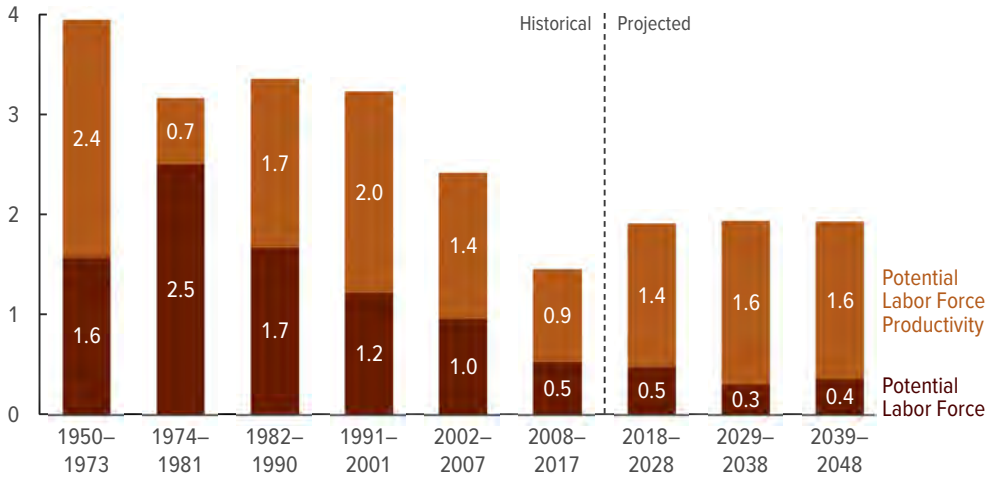
15. That rate is based on the Census Bureau's projections for late in the coming decade. See Census Bureau, "2014 National Population Projections: Summary Tables," Table 1, https://go.usa.gov/xQAbu. The Census Bureau has recently released a new set of projections, but information from those projections has not been incorporated in this analysis. In those projections, the population is slightly smaller than the Census Bureau projected in 2014.

16. Life expectancy as used here is period life expectancy, which is the amount of time that a person in a given year would expect to survive beyond his or her current age on the basis of that year's mortality rates for various ages.

Figure 5.

Average Annual Growth of Real Potential GDP in CBO's Extended Baseline

Percent



Growth in potential GDP is projected to be slower than it has been in the past, driven mostly by slower growth of the labor force.

Source: Congressional Budget Office.

Real potential GDP is the maximum sustainable output of the economy adjusted to remove the effects of inflation. The two contributing factors are potential labor force productivity (the ratio of potential GDP to the potential labor force) and the potential labor force (the labor force adjusted for ups and downs in the business cycle).

GDP = gross domestic product.

variables, such as the size and composition of the labor force, capital accumulation, productivity, inflation, and interest rates. The agency also considers ways in which fiscal policy influences economic activity.

In CBO's projections, growth in potential (maximum sustainable) GDP in the future is slower than it has been over the past 50 years. Under its extended baseline, CBO projects an increase in real potential GDP of 1.9 percent per year, on average, over the next 30 years, compared with its historical growth rate of 2.8 percent. That slower economic growth is attributable to several factors—most notably, slower growth of the potential labor force (the labor force adjusted for ups and downs in the business cycle). In CBO's projections, the potential labor force grows by 0.4 percent per year, on average, through 2048 (see Figure 5); the average annual growth rate over the 1968–2017 period was 1.5 percent. That slower projected growth of the potential labor force mainly results from the aging of the population and the relative stability (after rising for decades) in the share of women participating in the labor force.[17]

In CBO's projections, total factor productivity grows more slowly than its historical average, increasing by 1.2 percent per year, on average, from 2018 to 2048. That rate, which measures the average real output per unit of combined labor and capital services, is slower than the annual average of 1.5 percent since 1950. Factors influencing that projection include slower productivity growth over the past several decades (except during a period of rapid growth in the late 1990s and early 2000s), modest growth in labor quality (a measure of workers' skills), and a projected reduction in federal investment as a share of GDP. Potential labor productivity—defined as real potential output per potential hour of labor—is likewise projected to grow more slowly than it has in the past, reflecting less

17. For more details about how CBO projects labor force participation rates, see Joshua Montes, *CBO's Projection of Labor Force Participation Rates,* Working Paper 2018-04 (Congressional Budget Office, March 2018), www.cbo.gov/publication/53616.

private investment in capital goods. Since 1950, labor productivity has expanded by 1.7 percent per year, on average; through 2048, that growth rate is projected to average 1.5 percent per year (see Figure 5).

Interest rates, in CBO's projections, rise as the economy continues to expand but remain lower than they have been historically. Slower growth of the labor force and lower inflation push interest rates down from their historical levels, and those factors are projected to outweigh the effects of rising federal debt and other factors that tend to push interest rates up. In CBO's latest economic projections, the interest rate on 10-year Treasury notes rises from 2.4 percent at the end of 2017 to 3.7 percent in 2028. That rate is projected to rise to 4.8 percent in 2048—1 percentage point below the 5.8 percent average recorded over the 1990–2007 period. (That period is used for comparison because it was characterized by fairly stable expectations for inflation and by a lack of significant financial crises or severe economic downturns.)

The average interest rate on all federal debt held by the public tends to be lower than the rate on 10-year Treasury notes. (Interest rates generally are lower on shorter-term debt than on longer-term debt, and the average term to maturity of federal debt has been less than 10 years since the 1950s.) Based on projections of interest rate spreads and the term structure of rates on federal debt, the average interest rate on federal debt is projected to be about 0.4 percentage points lower than the interest rate on 10-year Treasury notes after 2028.[18] As a result, in CBO's projections, the average interest rate on federal debt rises to 4.4 percent by 2048.

CBO's economic projections incorporate the macroeconomic effects of federal tax and spending policies. In particular, the agency projects that increased borrowing by the federal government under current law generally would crowd out some private investment in productive capital in the long term. Less private investment in capital goods would make workers less productive, leading to lower wages and a smaller supply of labor. Furthermore, the extended baseline incorporates the economic effects of higher marginal tax rates. As more income is pushed into higher tax brackets over time, labor and capital income face higher tax rates. Higher marginal tax rates on labor income would lessen people's incentive to work, and the increase in the marginal tax rate on capital income would reduce their incentive to save. All told, less private domestic investment and a smaller labor supply would result in lower economic output and income than would otherwise be the case.

Projected Spending Through 2048

Spending for all of the government's programs and activities, combined with net interest costs, is projected to account for a larger percentage of GDP in coming years than it has, on average, over the past 50 years. From 1968 to 2017, federal outlays other than those for the government's net interest costs averaged 18 percent of GDP. The percentage was higher over the past decade, when noninterest spending averaged 20 percent of GDP, because of underlying demographic trends and because of temporary conditions in the economy (namely, the financial crisis, the weak recovery, and the federal policies that were created to address those circumstances). Under current law, noninterest outlays are projected to rise from 19 percent in 2018 to 20 percent in 2028 (adjusted to exclude shifts in timing; the share would be 21 percent if timing shifts were included). Over the next decade, mandatory spending (which includes spending on Social Security and the major health care programs, along with many smaller programs) is generally projected to increase as a share of the economy, and discretionary spending is generally projected to decrease.

After 2028, under the assumptions that govern the extended baseline, noninterest spending would continue to rise relative to the size of the economy, reaching 23 percent of GDP by 2048. (For a summary of CBO's assumptions about spending and revenues, see Table 2.) That increase would mostly result from larger outlays for the two biggest mandatory programs: Social Security and Medicare (see Figure 6).

Under current law, net interest costs would rise from 1.6 percent of GDP in 2018 to 3.1 percent in 2028, CBO projects, as debt accumulates and as interest rates increase from their currently low levels. By 2048, net interest costs would equal 6.3 percent of GDP, boosting total federal spending to 29 percent of GDP. Spending has exceeded that amount only once, for a three-year period during World War II. For those years, when

18. Term structure is the relationship between interest rates or bond yields and different terms or maturities.

Table 2.

Assumptions About Spending and Revenues Underlying CBO's Extended Baseline

	Assumptions About Spending
Social Security	As scheduled under current law[a]
Medicare	As scheduled under current law through 2028; thereafter, projected spending depends on the estimated number of beneficiaries and health care costs per beneficiary (for which excess cost growth is projected to move smoothly to a rate of 1.0 between 2029 and 2048)[a]
Medicaid	As scheduled under current law through 2028; thereafter, projected spending depends on the estimated number of beneficiaries and health care costs per beneficiary (for which excess cost growth is projected to move smoothly to a rate of 1.0 between 2029 and 2048)
Children's Health Insurance Program	As projected in CBO's baseline through 2028; constant as a percentage of GDP thereafter
Subsidies for Health Insurance Purchased Through the Marketplaces Established Under the Affordable Care Act	As scheduled under current law through 2028; thereafter, projected spending depends on the estimated number of beneficiaries, an additional indexing factor for subsidies, and excess cost growth for private health insurance premiums (which is projected to move smoothly to an annual rate of 1.0 between 2029 and 2048)
Other Mandatory Spending	As scheduled under current law through 2028; thereafter, refundable tax credits are estimated as part of revenue projections, and the rest of other mandatory spending is assumed to decline as a percentage of GDP at roughly the same annual rate at which it is projected to decline between 2023 and 2028[b]
Discretionary Spending	As projected in CBO's baseline through 2028; roughly constant as a percentage of GDP thereafter[c]
	Assumptions About Revenues
Individual Income Taxes	As scheduled under current law
Payroll Taxes	As scheduled under current law
Corporate Income Taxes	As scheduled under current law
Excise Taxes	As scheduled under current law[d]
Estate and Gift Taxes	As scheduled under current law
Other Sources of Revenues	As scheduled under current law through 2028; constant as a percentage of GDP thereafter

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

For CBO's most recent 10-year baseline projections, see Congressional Budget Office, *An Analysis of the President's 2019 Budget* (May 2018), www.cbo.gov/publication/53884.

Excess cost growth refers to the extent to which the growth rate of nominal health care spending per person—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential GDP per person. (Potential GDP is the maximum sustainable output of the economy.)

GDP = gross domestic product.

a. Assumes the payment of full benefits as calculated under current law, regardless of the amounts available in the program's trust funds.

b. In that projection, GDP includes the macroeconomic effects of the policies underlying the extended baseline. If it did not, the rest of other mandatory spending after 2028 would decline at the same rate at which it is projected to decline between 2023 and 2028 (excluding the decline in spending for the Supplemental Nutrition Assistance Program).

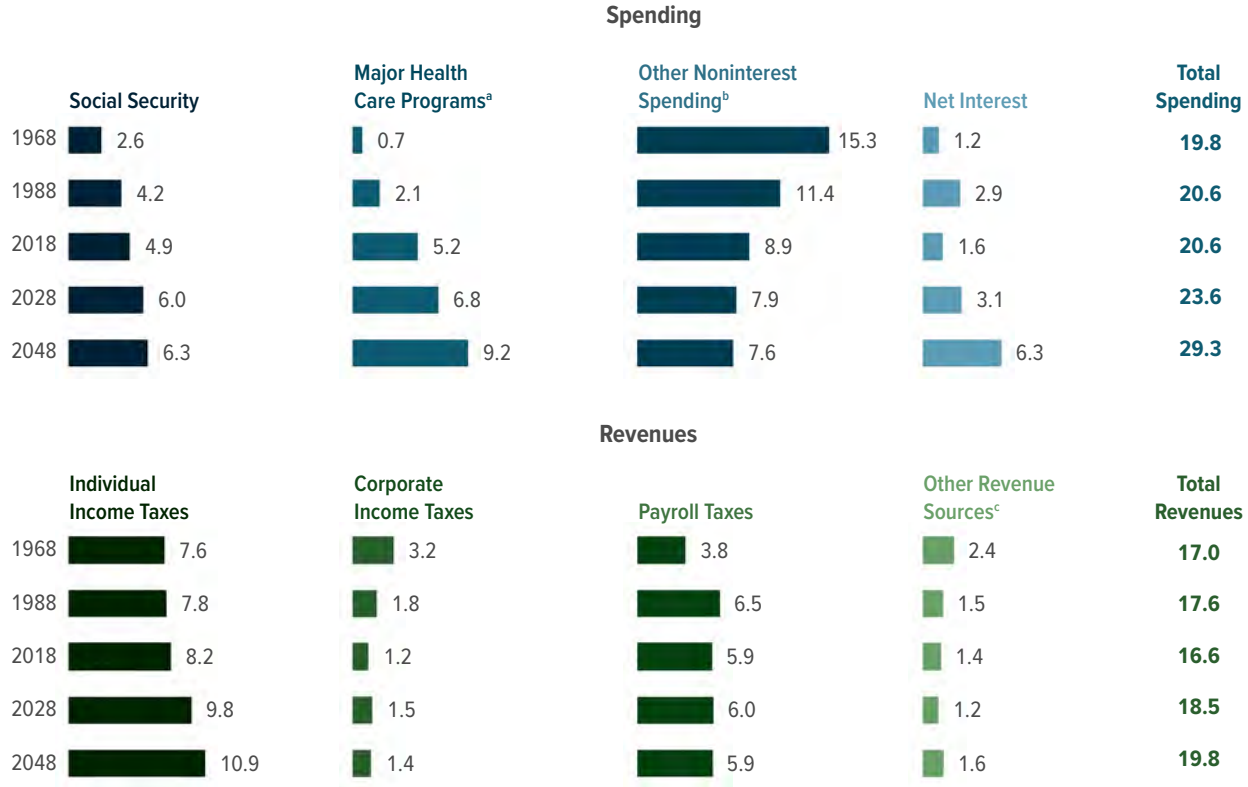
c. In that projection, GDP includes the macroeconomic effects of the policies underlying the extended baseline. If it did not, discretionary spending after 2028 would remain the same (measured as a percentage of GDP) as the amount projected for 2028.

d. The exception to the current-law assumption applies to expiring excise taxes dedicated to trust funds. The Balanced Budget and Emergency Deficit Control Act of 1985 requires CBO's baseline to reflect the assumption that those taxes would be extended at their current rates. That law does not stipulate that the baseline include the extension of other expiring tax provisions, even if they have been routinely extended in the past.

Figure 6.

Spending and Revenues in the Past and in CBO's Extended Baseline

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

b. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.

c. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.

defense spending increased sharply, total federal spending topped 40 percent.

CBO projects that the growth in spending for Social Security, the major health care programs, and net interest would continue to reshape the spending patterns of the U.S. government (see Figure 7). Spending for net interest would account for a much greater portion of total federal spending by 2048 than it does today, and spending on Social Security and the major health care programs would account for a much larger share of all federal noninterest spending.

Spending for Social Security and the Major Health Care Programs

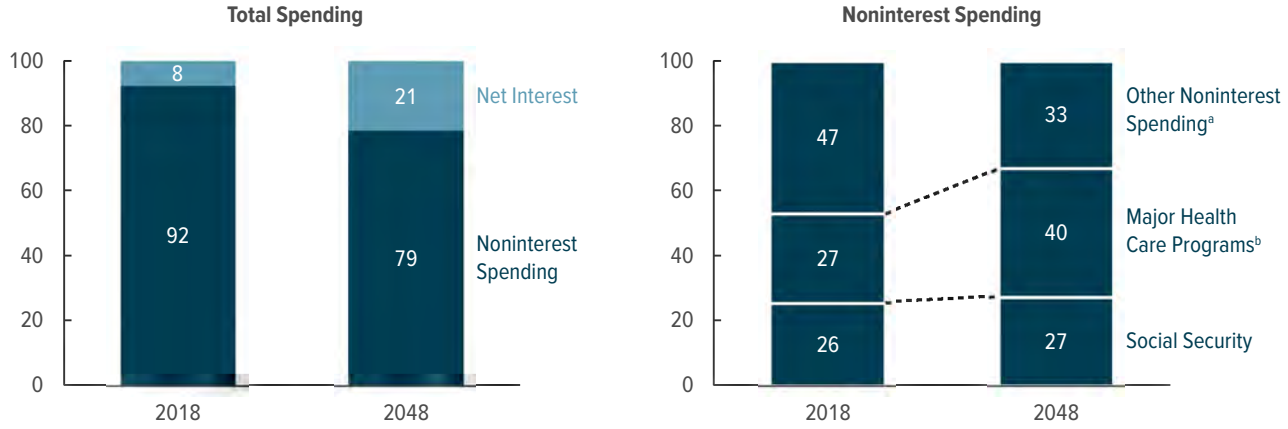
Mandatory programs have accounted for a rising share of the federal government's noninterest spending over the past few decades. Most of the growth has occurred because Social Security and Medicare provide benefits mainly to people age 65 or older, a group that has been growing significantly.

Social Security. Created in 1935, Social Security is the largest single program in the federal budget. Its two components pay benefits to 62 million people in all.

Figure 7.

Composition of Federal Spending in CBO's Extended Baseline

Percent



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.

b. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

The larger of the two, Old-Age and Survivors Insurance (OASI), pays benefits to retired workers, to their eligible dependents, and to some survivors of deceased workers. The smaller program, Disability Insurance (DI), makes payments to disabled workers and to their dependents until those workers are old enough to claim full retirement benefits under OASI.

Under current law, CBO projects, spending for Social Security would increase noticeably as a share of the economy, continuing the trend of the past five decades. That spending would increase from 4.9 percent of GDP in 2018 to 6.3 percent in 2048 (see Figure 6 on page 15), and the number of beneficiaries would rise from 62 million to nearly 99 million. In CBO's extended baseline projections, Social Security is assumed to pay benefits as scheduled under current law, regardless of the status of the program's trust funds.[19] That approach is consistent with a statutory requirement that CBO's 10-year baseline projections incorporate the assumption that funding for such programs is adequate to make all payments required by law.[20]

The Social Security program is funded by dedicated tax revenues from two sources. Currently, 96 percent comes from a payroll tax; the rest is collected from income taxes on Social Security benefits. Revenues from the payroll tax and the tax on benefits are credited to the Old-Age and Survivors Insurance Trust Fund and the Disability Insurance Trust Fund, which finance the program's benefits.

A common measure of the sustainability of a program that has a trust fund and a dedicated revenue source is its estimated actuarial balance over a given period—that

19. The balances of the trust funds represent the total amount that the government is legally authorized to spend for those purposes. For more details about the legal issues related to exhaustion of a trust fund, see Noah P. Meyerson, *Social Security: What Would Happen If the Trust Funds Ran Out?* Report for Congress RL33514 (Congressional Research Service, August 28, 2014), available from U.S. House of Representatives, Committee on Ways and Means, *2014 Green Book*, Chapter 1: Social Security, "Social Security Congressional Research Service Reports" (accessed April 19, 2018), http://go.usa.gov/cCXcG.

20. Sec. 257(b)(1) of the Balanced Budget and Emergency Deficit Control Act of 1985 (Deficit Control Act), Public Law 99-177 (codified at 2 U.S.C. §907(b)(1) (2016)).

is, the sum of the present value of projected tax revenues and the current trust fund balance minus the sum of the present value of projected outlays and a year's worth of benefits at the end of the period.[21] For Social Security, that difference is traditionally presented as a percentage of the present value of taxable payroll over 75 years.[22]

Over the next 75 years, if current laws remained in place, the program's actuarial shortfall would be 1.5 percent of GDP, or 4.4 percent of taxable payroll, CBO projects (see Table 3).[23] According to CBO's projections, therefore, it would be possible to pay the benefits prescribed by current law and maintain the necessary trust fund balances through 2092 if payroll taxes were raised immediately and permanently by about 4.4 percent of taxable payroll, if scheduled benefits were reduced by an equivalent amount, or if some combination of tax increases and spending reductions of equal present value was adopted.[24]

Table 3.

Financial Measures for Social Security

Projection Period (Calendar years)	Income Rate	Cost Rate	Actuarial Balance (Difference)
	As a Percentage of Gross Domestic Product		
25 Years (2018 to 2042)	5.1	6.2	-1.0
50 Years (2018 to 2067)	4.8	6.2	-1.4
75 Years (2018 to 2092)	4.7	6.2	-1.5
	As a Percentage of Taxable Payroll		
25 Years (2018 to 2042)	14.6	17.5	-2.9
50 Years (2018 to 2067)	14.0	18.0	-4.0
75 Years (2018 to 2092)	13.9	18.3	-4.4

Source: Congressional Budget Office.

These projections incorporate the assumption that spending for Social Security continues as scheduled even if its trust funds are exhausted. Through 2048, the projections incorporate macroeconomic feedback caused by rising federal debt and marginal tax rates. After 2048, they do not account for such feedback.

Over each projection period, the income rate is the present value of annual tax revenues plus the initial trust fund balance, and the cost rate is the present value of annual outlays plus the present value of a year's worth of benefits as a reserve at the end of the period, each divided by the present value of gross domestic product or taxable payroll. (The present value of a flow of revenues or outlays over time expresses that flow as a single amount received or paid at a specific time. The present value depends on a rate of interest, known as the discount rate, that is used to translate past and future cash flows into current dollars.) The actuarial balance is the difference between the income and cost rates.

Another commonly used measure of Social Security's sustainability is a trust fund's date of exhaustion. CBO projects that, under current law, the DI trust fund would be exhausted in fiscal year 2025 and the OASI trust fund would be exhausted in calendar year 2032. If their balances were combined, the OASDI trust funds would be exhausted in calendar year 2031, according to CBO's estimate.

The Major Health Care Programs. Outlays for the major health care programs consist of spending for Medicare, Medicaid, and the Children's Health Insurance Program (CHIP), as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act (ACA) and related spending.[25] Medicare, which provides health insurance to about

21. A present value expresses a flow of past and future income or payments as a single amount received or paid at a specific time. The value depends on the rate of interest, known as the discount rate, used to translate past and future cash flows into current dollars at that time. To account for the difference between a trust fund's current balance and the balance desired for the end of the period, the balance at the beginning is added to the projected tax revenues, and an additional year of costs at the end of the period is added to projected outlays.

22. Taxable payroll is the total amount of earnings (wages and self-employment income) for employment covered by Social Security that is below the applicable annual taxable maximum ($128,400 in 2018).

23. The 75-year projection period used here begins in calendar year 2018 and ends in calendar year 2092. The Social Security trustees have estimated that the program's 75-year actuarial shortfall would be 2.8 percent of taxable payroll, which is about 1.6 percentage points less than CBO's projection. For details on the trustees' projections, see Social Security Administration, *The 2018 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* (June 2018), www.ssa.gov/oact/tr/2018.

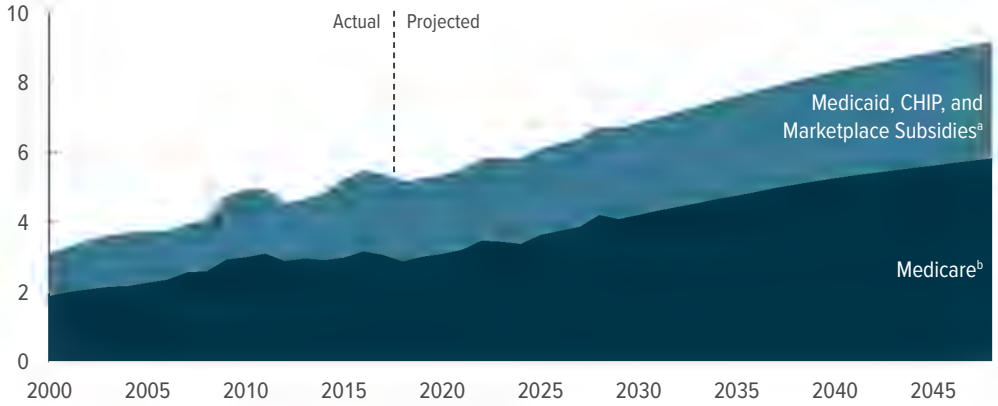
24. A policy that either increased revenues or reduced outlays by the same percentage of taxable payroll each year that would be required to eliminate the 75-year shortfall would not necessarily place Social Security on a permanently stable financial path. Estimates of the actuarial shortfall do not account for revenues or outlays after the 75-year projection period. Because shortfalls are smaller earlier in the 75-year projection period than they are later, such a policy would create surpluses in the next several decades but result in deficits later and leave the system financially unbalanced after calendar year 2092. Additionally, the calculation of the actuarial balance excludes the effects of any macroeconomic feedback that would result from an increase in taxes or a reduction in benefits.

25. Spending related to subsidies for insurance purchased through the marketplaces includes spending for subsidies for insurance provided through the Basic Health Program and spending for the risk-adjustment and reinsurance programs that were established by the ACA to stabilize premiums for health insurance purchased by individuals and small employers.

Figure 8.

Federal Spending on the Major Health Care Programs, by Category

Percentage of Gross Domestic Product



Medicare spending, net of offsetting receipts, would account for about three-quarters of the increase in spending for the major health care programs over the next 30 years.

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

CHIP = Children's Health Insurance Program; GDP = gross domestic product.

a. "Marketplace Subsidies" refers to spending to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and insurance provided through the Basic Health Program, as well as spending to stabilize premiums for health insurance purchased by individuals and small employers.

b. Refers to net spending for Medicare, which accounts for offsetting receipts that are credited to the program. Those offsetting receipts are mostly premiums paid by beneficiaries to the government.

59 million people (most of whom are at least 65 years old), accounts for more than half of that spending.

CBO projects federal spending for the government's major health care programs for 2018 through 2028 under the assumption that the laws governing those programs will, in general, remain unchanged. As with Social Security, CBO assumes that Medicare will pay benefits as scheduled under current law, regardless of the amounts in the program's trust funds. For longer-term projections, considerable uncertainty surrounds the evolution of health care delivery and financing systems. That uncertainty leads CBO to employ a formulaic approach for its projections beyond 2028: It combines estimates of the number of expected beneficiaries of the government's health care programs with mechanical estimates of the growth in spending per beneficiary.

Over the past five decades, spending for the major health care programs has steadily grown faster than the economy, and that trend continues in CBO's extended baseline. In 2018, net federal spending for the major health care programs is estimated to equal 5.2 percent of GDP, CBO projects. If current laws generally remained in place, net outlays for those programs would increase to 9.2 percent in 2048, with Medicare spending, net of offsetting receipts (mostly premiums paid by enrollees), growing by about 3 percent of GDP, and spending on Medicaid and CHIP, combined with outlays for marketplace subsidies and related spending, growing by about 1 percent of GDP (see Figure 8).[26]

Causes of Growth in Spending for Social Security and the Major Health Care Programs

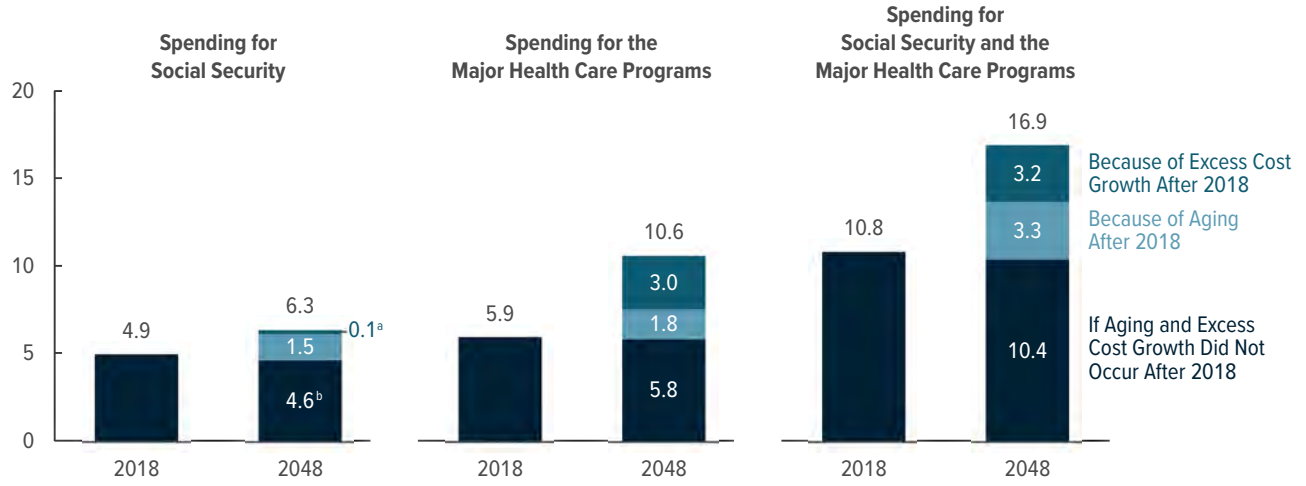
The aging of the population and rising health care costs per person are reasons for the sharp rise in projected spending for Social Security and the major federal health care programs over the next 30 years. The extent to which health care costs per person, adjusted for demographic changes, grow faster than potential GDP per person is known as excess cost growth.

26. In CBO's projections, the outlays for subsidies for insurance purchased through the marketplaces and related spending are presented in combination with outlays for Medicaid and CHIP. Most of those outlays constitute federal subsidies for health insurance for low- and moderate-income households.

Figure 9.

Spending Growth in Social Security and the Major Health Care Programs in CBO's Extended Baseline

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

Outlays for the major health care programs consist of gross spending for Medicare (which does not account for offsetting receipts that are credited to the program), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending. Those outlays have been adjusted to exclude the effects of shifting payments from one fiscal year into another so that those payments are not made on a weekend.

Excess cost growth refers to the extent to which the growth rate of nominal health care spending per person—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential gross domestic product per person. (Potential gross domestic product is the maximum sustainable output of the economy.)

This figure highlights the most important effects of aging and excess cost growth.

a. Excess cost growth accounts for a small portion of the increase in spending for Social Security as a share of GDP in 2048 because greater spending on federal health care programs leads to larger deficits, which in turn slow the growth of GDP.

b. If aging and excess cost growth did not occur after 2018, spending on Social Security as a share of GDP would be lower in 30 years, mainly because of the scheduled increase in the full retirement age for Social Security.

In developing its projections, if CBO had set the shares of the population by age at today's proportions and had set excess cost growth at zero, spending on those programs as a share of GDP in 2048 would be 0.4 percentage points below the 10.8 percent estimated for 2018 (adjusted to exclude shifts in timing).[27] In the extended baseline, however, that spending reaches 16.9 percent of GDP by 2048 (see Figure 9).[28] Aging accounts for an increase of 3.3 percentage points, or roughly half of the difference. Excess cost growth, at an increase of 3.2 percentage points, accounts for the other half.

The Aging Population. In CBO's projections, the aging of the baby-boom generation and continued gains in life expectancy increase the share of the population that is age 65 or older from 16 percent to 22 percent between 2018 and 2048.

Aging accounts for nearly all of the projected long-term increase in Social Security spending as a percentage of

27. Excluding aging and excess cost growth, spending on those programs as a percentage of GDP would be lower in 30 years, mainly because of the scheduled increase in the full retirement age for Social Security.

28. This analysis of causes of spending growth includes gross spending on Medicare.

GDP.[29] Because of growth in the share of the population that is 65 or older, a larger segment of the population will consist of Social Security beneficiaries, and their benefits will require greater federal spending.

Aging also contributes to the projected increase in the share of GDP taken up by spending for the major health care programs, particularly Medicare, which is the largest such program. Most beneficiaries qualify for Medicare at age 65. As that group becomes larger and older, on average, Medicare spending will increase because the number of beneficiaries will rise and because people tend to require more health care as they age. In CBO's projections for the 2018–2048 period, aging explains about one-third of the increase in spending for the major health care programs as a share of GDP.

Rising Health Care Costs per Person. Even though growth in health care costs per person has slowed recently, over the next 30 years it is projected to still be faster than growth in potential GDP per person. In CBO's extended baseline, excess cost growth accounts for about two-thirds of the increase in spending for the major health care programs as a share of GDP between 2018 and 2048. Such cost growth also leads to greater federal debt, which slows the growth of GDP and slightly raises projected spending as a share of GDP.

Other Noninterest Spending

In the extended baseline, total federal spending for everything other than Social Security, the major health care programs, and net interest declines to a smaller percentage of GDP than has been the case for more than 70 years. During the past 50 years, such spending has averaged 11 percent of GDP, but it has been as high as 15 percent (in 1968) and as low as 8 percent (in the late 1990s and early 2000s). Other noninterest spending in 2018 is estimated to equal 8.9 percent of GDP. Under the assumptions used for this analysis, that spending is projected to fall to 7.9 percent of GDP in 2028 and to 7.6 percent of GDP in 2048.

Discretionary Spending. About half of all discretionary spending is dedicated to national defense, and the rest is for an array of federally funded investments and activities, including education, transportation, housing assistance, veterans' health care, health-related research and public programs, administration of justice, and international affairs.

Over the past half-century, discretionary spending has diminished markedly as a percentage of GDP: Between 1968 and 2017, it declined from 13.1 percent to 6.3 percent. In CBO's baseline, discretionary outlays remain at about that level through next year before decreasing again, to 5.4 percent of GDP by 2028.

Through 2021, most discretionary funding is limited by caps on annual discretionary appropriations that were originally specified in the Budget Control Act of 2011 (P.L. 112-25, as amended). The Bipartisan Budget Act of 2018 increased limits on discretionary funding that otherwise would have been in place for 2018 and 2019. The subsequent decline in discretionary outlays relative to GDP reflects lower statutory limits on discretionary funding in 2020 and 2021 and the assumption (required by law) that discretionary funding will grow at the rate of inflation—which is slower than projected growth in GDP—beginning in 2022. After 2028, in CBO's extended baseline projections, discretionary spending is assumed to remain roughly constant as a percentage of GDP (see Figure 10).[30]

Other Mandatory Spending. Since the mid-1960s, mandatory spending other than that for Social Security and the major health care programs has generally remained between 2 percent and 4 percent of GDP. (An exception was the spike to 5.1 percent in 2009 because of higher spending in response to the severe recession.) That category of mandatory spending includes retirement programs for federal civilian and military employees, certain veterans' programs, the Supplemental Nutrition Assistance Program (SNAP), Supplemental Security

29. Excess cost growth accounts for a small portion of the increase in spending for Social Security as a share of GDP in 2048, amounting to about 0.1 percent of GDP, because greater spending on federal health care programs leads to larger deficits, which in turn slow the growth of GDP.

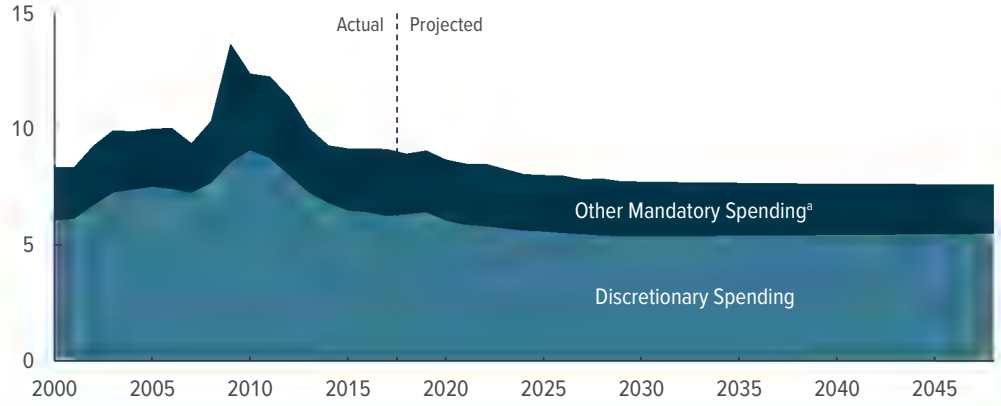
30. CBO assumed that discretionary spending after 2028 would remain constant as a percentage of GDP before the agency accounted for the effect on the economy of the fiscal policies projected under the extended baseline. Because CBO estimates that fiscal policy under the extended baseline would dampen economic growth, its projection of discretionary spending would not grow at precisely the same rate as GDP.

    Although discretionary spending would decline relative to GDP from 2018 to 2028 in CBO's projections, historical evidence suggests that such a decline is unlikely to persist: Discretionary spending has historically been a larger share of economic output than it is projected to be in 2028. For that reason, CBO did not assume that the share would decline further.

Figure 10.

Other Federal Noninterest Spending in CBO's Extended Baseline

Percentage of Gross Domestic Product



Measured as a percentage of economic output, other federal noninterest spending in CBO's extended baseline declines between 2018 and 2048, mainly because of a projected decrease in discretionary spending over the next decade.

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. "Other Mandatory Spending" is all mandatory spending other than that for Social Security and the major health care programs. It includes the refundable portions of the earned income and child tax credits and of the American Opportunity Tax Credit.

Income, unemployment compensation, and refundable tax credits.[31]

Other mandatory spending is projected to decline slightly as a share of the economy over the next 10 years. That category accounts for 2.6 percent of GDP today and, if current laws generally remained unchanged, it would decline to 2.4 percent of GDP in 2028, CBO projects.[32] That small decrease primarily reflects the effects of growth in average income on eligibility for some programs and refundable tax credits as well as reductions in the average payment per beneficiary (when measured relative to average income) for certain large programs.

In CBO's extended baseline, other mandatory spending is projected to fall to 2.1 percent of GDP by 2048. In part, that reduction reflects the effects of further growth in income on eligibility for refundable tax credits. It also reflects the assumption that other mandatory spending, excluding outlays for such tax credits, would decline roughly in line with projections for such spending between 2023 and 2028.[33]

Net Interest Costs

Over the past 50 years, the government's net interest costs have averaged 2.0 percent of GDP, although they have been as high as 3.2 percent and as low as 1.2 percent. In CBO's extended baseline, net interest costs are projected to roughly double as a share of the economy over the next decade—from 1.6 percent of GDP in 2018 to 3.1 percent by 2028—as greater federal borrowing boosts debt-service costs and as currently low interest

31. Refundable tax credits reduce a filer's overall income tax liability; if the credit exceeds the rest of the filer's income tax liability, the government pays all or some portion of that excess to the taxpayer (and the payment is treated as an outlay in the budget). See Congressional Budget Office, *Refundable Tax Credits* (January 2013), www.cbo.gov/publication/43767.

32. Sec. 257(b)(2) of the Deficit Control Act, which governs CBO's baseline projections, makes exceptions regarding current law for some programs, such as SNAP, that have expiring authorizations but that are assumed to continue as currently authorized.

33. For the years after 2028, mandatory spending excluding that for Social Security, the major health care programs, and refundable tax credits was not projected in detail because of the number of programs involved and the variety of factors that influence spending on them. Instead, CBO used an approximate method to project spending for those programs as a group. Except for the outlays for refundable tax credits, such spending is assumed to decline relative to GDP (excluding any effects that fiscal policy may have on the economy) after 2028 at the same rate at which it is projected to fall between 2023 and 2028 (excluding the decrease in spending for SNAP).

rates rise. In the extended baseline, those costs reach 6.3 percent of GDP by 2048, a higher amount than has ever been experienced (see Figure 6 on page 15). Those costs would exceed mandatory spending other than that for Social Security and the major health care programs in the next few years, exceed all discretionary spending by 2045, and be about equal to spending for Social Security by 2048.

In CBO's projections, deficits and debt rise because of the growing gap between spending and revenues, and higher interest costs are a major contributor to that growing gap. Between 2018 and 2048, more than half of the increase in spending as a percentage of GDP results from higher net interest costs. In large part, those rising interest costs stem from increases in interest rates that reflect long-term economic trends, which CBO projects would occur even if debt did not rise beyond its current level. But greater federal borrowing places additional upward pressure on interest rates and thus on interest costs. Moreover, growth in net interest costs and growth in debt reinforce one another: Rising interest costs would boost deficits and debt, and rising debt would push up interest costs.

Projected Revenues Through 2048

In CBO's extended baseline, revenues are generally projected to constitute a larger share of GDP than they have, on average, in recent decades. Over the past 50 years, revenues as a share of GDP have averaged about 17 percent, but the number has fluctuated between 15 percent and 20 percent of GDP because of changes in tax laws and interactions between those laws and economic conditions.

If current laws generally remained unchanged, revenues would increase as a share of GDP over the coming decade, CBO projects. Revenues would remain near 16.6 percent of GDP through 2021, rise steadily to 17.5 percent by 2025, and then increase sharply in 2026—to 18.1 percent of GDP—following the scheduled expiration of many temporary provisions of the 2017 tax act. By 2028, revenues are projected to total 18.5 percent of GDP.

For years beyond 2028, revenues are projected following the assumption that the rules for all tax sources will evolve as scheduled under current law.[34] Thus, under CBO's extended baseline, revenues would continue to grow faster than GDP beyond 2028 and, two decades later, would total 19.8 percent of GDP. Increases in receipts from individual income taxes account for most of the projected rise of 3.2 percentage points in total revenues as a share of GDP over the next three decades. All told, receipts from all other sources combined are projected to increase slightly as a share of GDP (see Figure 6 on page 15).

The projected increase in total revenues through 2048 reflects structural features of the income tax system, new and expiring tax provisions, demographic trends, changes in the distribution of income, and other factors.

Structural features of the income tax system are the largest contributor to the increase in total revenues (see Table 4). If current laws remained generally unchanged, real bracket creep would continue to gradually push up taxes relative to income over the next three decades, CBO projects. That occurs because most income tax brackets, exemptions, and other tax thresholds are indexed only to inflation. When income grows faster than inflation, as generally happens during economic expansions, tax receipts grow faster than income.[35]

Under current law, some provisions of tax law will expire and others will take effect during the next decade. In total, those changes lead to higher tax revenues in the extended baseline. The most significant change is the expiration, after calendar year 2025, of nearly all provisions in the 2017 tax act that affect individual income taxes. The expiration of those provisions boosts individual income tax receipts relative to GDP by 0.7 percentage points, CBO projects. In addition, a new tax on certain employment-based health insurance plans with high premiums is scheduled to take effect in 2022. Although the revenues raised by that tax would be small initially, rapid growth in health care costs would cause revenues from that tax to rise rapidly over subsequent decades. Also, some rules that allow businesses to accelerate

34. The sole exception to the current-law assumption during the baseline period applies to expiring excise taxes dedicated to trust funds. The Deficit Control Act requires CBO's baseline to reflect the assumption that those taxes would be extended at their current rates. That law does not stipulate that the baseline include the extension of other expiring tax provisions, even if lawmakers have routinely extended them before.

35. The 2017 tax act changed the measure of inflation used to index many parameters of the tax system to an alternative measure that grows more slowly. Consequently, the effect of real bracket creep is slightly greater than CBO projected in prior years.

Table 4.

Reasons for Growth in Total Revenues in CBO's Extended Baseline, 2018 to 2048

Percentage of Gross Domestic Product

Reason for Growth	2018–2028	2029–2048	Total, 2018–2048
Structural Features of the Individual Income Tax[a]	0.5	0.9	1.4
New and Expiring Tax Provisions	0.8	0.4	1.2
Aging and the Taxation of Retirement Income	0.2	0.1	0.3
Changes in the Distribution of Income (Effect on individual income taxes)	0.1	0.1	0.2
Changes in the Distribution of Income (Effect on payroll taxes)	-0.1	-0.1	-0.2
Other Factors	0.4	-0.1	0.3
Total Growth in Revenues Between 2018 and 2048	**1.9**	**1.3**	**3.2**

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Includes real bracket creep, which occurs as more income is pushed into higher tax brackets because people's income rises faster than inflation.

deductions for investment expenses are scheduled to be phased out by the end of December 2027, increasing revenues as a result.

As the population ages, distributions from tax-deferred retirement accounts (including individual retirement accounts, 401(k) plans, and traditional defined benefit pension plans) will tend to grow more rapidly than GDP. Those rising taxable distributions would also boost revenues relative to GDP, mainly between 2018 and 2028, CBO projects.

Earnings are projected to grow faster for higher-income people than for other people over the next 30 years. That trend would cause a larger share of income to be taxed at higher rates under the individual income tax, pushing up revenues relative to GDP by nearly 0.2 percentage points. That increase would be largely offset by a projected decrease of nearly the same amount in payroll tax receipts, as a greater share of earnings would be above the maximum amount subject to Social Security payroll taxes.

As a result of those factors, the effects of the tax system in 2048 would differ substantially from the effects today, both because of the changes in tax rules scheduled under current law and because of structural features in the tax code that gradually push up taxes relative to income. Average taxpayers at every income level would pay more of their income in taxes in 2048 than similar taxpayers do now, primarily because of real bracket creep. Effective marginal federal tax rates also would rise if current laws generally stayed in place, so a larger share of each additional dollar of income that households earned would go to pay taxes (see Table 5). The increase in the marginal tax rate on labor income would reduce people's incentive to work, and the increase in the marginal tax rate on capital income would reduce their incentive to save, thus dampening economic activity, in CBO's estimation.[36] (For a discussion of the long-term economic effects of the 2017 tax act, see Box 1 on page 26.)

Uncertainty of CBO's Long-Term Projections

Even if future tax and spending policies did not vary from those specified in current law, budgetary outcomes would undoubtedly differ from those in CBO's baseline projections because of unexpected changes in the economy, demographics, and other factors. To illustrate the uncertainty of its projections, CBO examined the extent to which federal debt as a percentage of GDP would differ from the amounts in its extended baseline if the agency varied four key factors in its analysis:[37]

- The labor force participation rate,[38]

36. Even though the marginal tax rate on capital income is projected to rise under current law, it would still be lower than in recent years.

37. For additional details about this analytical approach, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 7, www.cbo.gov/publication/51580.

38. The labor force participation rate is the percentage of people in the civilian noninstitutionalized population who are age 16 or older and either working or actively seeking work.

Table 5.

Effective Marginal Federal Tax Rates in CBO's Extended Baseline

Percent

	2018	2028	2048
Marginal Tax Rate on Labor Income	27.2	30.8	32.4
Marginal Tax Rate on Capital Income	14.7	16.5	17.0

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

The effective marginal tax rate on labor income is the share of an additional dollar of such income that is paid in federal individual income taxes and payroll taxes, averaged among taxpayers, with weights proportional to their labor income. The effective marginal tax rate on capital income is the share of the return on an additional dollar of investment made in a particular year that will be paid in taxes over the life of that investment. The before- and after-tax rates of return used to calculate that effective tax rate are weighted averages of the rates for every combination of asset type, industry, form of organization, and source of financing; the weights used are the asset values of each combination.

- The growth rate of total factor productivity,
- Interest rates on federal debt held by the public, and
- Excess cost growth for Medicare and Medicaid spending.

The degree of variation was based on historical movements and on possible future developments. The resulting estimates show that if CBO varied one factor at a time, federal debt held by the public after 30 years would range from 42 percentage points of GDP below the agency's central estimate—152 percent of GDP—to 60 percentage points above it.[39]

If all four factors were varied simultaneously such that projected deficits increased, federal debt held by the public in 2048 would be about 96 percent of GDP above CBO's central estimate.[40] Conversely, if all four factors were varied such that projected deficits decreased, debt after 30 years would be 67 percentage points below the central estimate (see Figure 11).

Those calculations do not cover the full range of possible outcomes, and they do not address other sources of uncertainty in the budget projections, such as the risk of an economic depression or a major war or catastrophe, or the possibility of unexpected changes in rates of birth, immigration, or mortality. Nonetheless, they show that the main implications of this report apply under a wide range of possible values for some key factors that influence federal spending and revenues. In 30 years, if current laws remained generally unchanged, federal debt—which is already high by historical standards—would probably be at least as high as it is today and would most likely be much higher.

Policymakers could take that uncertainty into account in various ways as they make choices for fiscal policy.[41] For example, they might design policies that reduced the budgetary implications of certain unexpected events. Or they might decide to provide a buffer against events with negative budgetary implications by aiming for lower debt than they would in the absence of such uncertainty.

The Size and Timing of Policy Changes Needed to Meet Various Goals for Deficit Reduction

CBO estimated the size of changes in spending or revenues that would be needed if lawmakers wanted to achieve some specific targets for federal debt held by the public. CBO also assessed the extent to which the size of policy adjustments would change if such deficit reduction was delayed, and it examined the effects of waiting to resolve the long-term fiscal imbalance on different generations of the U.S. population.

The Size of Policy Changes Needed to Meet Various Goals for Deficit Reduction

If lawmakers set out to ensure that debt in 2048 matched its current level of 78 percent of GDP, they could achieve

39. CBO's estimates of federal debt with each factor varied individually are presented in the supplemental data accompanying this report at www.cbo.gov/publication/53919.

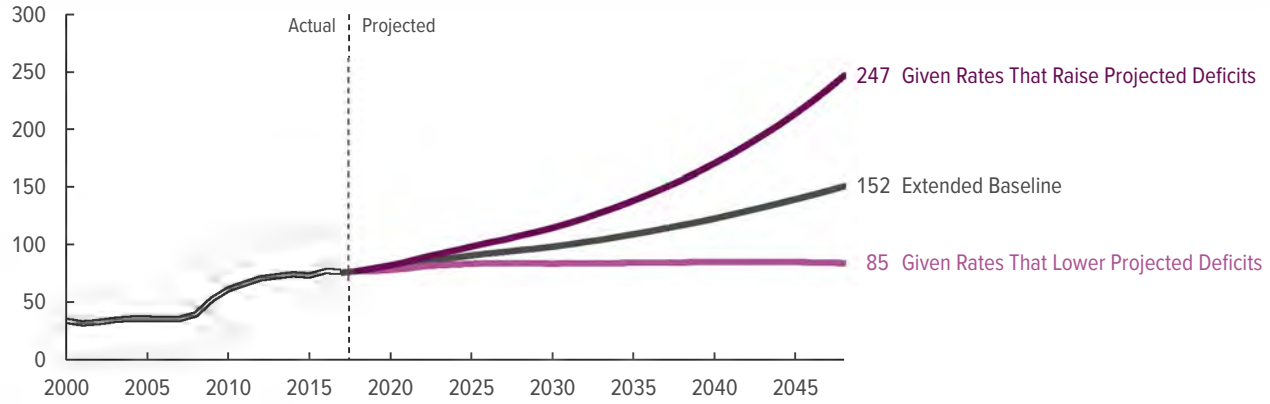
40. When CBO varied all factors simultaneously, it varied each factor by only 60 percent of the amount of variation in each factor individually. The agency used only part of the full range for each of the four factors because the chances of federal debt being above or below the estimates when all four factors are at the high or low ends of their ranges are much smaller than when each individual factor is at the high or low end of its range.

41. See Alan J. Auerbach and Kevin Hassett, "Uncertainty and the Design of Long-Run Fiscal Policy," in Auerbach and Ronald D. Lee, eds., *Demographic Change and Fiscal Policy* (Cambridge University Press, 2001), pp. 73–92, http://tinyurl.com/p93enfp.

Figure 11.

Federal Debt Given Different Rates of Labor Force Participation, Productivity Growth, Federal Borrowing, and Excess Cost Growth for Federal Spending on Medicare and Medicaid

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

Federal debt refers to debt held by the public. Values are CBO's central estimates from ranges determined by alternative assessments of two factors: how much deficits crowd out investment in capital goods, such as factories and computers (because a larger portion of private saving is being used to purchase government securities), and how much people respond to changes in after-tax wages by adjusting the number of hours they work.

The labor force participation rate is the percentage of people in the civilian noninstitutionalized population who are age 16 or older and either working or actively seeking work.

Productivity growth is the growth of total factor productivity—that is, the growth of real (inflation-adjusted) output that is not explained by the growth of labor and capital.

The federal borrowing rate is the interest rate on the federal debt.

Excess cost growth refers to the extent to which the growth rate of nominal health care spending per person—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential gross domestic product per person. (Potential gross domestic product is the maximum sustainable output of the economy.)

For this figure, CBO used values for four factors with a deviation from the extended baseline that was about 60 percent as large as the deviation the agency used when it varied each factor separately. The alternative projections for the four factors begin in 2019.

that result by cutting noninterest spending or raising revenues (or both) in each year beginning in 2019 by amounts totaling 1.9 percent of GDP (see Figure 12 on page 28). (In 2019, 1.9 percent of GDP would be about $400 billion, or $1,200 per person.) If the changes came entirely from revenues or entirely from spending, they would amount, roughly, to an 11 percent increase in revenues or a 10 percent cut in noninterest spending (in comparison with amounts in the extended baseline).

Increases in revenues or cuts in noninterest spending would need to be larger than 1.9 percent of GDP to reduce debt to the percentages of GDP that are more typical of those in recent decades. If lawmakers wanted to lower the debt to 41 percent of GDP (its average over the past 50 years) by 2048, they could achieve that outcome by increasing revenues or cutting noninterest spending (relative to amounts under current law) or by adopting some combination of those two actions beginning in 2019 by amounts totaling 3.0 percent of GDP each year. (In 2019, 3.0 percent of GDP would be about $630 billion, or $1,900 per person.)

If lawmakers wanted to lower debt to its average over the past 50 years by increasing all revenues or by cutting all noninterest spending, the following changes would be necessary:

Box 1.

Effects of the 2017 Tax Act on the Long-Term Budget Outlook

The Congressional Budget Office's extended baseline generally reflects current law, including the economic and budgetary effects of changes to legislation enacted over the past year—notably, the 2017 tax act (Public Law 115-97, originally called the Tax Cuts and Jobs Act). Those long-term projections are consistent with CBO's prior estimates of the 2017 tax act's effects on the U.S. economy—including higher investment, employment, and output—over the 2018–2028 period.[1]

Because various provisions of the 2017 tax act expire by the end of 2026, the economic and budgetary effects of the act as a whole are expected to peak during the early to middle part of the next decade. Beyond 2028, the effects of the major permanent provisions are expected to be modest, although their precise magnitudes are highly uncertain. CBO has not performed a detailed, quantitative analysis of the long-run effects of the 2017 tax act but is able to describe the qualitative effects of its most significant provisions.

Major Provisions of the 2017 Tax Act

The 2017 tax act has temporary and permanent provisions. For the next eight years, the major individual income tax changes are lower rates, a larger standard deduction, limits on the deductibility of mortgage interest and state and local taxes, elimination of personal exemptions, expansion of the child tax credit, changes to the treatment of "pass-through" business income, changes to the individual alternative minimum tax, and increases in the tax exemptions for property transferred at death and for certain gifts. For the next five years, the act allows businesses to immediately deduct the full cost of their investments for eligible equipment and software; that bonus-depreciation provision then phases out over the subsequent five years.

Following the expiration of most of the individual provisions at the end of 2025 and the phaseout of bonus depreciation by the end of 2026, the major permanent provisions of the act that continue are these:

- Lower corporate income taxes (a single rate of 21 percent);
- Higher thresholds for deducting the cost of a tangible asset in the year it is placed in service under section 179 of the tax code;
- Amortization of spending for research and experimentation;
- Limitations on net interest deductions and the use of net operating losses;
- Changes in the inflation adjustments for most tax parameters, including for income tax brackets;
- Elimination of the penalty for not having health insurance; and
- Changes in the taxation of foreign income and measures to reduce profit shifting.

Budgetary Effects Without Macroeconomic Feedback

The 2017 tax act has significant direct effects on CBO's budget projections. Those direct effects do not take into account any changes to the aggregate economy.

Budgetary Effects for 2018 to 2028. Before incorporating macroeconomic feedback, CBO estimated that the tax act would increase the primary deficit (that is, the deficit excluding the costs of servicing the debt) by a cumulative $1.843 trillion from 2018 to 2028 as a result of higher deficits through 2026. Once the temporary provisions have expired and scheduled changes to certain business provisions have taken effect, the permanent provisions are projected to reduce, on net, the primary deficit in 2027 and 2028. Because of the increased deficits, debt-service costs are higher in every year by growing amounts, totaling $471 billion over the period. The total direct effect on the deficit through 2028 would be $2.314 trillion.

Budgetary Effects for 2029 to 2048. After 2028, CBO estimates, the permanent provisions of the act would continue to reduce the primary deficit, on net, over the next 20 years. In particular, the change in the inflation indexing of tax parameters and elimination of the penalty for not having health insurance (which causes fewer people to enroll in health insurance programs subsidized by the federal government) would reduce the deficit by more than the revenues lost through lower corporate taxes.

Economic Effects of the 2017 Tax Act

The largest effects on investment, employment, and output are estimated to occur in the early to middle part of the 2018–2028 period, when both individual and corporate income tax rates are lower and when other temporary provisions and investment incentives (notably, full bonus depreciation) are in place. Most of the tax act's positive effects on the growth of real (inflation-adjusted) gross domestic product (GDP) would occur in the first few years of CBO's projection period. The positive effects on the economy would diminish over the following several years and are expected to be modest after 2028.

Economic Effects for 2018 to 2028. The 2017 tax act would boost the level of real GDP by 0.7 percent, on average, through 2028, with a peak effect of 1.0 percent in 2022. By lowering the corporate income tax rate, the act would give businesses

1. See Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), Appendix B, www.cbo.gov/publication/53651.

Continued

Box 1. Continued

Effects of the 2017 Tax Act on the Long-Term Budget Outlook

incentives to boost investment, and by decreasing individual income tax rates through 2025, it would give people incentives to increase their participation in the labor force and work more hours, expanding the labor supply and employment. Although some provisions of the tax act would deter residential investment, the overall effect on investment is estimated to be positive. However, private investment gains would be partially crowded out by higher federal deficits. Altogether, the largest positive effects on the economy would occur from 2022 to 2024 (before the individual income tax provisions expire at the close of 2025).

The effect of the tax act on real GDP is more modest over the following few years, and by 2028, real GDP would be 0.5 percent higher than it would have been otherwise. Between 2026 and 2028, investment would be boosted by the permanent reduction in the corporate income tax rate. However, the permanent change to amortization of research and experimentation expenses (instead of immediate expensing) would reduce the incentive for that type of investment.

The effects on the supply of labor are projected to be mixed. Marginal personal income tax rates would be higher after 2025 than under prior law because of the change in how various parameters of the tax system, including income tax brackets, are adjusted for inflation. That change would tend to reduce the supply of labor, as more income is pushed into higher tax brackets for a given amount of income growth because the new measure of inflation is expected to rise more slowly than the measure it replaced. In contrast, the permanent elimination of the penalty for not having health insurance would tend to increase the supply of labor, in part because under prior law the penalty rose as household income grew, causing it to act as a tax on income.

From 2026 to 2028, the pattern of the economic effects of the act reflects the transition from all the major provisions of the tax act being in place to only the permanent provisions remaining in effect. As a result, the positive effects on labor, investment, and real GDP would diminish. Nonetheless, those positive effects would be boosted by the reduction in the budget deficit by 2027 that results from the tax act, which makes additional resources available for private investment.

Furthermore, the tax act's international provisions are expected to change the reported location of profits in a way that boosts GDP through 2028, without changing the location of labor or capital. As a result, the provisions are expected to raise total factor productivity slightly over time.

Economic Effects for 2029 to 2048. In CBO's assessment, the various permanent provisions of the act would continue to boost the level of real GDP, on net, for a few years after 2028; over the longer term, the economic effects of the different provisions are expected to be modest, but the net effect is uncertain. The accelerated bracket creep resulting from the change in the indexing of tax parameters for inflation and the permanent change to amortization of research and experimentation expenses would tend to lower output by modestly reducing the supply of labor and capital, respectively. Elimination of the penalty for not having health insurance is expected to partially offset the negative effect on labor, and the permanent reduction in the corporate income tax rate and lower federal deficits would tend to increase output modestly by boosting investment.

The tax act's international provisions are expected to increase GDP slightly over the long term, although their overall economic effects are uncertain. Those effects would depend on how companies adjusted their international business structures and transactions and how foreign governments changed their tax rules in response.

Overall, the net impact on output would depend on the balance of all those effects. Individually and collectively, the effects become increasingly uncertain over the last 20 years of the projection period.

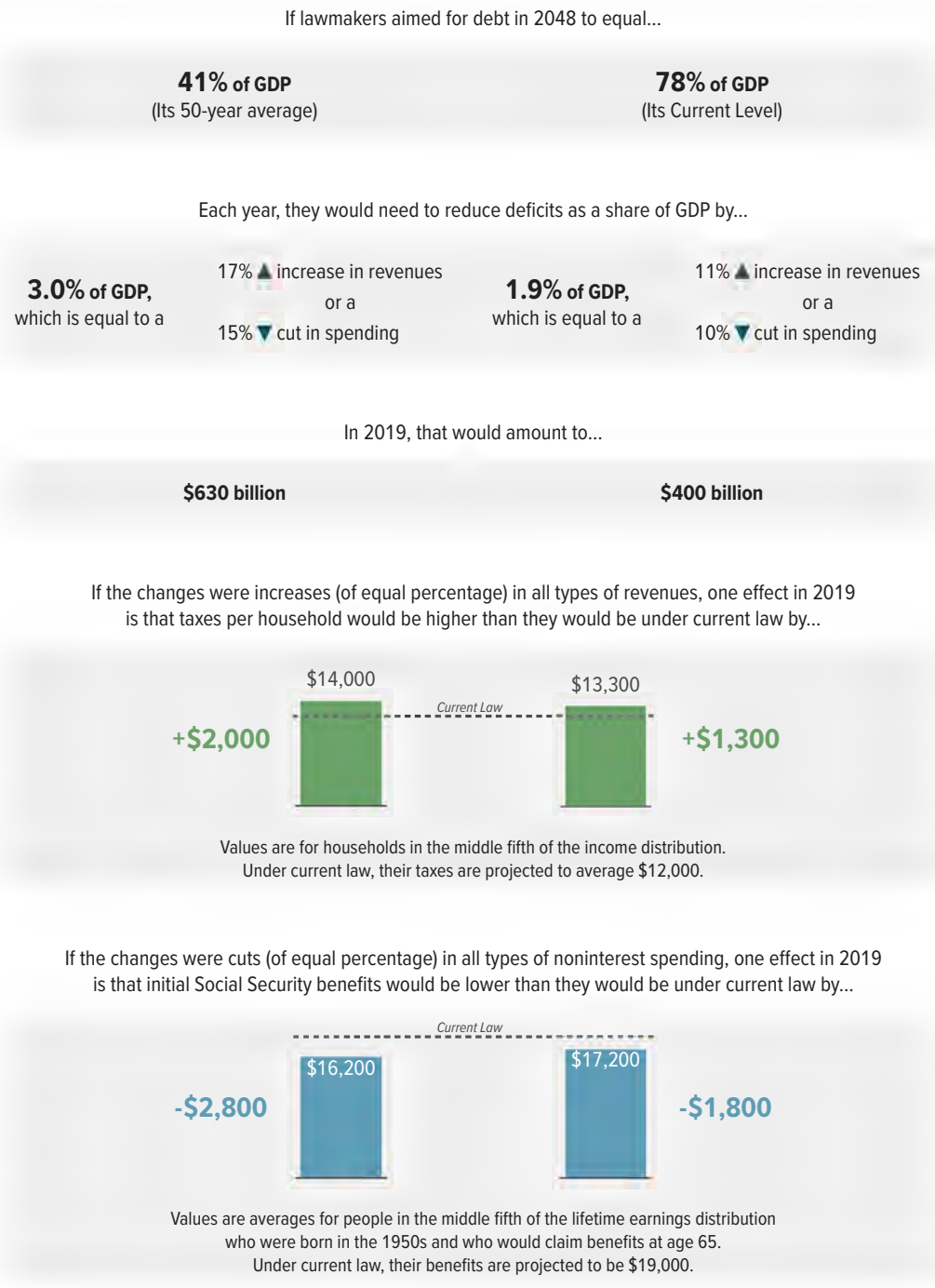
Budgetary Effects With Macroeconomic Feedback

CBO estimates that macroeconomic feedback from the tax act—that is, the ways in which the act would affect the budget by changing the overall economy—would subtract a total of $571 billion from primary deficits over the 2018–2028 period. That reduction would mainly result from the act's boost to taxable income, which would increase revenues. With that macroeconomic feedback incorporated, CBO projects that the act would increase primary deficits by $1.272 trillion through 2028. Incorporating the act's effects on debt-service costs from changes in federal borrowing and changes in interest rates would push the deficit to an estimated $1.854 trillion over the 2018–2028 period.

The net effects of the tax act on real GDP and other economic variables are expected to be modest after 2028 but the magnitudes are uncertain (in part because a number of factors tend to offset each other). As a result, the macroeconomic feedback to federal spending and revenues is also expected to be small but uncertain in those years. Despite that uncertainty, the overall effects of the permanent provisions of the act, including their macroeconomic feedback, are projected to reduce the primary deficit somewhat from 2029 to 2048.

Figure 12.

The Size of Policy Changes Needed to Make Federal Debt Meet Two Possible Goals in 2048



Source: Congressional Budget Office.

In this figure, the indicated sizes of the policy changes are relative to CBO's extended baseline, which generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period. The projected effects of the policy changes on debt include the direct effects of the policy changes and the feedback to the federal budget that would be attributable to faster economic growth. The effects on growth and the feedback to the federal budget reflect the positive economic effects of lowering the debt but do not reflect any assumptions about the specific details of the policy changes.

GDP = gross domestic product; n.a. = not applicable.

- If collections of the various types of revenues were increased proportionally, total revenues would need to rise by about 17 percent each year over the 2019–2048 period. On average, that adjustment would result in federal taxes that were about $2,000 higher than they are under current law for households in the middle fifth of the income distribution in 2019.

- If all types of noninterest spending were cut by an equal percentage, spending overall would need to decrease by about 15 percent in each of the next 30 years. For example, such cuts would lower initial annual Social Security benefits by about $2,800, on average, for people in the middle fifth of the lifetime earnings distribution who were born in the 1950s and who first claimed benefits at age 65.

In all of those examples, the projected effects on debt include both the direct effects of the policy changes and the feedback to the federal budget that would result from faster economic growth. Those economic effects reflect the reduction in debt but do not reflect any assumptions about the specific details of the policy changes. For example, such changes could alter productivity growth and people's incentives to work and save, which would then affect overall economic output and have macroeconomic feedback effects on the federal budget.

The Timing of Policy Changes Needed to Meet Various Goals for Deficit Reduction

The size of the policy changes that would be needed to achieve a particular goal for federal debt would depend, in part, on how quickly that goal was expected to be reached. Regardless of the chosen goal for federal debt, lawmakers would face trade-offs in deciding how quickly to implement policies designed to put federal debt on a sustainable path. The benefits of reducing the deficit sooner would include a smaller accumulated debt, smaller policy changes required to achieve long-term outcomes, and less uncertainty about the policies lawmakers would adopt. However, if lawmakers implemented spending cuts or tax increases too quickly, people might have insufficient time to plan for or adjust to the new system.

Over the next few years, such policy changes would dampen overall demand for goods and services, thus decreasing output and employment relative to CBO's projections under current law. However, that dampening effect would be temporary, CBO expects, because of the response of prices and interest rates to the reductions in demand and to the resulting actions by the Federal Reserve. Those responses to changing demand would be stronger over the next few years than they would be if the economy was weaker.

By contrast, if policymakers waited several years to reduce federal spending or increase taxes, more debt would accumulate over the long term, which would slow long-term growth in output and income. Thus, reaching any chosen target for debt would require larger changes. Nonetheless, if policymakers waited several years to enact deficit-reduction policies, the economy probably would be affected less over the short term than would be the case if immediate changes were made.

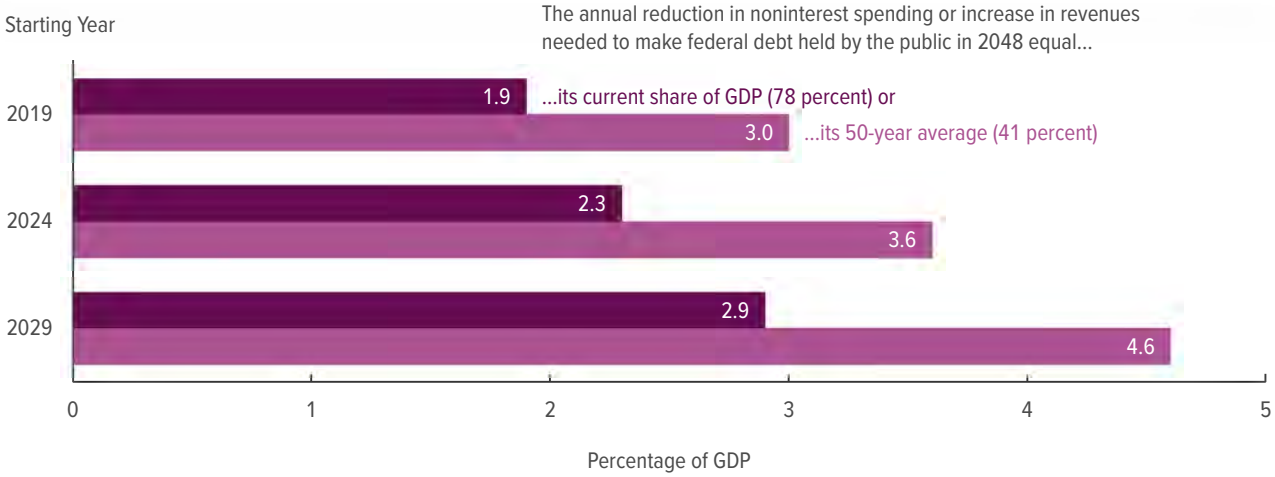
Faster or slower implementation of policies to reduce budget deficits would tend to impose different burdens on different generations. Reducing deficits sooner would probably require older workers and retirees to sacrifice more but would benefit younger workers and future generations. Reducing deficits later would require smaller sacrifices from older people but greater ones from younger workers and future generations.

CBO has analyzed those trade-offs in two ways. First, it estimated the extent to which the size of policy adjustments would change if deficit reduction was delayed. For example, if lawmakers sought to reduce debt as a share of GDP to its historical 50-year average of 41 percent in 2048 and if the necessary policy changes did not take effect until 2024, the annual deficit reduction would need to amount to 3.6 percent of GDP rather than the 3.0 percent that would accomplish the same goal if the changes were made in 2019 (see Figure 13). If lawmakers chose to wait another five years to implement the policies (having them take effect in 2029 instead), even larger changes would be necessary; the required annual deficit reduction in that case would amount to 4.6 percent of GDP.

Second, CBO studied the effects on various generations from waiting to resolve the long-term fiscal imbalance. In 2010, CBO compared economic outcomes under two policies. One would stabilize the debt-to-GDP ratio starting in a particular year; the other would wait

Figure 13.

How Timing Affects the Size of Policy Changes Needed to Make Federal Debt Meet Two Possible Goals in 2048



Source: Congressional Budget Office.

GDP = gross domestic product.

10 years to do so.[42] That analysis suggested that people in generations born after the earlier implementation date would be worse off under the second option. However, people born more than 25 years before the earlier implementation date would be better off if action was delayed—largely because they would partly or entirely avoid the policy changes needed to stabilize the debt. Generations born between those two groups could either gain or lose from delayed action, depending on the details of the policy changes.[43]

Even if lawmakers waited several years to implement policy changes to reduce deficits in the long term, making decisions about them sooner would offer two main advantages. First, people would have more time to prepare. Second, policy changes that reduced the debt would hold down longer-term interest rates and could lessen uncertainty—thus enhancing businesses' and consumers' confidence. Those factors would boost output and employment in the near term.

Changes From Last Year's Long-Term Budget Outlook

Compared with last year's projections of federal debt, those presented in this report are higher through 2041 and slightly lower thereafter. Most of the increases in debt through 2041 stem from larger projected deficits through 2025 that arise from tax and spending legislation enacted since last March: the 2017 tax act, the Bipartisan Budget Act of 2018, and the Consolidated Appropriations Act, 2018. After 2025, deficits are smaller as a share of GDP than CBO projected last year because of lower projected noninterest spending and similar or higher projected revenues. Those lower deficits ultimately result in lower projected debt as a share of GDP. (Appendix A describes the differences in demographic and economic projections between last year's report and this year's, and Appendix B describes key revisions to the budgetary projections since last year that are summarized in this section.)

42. See Congressional Budget Office, *Economic Impacts of Waiting to Resolve the Long-Term Budget Imbalance* (December 2010), www.cbo.gov/publication/21959. That analysis was based on a projection of slower growth in debt than CBO now projects, so the estimated effects of a similar policy today would be close, but not identical, to the effects estimated in that analysis. For a different approach to analyzing the costs of debt reduction for different generations, see Felix Reichling and Shinichi Nishiyama, *The Costs to Different Generations of Policies That Close the Fiscal Gap*, Working Paper 2015-10 (Congressional Budget Office, December 2015), www.cbo.gov/publication/51097.

43. Those conclusions do not incorporate the possible negative effects of a fiscal crisis or effects that might arise from the government's reduced flexibility to respond to unexpected challenges.

As a percentage of GDP, noninterest spending is generally lower than the amount projected last year. That slowdown is driven by lower projected spending as a share of GDP for Social Security, the major health care programs, and other mandatory spending. Those declines are partially offset by increases in discretionary spending. Revenues are lower as a share of GDP through 2026, largely unchanged for most of the next two decades, and slightly higher by 2048. Those changes reflect provisions of the 2017 tax act.

Under the extended baseline, CBO projects that debt would reach 148 percent of GDP in 2047, which is lower than the amount the agency projected last year. Projected deficits as a share of GDP in this year's report are larger from 2018 through 2025 and smaller thereafter than those in last year's report. The budgetary changes needed to make federal debt 30 years from now equal either today's level or the 50-year historical average (as a share of GDP) are similar to the changes CBO projected would be required in last year's report.

The 75-year actuarial deficit currently projected for Social Security is 1.5 percent of GDP (the same amount that CBO estimated last year) or 4.4 percent of taxable payroll (slightly smaller than last year's estimate of 4.5 percent). The projected actuarial deficit declined since last year because CBO boosted its projection of the share of earnings that are subject to Social Security payroll taxes over the next 30 years and because CBO projects slightly smaller benefits relative to GDP and taxable payroll and, over the next two decades, higher interest rates. Offsetting those changes is an adjustment to the 75-year period of analysis, which ends in 2092 in this report and thus includes an additional year of deficits.

APPENDIX

A

CBO's Projections of Demographic and Economic Trends

The Congressional Budget Office's assessment of the long-term outlook for the federal budget is based on projections over the next three decades of trends in a host of demographic and economic variables. Through 2028, the economic and demographic projections presented in this report are the same as those that CBO published in April.[1] For the years beyond 2028, CBO's projections generally reflect historical trends and anticipated demographic changes. (Average values for 2018 to 2048, the period encompassed by CBO's extended baseline, as well as for shorter periods, are shown in Table A-1.[2] The table also provides historical data for comparison. A set of annual projections is included in this report's supplemental data, available online at www.cbo.gov/publication/53919.)

Demographic Variables

Both the size and composition of the U.S. population influence the overall growth of the economy and affect federal tax revenues and spending. Rates of fertility, immigration, and mortality determine the population and thus the size of the labor force and the number of people receiving benefits from federal programs such as Social Security and Medicare. CBO projects the population to be about the same in the future as it projected last year.

Population

In CBO's projections, the total population increases from 332 million at the beginning of 2018 to 392 million in 2048, and its annual growth rate gradually declines from 0.7 percent in 2018 to 0.4 percent in 2048. The population is projected not only to grow more slowly but also to become older, on average, than in the past. In the agency's projections, over the 30-year period, the share of the population that is 65 or older grows, whereas the share that is of working age (defined as those between ages 20 and 64) shrinks. As a result, CBO projects, a growing portion of the population will receive benefits from the Social Security and Medicare programs while a shrinking portion will pay into the trust funds that support them.

Fertility

CBO projects a total fertility rate of 1.9 children per woman for the 2018–2048 period.[3] (That rate, which represents the average number of children that a woman would have in her lifetime, is calculated as the sum of fertility rates for all ages between 15 and 49 in a given year.)[4] The total fertility rate for the 1988–2007 period averaged 2.0 children per woman. Fertility rates often decline during recessions and rebound during recoveries. However, the U.S. fertility rate did not recover after the 2007–2009 recession; the rate (which was 2.1 in 2007) dropped and has remained below 1.9.[5] CBO's projected rate is consistent with the rate recommended to the Social Security Advisory Board by its 2015 Technical Panel on Assumptions and Methods, the board's most recent panel.[6]

1. See Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), www.cbo.gov/publication/53651.

2. The extended baseline generally reflects current law, following CBO's 10-year baseline projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

3. In CBO's long-term model, the likelihood that a particular woman will have a child depends on such factors as that woman's education, marital status, immigration status, and childbearing history.

4. The total fertility rate can also be defined as the average number of children that a woman would have in her lifetime if, in each year of her life, she experienced the birth rates observed or assumed for that year and if she survived her entire childbearing period.

5. Recent data show that total fertility rates have remained below 1.9. See Brady E. Hamilton and others, *Births: Provisional Data for 2017*, Vital Statistics Rapid Release Report 4 (National Center for Health Statistics, May 2018), www.cdc.gov/nchs/nvss/vsrr/reports.htm.

6. See 2015 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2015), p. 9, https://go.usa.gov/cJYR5 (PDF, 3.4 MB).

Table A-1.

Average Annual Values for Demographic and Economic Variables That Underlie CBO's Extended Baseline

	1988–2017	2018–2028	2029–2038	2039–2048	Overall, 2018–2048
			Demographic Variables		
Growth of the Population (Percent)	0.9	0.7	0.5	0.4	0.6
Fertility Rate (Children per woman)	2.0	1.9	1.9	1.9	1.9
Immigration Rate (Per 1,000 people in the U.S. population)	3.7	3.1	3.2	3.2	3.2
Life Expectancy at Birth, End of Period (Years)[a]	79.1	80.5	81.7	82.8	82.8
Life Expectancy at Age 65, End of Period (Years)[a]	19.4	20.2	20.9	21.7	21.7
			Economic Variables (Percent)		
Growth of GDP					
Real GDP	2.5	1.9	1.9	1.9	1.9
Nominal GDP (Fiscal Year)	4.7	4.1	4.0	4.0	4.0
Growth of the Labor Force	1.0	0.5	0.4	0.4	0.4
Labor Force Participation Rate	65.6	62.1	60.3	59.6	60.7
Unemployment					
Unemployment rate	5.9	4.4	4.8	4.7	4.6
Natural rate of unemployment	5.1	4.6	4.5	4.5	4.5
Growth of Average Hours Worked	-0.1	*	-0.1	-0.1	*
Growth of Total Hours Worked	1.0	0.5	0.3	0.4	0.4
Earnings as a Share of Compensation	81	81	81	81	81
Growth of Real Earnings per Worker	0.9	1.5	1.2	1.1	1.2
Share of Earnings Below the Taxable Maximum	85	81	81	80	81
Growth of Productivity					
Total factor productivity	1.2	1.1	1.2	1.2	1.2
Labor productivity[b]	1.5	1.4	1.6	1.6	1.5
Inflation					
Growth of the CPI-U	2.6	2.4	2.4	2.4	2.4
Growth of the GDP price index	2.1	2.1	2.0	2.0	2.0
Interest Rates					
Real rates					
On 10-year Treasury notes and Social Security bonds	2.3	1.4	1.6	2.1	1.7
Nominal rates					
On 10-year Treasury notes and Social Security bonds	4.9	3.8	4.0	4.5	4.1
On all federal debt held by the public[c]	5.0	3.1	3.6	4.1	3.6

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

CPI-U = consumer price index for all urban consumers; GDP = gross domestic product; * = between -0.05 percent and 0.05 percent.

a. Life expectancy as used here is period life expectancy, which is the amount of time that a person in a given year would expect to survive beyond his or her current age on the basis of that year's mortality rates for various ages.

b. The measure of labor productivity reported here is the ratio of real output to hours worked in the economy. Note that elsewhere CBO reports different measures of labor productivity, such as the ratio of potential real output to the potential labor force.

c. The interest rate on all federal debt held by the public equals net interest payments in the current fiscal year divided by debt held by the public at the end of the previous fiscal year.

Immigration

Under current law, CBO projects, net immigration to the United States (a measure that accounts for all people who either enter or leave the United States in any year) would grow by an average of 0.7 percent per year over the next decade. Thereafter, net immigration is projected to grow more slowly, at a rate of 0.6 percent per year. On the basis of those projections, CBO expects net annual immigration to rise from 1.1 million people in 2018 to 1.3 million people in 2048. Expressed another way, the rate of net annual immigration per thousand people in the U.S. population would rise from an average of 3.1 over the next decade to 3.2 in 2048.

CBO's projection of net immigration over the next decade is informed by the agency's economic projections and by recent demographic trends, both of which have particularly important implications for projections of net unauthorized immigration. CBO's projections of unauthorized immigration are the result of two offsetting effects, to which the agency gave equal weight in its analysis. On the one hand, in CBO's estimation, periods of moderate growth in the U.S. economy over the past two decades have been associated with increases in unauthorized immigration; consequently, CBO's projections of economic growth suggest growth in such immigration over the coming decade. On the other hand, although unauthorized immigration is very difficult to measure, historical estimates indicate that the number of unauthorized immigrants in the United States in 2015 was about the same as in 2005. The implication is that factors other than the strength of the economy have been more important recently and may continue to be in the future.[7]

CBO projects that the increase in net immigration over the next decade would be mostly driven by increases in the number of legal permanent residents. The annual increase in the number of legal temporary and unauthorized immigrants is projected to be relatively steady over the next 10 years.

For projections beyond the next decade, CBO employed a simplified approach: After 2028, under current law, the agency projects that net immigration would grow at an average rate of 0.6 percent annually, slightly faster than the overall average rate of population growth.[8]

Mortality

The mortality rate, which is the number of deaths per thousand people, has generally declined in the United States for at least the past half century. For the most part, the mortality rate has dropped more quickly for younger people than for older people during that period. Mortality rates for each five-year age group are projected to decline at the same average pace each group experienced from 1950 through 2014. After projecting average mortality rates for men and women in each age group, CBO incorporates differences in those rates on the basis of marital status, education, disability insurance status, and lifetime household earnings. CBO projects lower mortality rates and thus longer life expectancies for people who are married, have more education, do not receive benefits through the Social Security Disability Insurance (DI) program, or are in higher-income groups.[9] (For people under 30, the mortality projections account for age and sex only.)

CBO's projections result in an average life expectancy at birth of 82.8 years in 2048, compared with 79.2 years in 2018.[10] Similarly, CBO projects life expectancy at age

7. For the most recent estimates, see Jens Manuel Krogstad, Jeffrey S. Passel, and D'Vera Cohn, *As Mexican Share Declined, U.S. Unauthorized Immigrant Population Fell in 2015 Below Recession Level* (Pew Research Center, April 2017), https://tinyurl.com/mn5zbb5. For more details, see Jeffrey S. Passel and D'Vera Cohn, *Overall Number of U.S. Unauthorized Immigrants Holds Steady Since 2009* (Pew Research Center, September 2016), https://tinyurl.com/j45zw05. Official data on unauthorized immigrants do not exist, so historical estimates are very uncertain.

8. That rate is based on the Census Bureau's projections for late in the coming decade. See Census Bureau, "2014 National Population Projections: Summary Tables," Table 1, https://go.usa.gov/xQGwc. The Census Bureau has recently released a new set of projections, but information from those projections has not been incorporated in this analysis. In those projections, the population is slightly smaller than the Census Bureau projected in 2014.

9. For more information about mortality differences among groups with different earnings, see Tiffany Bosley, Michael Morris, and Karen Glenn, *Mortality by Career-Average Earnings Level*, Actuarial Study 124 (Social Security Administration, April 2018), https://tinyurl.com/yct5qdew (PDF, 301KB); Congressional Budget Office, *Growing Disparities in Life Expectancy* (April 2008), www.cbo.gov/publication/41681; and Julian P. Cristia, *The Empirical Relationship Between Lifetime Earnings and Mortality*, Working Paper 2007–11 (Congressional Budget Office, August 2007), www.cbo.gov/publication/19096.

10. Life expectancy as used here is period life expectancy, which is the amount of time that a person in a given year would expect to survive beyond his or her current age on the basis of that year's mortality rates for various ages.

65 to be 21.7 years in 2048, or 2.2 years longer than life expectancy at age 65 in 2018.[11]

Changes in Demographic Projections Since Last Year
CBO's projections of population growth in most years are very similar to those published in last year's report, except for small changes to CBO's projections of net immigration and mortality rates. Net immigration was projected to grow, on average, more quickly in the decade following 2017 in last year's report than it is projected to grow in the decade following 2018 in this year's report. That is because last year's projections included growth in 2017 that was higher than in the rest of the 10-year period. The average growth in net immigration over the decade following 2018 in this year's report does not include that year of higher growth.

The life expectancies CBO now projects are only slightly different from those reported last year. Life expectancy at birth is projected to be 82.7 years in 2047, 0.1 year shorter than CBO projected last year, and life expectancy at age 65 is projected to be 21.6 years, 0.1 year longer than in last year's projection. Those changes reflect recent data that show higher mortality rates than CBO expected last year for people ages 15 to 74 and lower mortality rates than expected last year for people 75 or older. Those data led CBO to increase its projection of mortality rates for people ages 15 to 74 in the near term and to reduce their rates of mortality improvement over the next three decades, which reduced CBO's projection of life expectancy at birth. In contrast, for people 75 or older, CBO decreased its projection of mortality rates and increased the rate of mortality improvement, which increased CBO's projection of life expectancy at age 65 throughout the 30-year period.

Economic Variables

The performance of the U.S. economy in coming decades will affect the federal government's tax revenues, spending, and debt accumulation. In CBO's analysis, the long-term effects depend on key economic variables such as the growth of gross domestic product (GDP), the size and composition of the labor force, the number of hours worked, earnings per worker, capital accumulation, and productivity. Over the short term, the effects also depend on variables that fluctuate over the business cycle, such as inflation and interest rates. The agency also considers ways in which fiscal policy influences economic activity.

Gross Domestic Product
CBO expects total output in the economy to grow moderately over the 2018–2048 period. In the agency's projections, real GDP growth over that period averages 1.9 percent per year, about what was projected last year for the 2017–2047 period. However, the pattern of that growth is different in this year's projections; CBO now projects that real GDP grows faster over the next few years. As a result, the level of real GDP remains higher over the projection period.

Projections of GDP. CBO anticipates that recent changes to the tax code, changes in discretionary spending, and continuing increases in aggregate demand will spur a pickup in the growth of real GDP over the next few years (see Box 1 on page 26 for details on the effects of the recent changes to the tax code).[12] Thereafter, growth in real GDP is projected to make a transition to a pace that reflects the increases in the supply of labor, capital services, and productivity described below. That projected pace also takes into consideration the influences of the marginal tax rates and increases in federal debt that CBO projects in its extended baseline.[13]

Over the long term, total GDP is projected to be one-half of one percent below its potential (maximum sustainable) amount, as it has roughly been, on average, over past decades. Those projected outcomes reflect CBO's assessment that, during and after economic downturns, actual output has fallen short of potential output to a greater extent and for longer periods than actual output has exceeded potential output during economic booms.[14]

11. CBO projects life expectancy in 2090 to be 86.9 years at birth and 24.4 years at age 65. CBO's projections of life expectancies are longer than those of the Social Security trustees (85.8 and 23.5 years, respectively) but shorter than the projections (88.3 and 25.3 years, respectively) recommended by the 2015 Technical Panel on Assumptions and Methods in *Report to the Social Security Advisory Board* (September 2015), pp. 13–20, https://go.usa.gov/cJYR5 (PDF, 3.4 MB).

12. Aggregate demand is total purchases by consumers, businesses, government, and foreigners of a country's output of final goods and services during a given period.

13. The marginal tax rate is the percentage of an additional dollar of income from labor or capital that is paid in taxes.

14. See Congressional Budget Office, *Why CBO Projects That Actual Output Will Be Below Potential Output on Average* (February 2015), www.cbo.gov/publication/49890.

Projected real GDP growth over the next three decades is slower than the average annual rate of 2.5 percent recorded over the past three decades, primarily because the labor force is anticipated to grow more slowly in the coming years. Moreover, with the labor force growing more slowly than the overall population, per capita real GDP is expected to increase at a slower pace than it has in the past—at an average annual rate of 1.4 percent over the 2018–2048 period, compared with 1.6 percent for the past 30 years.

Changes in Projections of GDP Since Last Year. In CBO's current projections, the level of real GDP is about 1.4 percent higher in 2027 than the agency projected last year. That gap shrinks over the next two decades; by 2047 real GDP is 0.7 percent higher than it was last year. The higher level of real GDP in this year's projections stems primarily from three factors: revisions to historical data, changes in federal fiscal policy, and improvements in analytical methods.

The Rate of Labor Force Participation

The size of the labor force is determined by the size of the population and the rate at which people participate in the labor market. CBO has slightly raised its projection of the labor force participation rate since last year.

Projections of the Labor Force Participation Rate. In CBO's projections, the rate of labor force participation—that is, the share of the civilian noninstitutionalized population age 16 or older that is either working or seeking work—declines from 62.8 percent in 2018 to 61.0 percent in 2028 and to 59.5 percent in 2048. The aging of the population is the most important factor driving down the overall participation rate over the next 30 years; the effects of other factors roughly offset one another.

Because older people tend to participate in the labor force at lower rates than younger people, the aging of the population is expected to significantly dampen the rate of participation over the next 30 years. The share of people over the age of 65 is projected to increase from 16 percent in 2018 to 22 percent in 2048, and the share of the population ages 20 to 64 is expected to decline from 59 percent to 55 percent during that 30-year period. Without the effects of an aging population—that is, if the age-and-sex composition of the population remained the same as it is expected to be in 2018—the labor force participation rate would stay roughly constant over the next 30 years, in CBO's judgment.[15]

The effects of several other trends and fiscal policies roughly offset one another. Three trends put downward pressure on the participation rate:

- Men of the generations that followed the baby boomers tend to participate in the labor force at lower rates than male baby boomers did at the same age. (The participation of women from generations following the baby boomers has remained relatively constant.)
- The share of people receiving DI benefits is generally projected to continue to rise, and people who receive such benefits are less likely to work.
- The marriage rate is projected to continue to fall, especially among men, and unmarried men tend to participate in the labor force at lower rates than married men.

CBO expects those forces to be mostly offset by two trends. As the population becomes more educated, labor participation rates are expected to increase because workers with more education tend to participate in the labor force at higher rates than do people with less education. Second, increasing longevity is expected to lead people to continue working to increasingly older ages.[16]

In addition to the effects of those demographic trends, recent changes in tax law, combined with economic and budgetary trends, would also affect the labor force:

- CBO estimates that, under current law, lower tax rates on labor would increase participation in the labor force over most of the next decade because individuals would see a greater return on their labor. However, the lower tax rates are scheduled to expire

15. That calculation includes an adjustment for age and sex, but the sex composition of the population is projected to change only slightly. Therefore, the decline in the labor force participation rate is attributable almost entirely to aging.

16. The agency recently updated its methods for projecting labor force participation to more adequately account for recent trends in educational attainment and aging. See Josh Montes, *CBO's Projection of Labor Force Participation Rates*, Working Paper 2018-04 (Congressional Budget Office, March 2018), www.cbo.gov/publication/53616.

at the end of 2025, reducing the incentive to work, which would in turn reduce participation in the labor force toward the end of the decade.

- In addition, major tax legislation enacted in 2017 adopted an alternative measure of inflation for the tax code that grows slightly more slowly than the inflation measure used previously. Tax brackets, which are set to increase with inflation, will increase more slowly because of this new measure. Consequently, real income growth in the future will cause an increased share of labor income to be pushed into higher tax brackets. Over time, under an assumption that current laws remain unchanged, that bracket creep would reduce incentives to work.

- Rising federal deficits are projected to slow growth in the stock of private capital and limit the growth of after-tax wages, also reducing the supply of labor. However, recent changes to the tax code provide greater incentives to invest, mitigating some of the effects of higher deficits on the stock of private capital.

Changes in Projections of the Labor Force Participation Rate Since Last Year. CBO's current projections of the labor force participation rate through 2025 are higher than its projections last year because of the enactment of individual tax provisions that raise after-tax wages during the next several years. Last year, CBO projected the participation rate would be 61.3 percent by 2025. This year, CBO projects the participation rate to be 61.7 percent in 2025.

Beyond 2025, participation rates over the next three decades are slightly higher than the rates published last year. Last year, the participation rates were projected to be 61.0 percent in 2027 and 59.3 percent in 2047. In the current projections, those rates are 61.2 percent and 59.5 percent, respectively.

When combined with CBO's projections of the population, the projected rates of labor force participation imply that the labor force grows by 0.4 percent per year, on average, over the 2018–2048 period. That rate is slightly less than the 0.5 percent per year projected a year ago.

Other Labor Market Outcomes

Among the factors accounted for in CBO's labor market projections—in addition to the size of the population and the rate of labor force participation—are the unemployment rate, the average and total number of hours that people work, and various measures of workers' earnings. The agency has changed its projections of those variables over the past year because of updates to historical data and reexamination of recent trends.

Unemployment. In CBO's projections, the unemployment rate, which was 4.1 percent at the end of 2017, declines to 3.3 percent in 2019, gradually rises to 4.8 percent by 2024, and then remains at that level, on average, through 2028. In the meantime, the natural rate of unemployment (the rate that results from all sources other than fluctuations in overall demand related to the business cycle) is projected to remain at 4.6 percent from 2018 to 2028. From 2024 onward, the unemployment rate is expected to remain about one-quarter of one percentage point above the natural rate, a difference that is consistent both with the historical average relationship between the two measures and with the projected gap of one-half of one percent between actual and potential GDP.

After 2028, both the actual and the natural rates of unemployment are projected to decline gradually as the labor force ages and becomes increasingly more educated. (Older and more educated workers tend to have lower actual and natural rates of unemployment.) By 2048, the natural rate of unemployment is projected to be slightly less than 4.4 percent, and the actual rate is projected to be about 4.7 percent.

Average Hours Worked. Different subgroups of the labor force work different numbers of hours, on average. Men tend to work more hours than women do, for example, and people between the ages of 30 and 40 tend to work more hours than people between the ages of 50 and 60. In CBO's estimation, those differences among groups will remain stable. However, over the long term, the composition of the labor force is projected to shift toward groups that tend to work less (such as older workers). As a result, the average number of hours worked by the labor force as a whole is expected to decline slightly. By 2048, the average number of hours that people work is expected to be about 1 percent less than it is today.

Total Hours Worked. On the basis of projections of the size of the labor force, average hours worked, and unemployment, total hours worked are estimated to increase at an average annual rate of 0.4 percent between 2018 and 2048.

Earnings as a Share of Compensation. Workers' total compensation consists of taxable earnings and nontaxable benefits such as employers' contributions to health insurance and pensions. Over the years, the share of total compensation paid in the form of earnings has declined—from about 90 percent in 1960 to about 81 percent in 2017—mainly because the cost of health insurance has risen more quickly than total compensation.[17]

CBO expects that trend in health care costs to continue, which would further decrease the proportion of compensation that workers receive as earnings. However, under current law, a new excise tax on certain employment-based health insurance plans that have premiums above specified amounts is scheduled to take effect in 2022. Some employers and workers are expected to respond by shifting to less expensive plans, thereby reducing the share of compensation consisting of health insurance premiums and increasing the share that consists of earnings. In CBO's projections, the effects of the tax on the mix of compensation roughly offset the effects of rising costs for health care until the effects of rising costs outweigh those of the excise tax late in the projection period. As a result, the share of compensation that workers receive as earnings is projected to remain close to 81 percent through most of the 2018–2048 period.

Growth of Real Earnings per Worker. Projections of prices, nonwage compensation (such as employment-based health insurance), average hours worked, and labor productivity (discussed below) imply that real earnings per worker grow by an average of 1.2 percent annually over the 2018–2048 period. That rate is higher than the average annual growth—0.9 percent—of real earnings per worker over the last 30 years.

Distribution of Earnings. Over the past several decades, earnings have grown faster for higher earners than for lower earners. In CBO's projections, the unequal growth in earnings continues for the next three decades. The distribution of earnings affects revenues from income taxes and payroll taxes, among other things. Income taxes are affected by the earnings distribution because of the progressive rate structure of the income tax; people with lower earnings pay a smaller share of their earnings than people with higher earnings.

Social Security payroll taxes are also affected by the earnings distribution. Those taxes are levied only on earnings up to a certain annual amount ($128,400 in 2018). Below that amount, earnings are taxed at a combined rate of 12.4 percent, split between the employer and employee (self-employed workers pay the full amount); no tax is paid on earnings above the cap. The taxable maximum has remained a nearly constant proportion of the average wage since the mid-1980s, but because earnings have grown more for higher earners than for others, the portion of covered earnings on which Social Security payroll taxes are paid has fallen from 90 percent in 1983 to 83 percent in 2016.[18] The portion of earnings subject to Social Security taxes is projected to fall to about 81 percent by 2028 and to fall below 80 percent by 2048.

Changes in Projections of Other Labor Market Outcomes Since Last Year. Projections of most other labor market outcomes are similar to what CBO projected last year. For example, CBO's long-term projection of the natural rate of unemployment is only slightly lower than its projection a year ago because of updates to historical data and trends.

An important change since last year in the labor market outcomes discussed in this section is to the projected distribution of earnings. Data for the past few years show smaller-than-expected increases in the share of wages and salaries received by higher earners. In response, the agency made a downward revision to projected increases in that share over the next decade. As a result, in this year's projections, households with lower individual income tax rates earn a larger share of total income than CBO projected last year, and total income tax revenues are lower than would otherwise be the case.

Additionally, with a smaller share of wages and salaries received by higher earners, a larger share is received by

17. For more details, see Congressional Budget Office, *How CBO Projects Income* (July 2013), www.cbo.gov/publication/44433.

18. Covered earnings are those received by workers in jobs subject to Social Security payroll taxes. Most workers pay payroll taxes on their earnings, although a small number—mostly in state and local government jobs or in the clergy—are exempt.

people whose annual earnings are below the maximum amount subject to Social Security payroll taxes. Thus, the share of earnings below the taxable maximum is expected to decline more slowly than CBO projected last year. In last year's projections, the share of earnings below the taxable maximum declined until 2027 and then remained at roughly that level through the end of the projection period. In this year's projections, the share of earnings below the taxable maximum declines gradually through 2048. By 2027 that share is 1.4 percentage points higher than in last year's projections, and declines to roughly the same level in 2047 as CBO projected last year. Over the 30-year period, that share is about half of a percentage point higher, on average, than CBO estimated last year.

Capital Accumulation and Productivity

In addition to growth in the labor force and the number of hours worked, two other important factors affect the growth in output. One is the accumulation of capital, including physical structures, equipment, land, and inventories used in production, along with intangible capital such as computer software. The accumulated stock contributes a stream of services to production. The second is the growth of total factor productivity (TFP), which is the growth of real output per unit of combined labor and capital services—that is, the growth of output that is not explained by the growth of labor and capital. Combined, the growth rates projected for the labor supply, the capital stock, and TFP result in a projection of the average growth of labor productivity (output per worker).

Capital Services. Over the longer term, in CBO's view, growth in the nation's stock of capital will be driven by private saving, federal borrowing, and international flows of financial capital. Private saving and international capital flows tend to move with the after-tax rate of return on investment, which measures the extent to which investment in the stock of capital results in a flow of income. That rate is affected both by tax rates and by the growth of TFP. Recent reductions in statutory tax rates on corporations permanently increase incentives to invest in capital and consequently raise the level of capital services.

Total Factor Productivity. The annual growth of TFP is projected to increase from about 0.9 percent in 2018 to about 1.2 percent in 2022 and then to remain at that rate through 2048, yielding an average annual growth rate of roughly 1.2 percent from 2018 to 2048. That projected growth rate is about 0.3 percentage points slower than the average annual rate of 1.5 percent observed since 1950 and slightly slower than the average rate recorded since 1990.

The projected path for TFP reflects several considerations that, in CBO's judgment, suggest slower growth in coming decades than the long-term historical average. For example, with the exception of a period of rapid growth in the late 1990s and early 2000s, productivity has tended to grow more slowly in recent decades than it did during the 1950s and 1960s. The long-term trend suggests that projections for the next few decades should place greater weight on more recent, slower growth than on the relatively rapid growth of the more distant past. Thus, although CBO projects an acceleration of TFP growth from its unusually slow recent rate, the agency anticipates it to return to a rate that is slower than its long-term historical average.

A number of developments support slow-growth projections for TFP. One is the anticipated slowing of growth in labor quality, a measure of workers' skills that accounts for educational attainment and work experience that, in CBO's analysis, is implicitly a part of TFP. Following a relatively rapid rise during the 1980s and 1990s, growth in labor quality slowed after 2000. In CBO's judgment, that change results both from a gradual slowdown in the increase in average educational attainment and from the burgeoning retirement of a relatively large and skilled portion of the workforce—the baby-boom generation. In coming decades, however, the slowdown in the growth of labor quality is expected to be partly offset by the aging of those remaining in the labor force, especially as better health and longer life expectancy lead people to stay in the workforce longer than did members of previous generations. (An older workforce generally has a larger proportion of more highly educated workers because they tend to remain in the labor force longer than do workers with less education.) Nevertheless, CBO anticipates slower growth in labor quality than in the past.

Another factor that is projected to slow the growth of TFP relative to its long-term average is the projected reduction in spending for federal investment. Under the assumptions used for CBO's baseline, the government's nondefense discretionary spending is projected to decline over the next decade to a much smaller percentage of GDP than it has averaged in the past. About half of nondefense discretionary spending from the 1980s onward has consisted of federal investment in physical

capital (such as roads and other infrastructure), education and training, and research and development—all of which, in CBO's judgment, contributed to TFP growth. Consequently, lower nondefense discretionary spending as a percentage of GDP would mean less federal investment, causing TFP to grow more slowly.

In contrast, changes to the tax code are projected to raise productivity by discouraging multinational corporations' profit-shifting strategies that historically have reduced official estimates of TFP. Because TFP is a component of GDP, CBO projects an increase in GDP as tax incentives encourage firms to claim as domestic production the services of intellectual property that were previously claimed as production abroad. CBO has slightly increased its projections of TFP to account for this anticipated increase in output, which is not matched by an increase in production inputs.

Labor Productivity. Taken together, the projections of labor supply, capital services, and TFP result in labor productivity that is expected to grow by 1.5 percent annually over the 2018–2048 period.[19]

Changes in Projections of Capital Accumulation and Productivity Since Last Year. CBO projects roughly the same average TFP growth that it projected last year. However, CBO's projection of capital services is above the level it projected last year, largely because of stronger investment incentives in the tax code that cause businesses to raise investment.

Inflation

CBO projects rates of inflation for two categories: prices of consumer goods and services and prices of final goods and services in the economy.[20] Those rates influence nominal (current year) levels of income and interest rates and thereby influence tax revenues, various types of federal expenditures that are indexed for inflation, and interest payments on federal debt.

Prices of Consumer Goods and Services. One measure of consumer price inflation is the annual rate of change in the consumer price index for all urban consumers (CPI-U). Over the 2018–2048 period, inflation in that measure averages 2.4 percent in CBO's projections. That long-term rate is slightly less than the average rate of inflation since 1990 of 2.5 percent per year. CBO projects that, under a chained measure of inflation, prices grow at a rate 0.25 percent less than the annual increase in the consumer price index.[21]

Prices of Final Goods and Services. After 2018, the annual inflation rate for all final goods and services produced in the economy, as measured by the rate of increase in the GDP price index, is projected to average 0.4 percentage points less than the annual increase in the consumer price indexes. The GDP price index grows more slowly than the consumer price indexes because it is based on the prices of a different set of goods and services and a different method of calculation.

Changes in Projections of Inflation Since Last Year. Inflation in both measures of consumer prices is projected to be roughly the same as the rates CBO projected last year for the 2017–2047 period.

Interest Rates

CBO projects the interest rates, both real and nominal, that apply to federal borrowing, including the rate on 10-year Treasury notes and special-issue Social Security bonds. It also projects the average nominal interest rates on federal debt held by the public and on the bonds held in the Social Security trust funds. Those rates influence the cost of the government's debt burden and the evolution of the trust funds.

After considering a number of factors, including slower growth of the labor force, CBO expects real interest rates on federal borrowing to be lower in the future than they have been, on average, over the past few decades. The

19. The measure of labor productivity reported here is the ratio of real output to hours worked in the economy. Note that elsewhere CBO reports different measures of labor productivity, such as the ratio of potential real output to the potential labor force.

20. Final goods and services are those purchased directly by consumers, businesses (for investment), and governments, as well as net exports.

21. The chained CPI-U tends to grow more slowly than the standard CPI-U because it uses a formula that better accounts for households' tendency to substitute similar goods and services for each other when relative prices change and because, unlike the CPI-U, it is little affected by statistical bias related to the sample sizes that the Bureau of Labor Statistics uses in computing each index. Historically, inflation as measured by the chained CPI-U has been 0.25 percentage points lower, on average, than inflation as measured by the CPI-U. CBO's projections reflect that average difference between the two measures.

real interest rate on 10-year Treasury notes (calculated by subtracting the rate of increase in the consumer price index from the nominal yield on those notes) averaged roughly 2.9 percent between 1990 and 2007.[22] That rate has averaged 1.0 percent since 2009 and is projected to be 1.4 percent in 2028. In CBO's projections, the rate continues to rise thereafter, reaching 2.4 percent in 2048, 0.5 percentage points below its average over the 1990–2007 period. CBO's projections of interest rates this year are higher than last year's.

Factors Affecting Interest Rates. Interest rates are determined by a number of factors. CBO projects the rates by comparing how the values of those factors are expected to differ in the long term relative to their average values in the past. However, conclusions from such analyses depend greatly on the period being considered, as some recent decades show: Real interest rates were low in the 1970s because of an unexpected surge in inflation. In the 1980s, when inflation declined at an unexpectedly rapid pace, real rates were high.[23] Interest rates fell sharply during the financial crisis and recession that began in 2007.

To avoid using any of those possibly less representative periods, CBO considered average interest rates and their determinants over the 1990–2007 period and then judged how different those determinants might be over the long term.[24] That period was chosen for comparison because it featured fairly stable expectations of inflation and no severe economic downturns or significant financial crises.

Some factors reduce interest rates; others increase them. In CBO's estimates for the 2018–2048 period, several factors tend to reduce interest rates on government securities relative to their 1990–2007 average:

- The labor force is projected to grow much more slowly than it did from 1990 to 2007. That slower growth in the number of workers would tend to increase the amount of capital per worker in the long term, reducing the return on capital and, therefore, also reducing the return on government bonds and other investments.[25]

- The share of total income received by higher-income households is expected to be larger in the future than during the 1990–2007 period. Higher-income households tend to save a greater proportion of their income, so the difference in the distribution of income is projected to increase the total amount of saving available for investment, other things being equal. As a consequence, the amount of capital per worker is projected to rise and interest rates are expected to be lower.

- TFP is projected to grow more slowly in the future than it did from 1990 to 2007. For a given rate of investment, lower productivity growth reduces the return on capital and results in lower interest rates, all else being equal.

- CBO expects investors' preferences for Treasury securities relative to riskier assets to remain elevated compared with inclinations over the 1990–2007 period. Investors began to have less appetite for risk

22. Between 1970 and 2007, the real interest rate on 10-year Treasury notes averaged 2.8 percent; the average from 1954 to 2007 was 2.6 percent. Historical inflation rates are taken from the consumer price index, adjusted to account for changes over time in the way that the index measures inflation. See Bureau of Labor Statistics, "CPI Research Series Using Current Methods (CPI-U-RS)" (March 28, 2018), www.bls.gov/cpi/cpiurs.htm.

23. CBO calculates real interest rates by subtracting expected rates of inflation from nominal interest rates. In general, borrowers and lenders agree to nominal interest rates after accounting for their expectations of what inflation will be. However, if inflation ends up being higher than was expected when the rates were agreed to, real interest rates will turn out to be lower than anticipated. If inflation ends up lower than expected, the opposite will occur. CBO uses the actual consumer price index, adjusted to account for changes over time in the way that the index measures inflation, as a proxy for both what expectations of inflation have been in the past and what they will be in the future. One drawback is that if inflation fluctuates rapidly over time, changes in expectations may lag behind changes in actual inflation. Although CBO's approach could mismeasure expectations of inflation and real interest rates in some years, the way inflation has varied over time suggests that CBO's approach is a useful proxy over long periods, on average.

24. A Bank of England study identified a similar set of determinants that account for the decline in real interest rates over the past 30 years. See Rachel Lukasz and Thomas D. Smith, *Secular Drivers of the Global Real Interest Rate*, Staff Working Paper 571 (Bank of England, December 2015), https://tinyurl.com/z6zqnb7 (PDF, 1.8 MB).

25. For more information about the relationship between the growth of the labor force and interest rates, see Congressional Budget Office, *How Slower Growth in the Labor Force Could Affect the Return on Capital* (October 2009), www.cbo.gov/publication/41325.

in the early 2000s, and the demand for low-risk assets was strengthened by the economic fallout from the financial crisis, the slow subsequent recovery, and financial institutions' response to increased regulatory oversight. Moreover, in the past several years, the perception that investments in emerging market economies were riskier than investments in the United States probably contributed to the increased demand for U.S. assets (particularly federal debt) that are considered to be relatively risk-free. The rise in demand for Treasury securities from those sources contributed to lower returns (that is, to lower interest rates). CBO expects preferences for Treasury securities relative to riskier assets to gradually decline over the next three decades but to remain above their average levels from 1990 to 2007.

At the same time, in CBO's estimates, several factors tend to boost interest rates on government securities relative to their average over the 1990–2007 period:

- Under CBO's extended baseline, federal debt is projected to be much larger as a percentage of GDP than it was before 2007—reaching 96 percent by 2028 and 152 percent by 2048. The latter figure is more than three and a half times the average over the 1990–2007 period. Greater federal borrowing tends to crowd out private investment in the long term, reducing the amount of capital per worker and increasing both interest rates and the return on capital over time.

- CBO anticipates that emerging market economies will attract a greater share of foreign investment in coming decades than they did in the 1990–2007 period. As economic and financial conditions in those economies continue to improve, they will become increasingly attractive destinations for foreign investment. CBO projects that development to put upward pressure on interest rates in the United States.

- The capital share of income—the percentage of total income that is paid to owners of capital—has been on an upward trend for the past few decades. The share is projected to decline over the next decade from its current, elevated level but remain higher than its average over recent decades. The factors that appear to have contributed to the rise in income for owners of capital (such as technological change and globalization) are likely to persist, keeping it above the historical average. In CBO's estimation, a larger share of income accruing to owners of capital would directly boost the return on capital and, thus, interest rates.

- The retirement of members of the baby-boom generation and slower growth of the labor force will reduce the number of workers in their prime saving years relative to the number of older people who are drawing down their savings, CBO projects. As a result, in CBO's estimates, the total amount of saving available for investment decreases (all else being equal), which tends to reduce the amount of capital per worker and thereby push up interest rates. (CBO estimates that this effect only partially offsets the positive effect of increased income inequality on saving, leaving a net increase in savings available for investment.)

Some factors mentioned above are easier than others to quantify. For instance, the effect of labor force growth and rising federal debt can be estimated from available data, theoretical models, and estimates in the literature. The extent to which other factors will affect interest rates is more difficult to estimate. A shift in preferences for low- rather than high-risk assets is not directly observable, for example. And although the distribution of income is observable, neither models nor empirical estimates offer much guidance for quantifying its effect on interest rates.

In light of those sources of uncertainty, CBO relies not only on economic models and findings from the research literature but also on information from financial markets to guide its assessments of the effects of various factors on interest rates over the long term. The current rate on 30-year Treasury bonds, for example, reflects market participants' judgments about the path that interest rates on short-term securities will take 30 years into the future. That market forecast informs CBO's assessment of market expectations for the risk premium—the premium paid to investors for the extra risk associated with holding longer-term bonds—and for investment opportunities in the United States and abroad, and it points to considerably lower interest rates well into the future than those of recent decades.

Projections of Interest Rates. CBO anticipates considerable movement in long-term interest rates over the first 11 years of the projection. For the next few years, CBO

projects interest rates to rise as GDP expands beyond its potential and the Federal Reserve tightens monetary policy. Beginning in late 2021, CBO expects long-term interest rates to decline as GDP growth slows and the economy moves back towards its historical relationship with potential output. Beginning in 2024, long-term interest rates in CBO's projections gradually rise in response to increases in the ratio of debt to GDP.

The nominal interest rate on 10-year Treasury notes is projected to average 4.1 percent over the 2018–2048 period and to reach 4.8 percent in 2048. The real interest rate on 10-year Treasury notes is projected to average about 1.7 percent and, at the end of the period, to be 2.4 percent.

The average interest rate on all federal debt held by the public tends to be lower than the rates on 10-year Treasury notes because interest rates are generally lower on shorter-term debt than on longer-term debt and because Treasury securities are expected to mature, on average, over periods of less than 10 years.[26] CBO projects a 0.4 percentage-point difference between the rate on 10-year Treasury notes and the effective rate on federal debt over the 2029–2048 period. That difference is projected to average 0.6 percentage points over the next decade. The difference is larger over the coming decade than for later years because a significant portion of federal debt that will be outstanding during the next 10 years was issued at the very low interest rates prevailing in the aftermath of the 2007–2009 recession. (The average interest rate on all federal debt changes more slowly than the 10-year rate because only a portion of federal debt matures each year.) Thus, in CBO's projections, the average nominal interest rate on all federal debt held by the public is about 3.6 percent for the 2018–2048 period and reaches 4.4 percent in 2048.

The Social Security trust funds hold special-issue bonds that generally earn interest at rates that are higher than the average rate on federal debt. In CBO's projections, the nominal interest rate on bonds newly issued to the trust funds averages 4.1 percent over the 2018–2048 period and reaches 4.8 percent in 2048. The corresponding real rates are 1.7 percent, on average, over the full period and 2.4 percent in 2048.

Because interest rates have been low for much of the past decade, CBO projects the average interest rate earned by all bonds held (both new and previously issued) by the Social Security trust funds to be slightly lower than the interest rate on newly issued bonds over the next decade. The average interest rate on all bonds, which CBO uses to calculate the present value of future streams of revenues and outlays for those funds, is projected to average 3.8 percent for the 2018–2048 period.[27]

Changes in Projections of Interest Rates Since Last Year. CBO's projections of interest rates this year are higher than last year's. The real rates on 10-year Treasury notes and the Social Security bonds are projected to average 1.7 percent over the 2018–2048 period and to be 2.3 percent in 2047. Last year, CBO projected both rates would average 1.5 percent over the 2017–2047 period and would be 2.3 percent in 2047.

The path of interest rates is higher in this year's projections than in last year's. Long-term interest rates are poised to end the first half of 2018 roughly half a percentage point higher than CBO projected last year. The higher rate probably reflects the expectation of tighter monetary policy (in response to a stronger labor market and greater inflationary pressure) as well as reduced demand for long-term Treasury bonds. Both trends are expected to continue over the next several years. In addition, CBO projects greater federal borrowing to push up interest rates. The upward revision to 10-year Treasury rates is anticipated to peak at 1 percentage point in 2020. The upward revision is predicted to be smaller in later years, as economic growth returns to its historical relationship with potential output growth and downward revisions to projected deficits gradually reduce the upward revision to the stock of debt. From 2023 to 2047, the 10-year Treasury rate is roughly unchanged in this year's report compared to last year's projection.

26. In particular, from 2018 to 2028, the difference between the rate on 3-month Treasury bills and the rate on 10-year Treasury notes shrinks from 1.2 percentage points to its longer-run level of 1 percentage point.

27. A present value is a single number that expresses a flow of past and future income or payments in terms of an equivalent lump sum received or paid at a specific time. The value depends on the rate of interest, known as the discount rate, that is used to translate past and future cash flows into current dollars at that time.

APPENDIX

B

Changes in Long-Term Budget Projections Since March 2017

The 30-year projections of federal spending and revenues presented in this report differ from the projections that the Congressional Budget Office published in 2017 because of certain changes in law, revisions to some of the agency's assumptions and methods, the availability of more recent data, and changes to the agency's projections of demographic and economic variables.[1] For the same reasons, CBO's 10-year projections have also changed since 2017, and they serve as the foundation for the 30-year projections. The 10-year projections are typically published in *The Budget and Economic Outlook*; however, since the publication of that report in April, the agency has adjusted them.[2] As a result, the long-term projections in this report are based on those adjusted projections (see Table B-1).

This appendix compares CBO's current long-term budget projections with those published last year. Because most of the projections in the 2017 report ended in 2047, the appendix compares projections only through that year.

Measured as a percentage of gross domestic product (GDP), federal debt held by the public is now projected to be higher through 2041, and lower thereafter, than CBO projected last year. Under the extended baseline, debt is projected to grow from about 78 percent of GDP this year to 148 percent in 2047; last year, CBO projected that it would rise from 77 percent of GDP in 2018 to 150 percent in 2047 (see Figure B-1).[3] The revised projections of debt resulted from changes in both spending and revenue projections, all of them presented here as a percentage of GDP:

- Projected noninterest spending is lower than CBO anticipated last year, though the difference shrinks toward the end of the 30-year projection period. The main cause is downward revisions to outlays for Social Security and the major health care programs in CBO's projections, though those reductions in mandatory spending are partially offset by increases in discretionary spending.[4]

- Net spending for interest is projected to be higher through the late 2030s than it was in last year's projections and lower thereafter. The initial difference results from higher projected interest rates and greater projected levels of debt held by the public than CBO projected last year. That relationship reverses later in the projection period as deficits become smaller than projected a year ago, a change that leads to lower interest costs and slower accumulation of debt.

- Projected revenues are lower through 2026 than they were in last year's projections, similar for most of the following two decades, and then slightly higher by the end of the 30-year projection period. Those changes reflect provisions of Public Law 115-97, which is referred to here as the 2017 tax act.

1. See Congressional Budget Office, *The 2017 Long-Term Budget Outlook* (March 2017), www.cbo.gov/publication/52480. The changes in demographic and economic projections are described in Appendix A of this report.

2. In total, the adjustments reduced the projected deficit for 2018 by $12 billion and reduced projected deficits over the 2019–2028 period by a cumulative $17 billion. For the April report, see Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028 (*April 2018), www.cbo.gov/publication/53651. For the adjusted projections, see Congressional Budget Office, *An Analysis of the President's 2019 Budget* (May 2018), www.cbo.gov/publication/53884.

3. The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

4. Mandatory spending is generally governed by provisions of permanent law, whereas discretionary spending is controlled by annual appropriation acts.

Table B-1.

Comparison of CBO's Adjusted April 2018 Baseline and January 2017 Baseline

Billions of Dollars

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
						Adjusted April 2018 Baseline					
Revenues	3,339	3,490	3,680	3,829	4,016	4,232	4,448	4,667	5,003	5,301	5,520
Outlays	4,131	4,463	4,683	4,947	5,290	5,505	5,693	6,020	6,324	6,616	7,047
Deficit	-793	-973	-1,003	-1,118	-1,275	-1,273	-1,245	-1,352	-1,321	-1,314	-1,527
Debt Held by the Public at the End of the Year[a]	15,676	16,743	17,804	18,970	20,290	21,609	22,904	24,310	25,687	27,058	28,642
						January 2017 Baseline					
Revenues	3,604	3,733	3,878	4,019	4,176	4,346	4,527	4,724	4,931	5,140	n.a.
Outlays	4,091	4,334	4,562	4,816	5,135	5,346	5,554	5,890	6,228	6,548	n.a.
Deficit	-487	-601	-684	-797	-959	-1,000	-1,027	-1,165	-1,297	-1,408	n.a.
Debt Held by the Public at the End of the Year[a]	15,416	16,092	16,845	17,704	18,721	19,776	20,858	22,078	23,430	24,893	n.a.
						Difference Between Adjusted April 2018 Baseline and January 2017 Baseline					
Revenues	-265	-243	-199	-190	-160	-114	-79	-57	72	161	n.a.
Outlays	40	129	121	132	155	158	139	130	96	68	n.a.
Deficit[b]	-305	-372	-320	-322	-315	-272	-217	-187	-24	93	n.a.
Debt Held by the Public at the End of the Year[a]	260	650	959	1,266	1,569	1,832	2,046	2,232	2,257	2,165	n.a.

Sources: Congressional Budget Office; staff of the Joint Committee on Taxation.

n.a. = not applicable.

a. The net amount that the Treasury borrows is determined primarily by the annual budget deficit. In addition, several factors—collectively labeled "other means of financing" and not directly included in budget totals—also affect the government's need to borrow from the public.

b. Negative numbers indicate that CBO's projection of the deficit has grown.

Over most of the coming decade, the decrease relative to last year's projections, measured as a share of GDP, is larger for revenues than for noninterest spending (see Figure B-2). The result is that projected deficits through 2025 are now markedly larger than previously projected. Beginning in 2026, however, they are smaller than previously projected.

Changes in Projected Spending

In CBO's extended baseline, noninterest spending as a percentage of GDP is slightly lower than anticipated last year, mainly because the agency's projections of outlays for Social Security and the major health care programs have fallen. CBO's projections of discretionary spending, by contrast, are higher than they were a year ago. Projections of net interest costs are higher than previously projected through the late 2030s and then lower.

Noninterest Spending

As a share of GDP, noninterest spending—that is, spending for Social Security, spending for the major federal health care programs, and other noninterest spending—is projected to be about the same in 2018 as projected last year and lower thereafter. Specifically, it is projected to equal 19.0 percent of GDP in 2018 and to reach 23.0 percent of GDP by 2047 (0.2 percentage points lower than in last year's projection).

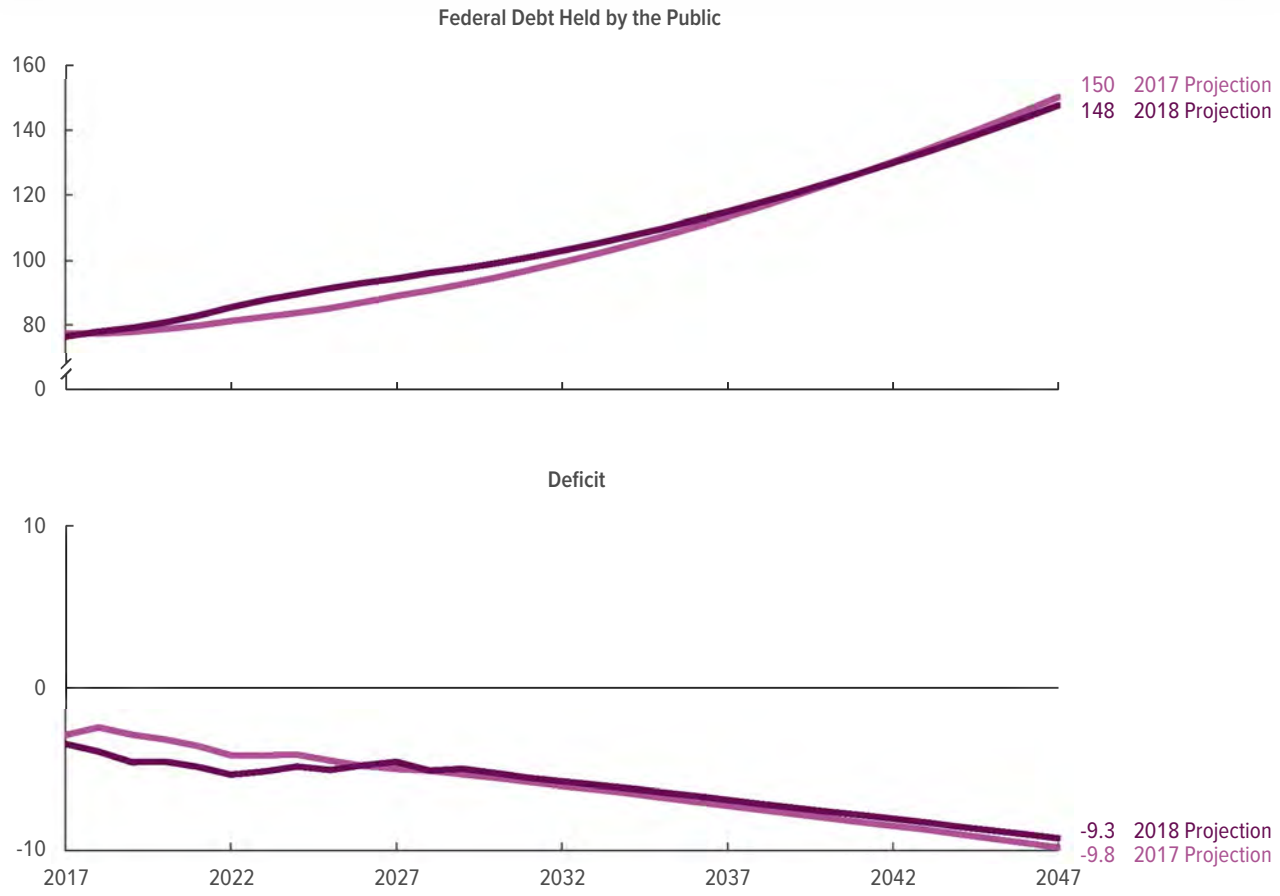
Social Security Spending. CBO projects that outlays for Social Security as a percentage of GDP will be slightly lower than the agency anticipated last year. That change reflects slightly lower projections of nominal outlays over the next 10 years and higher projections of GDP.

The revisions to nominal outlays over the next 10 years include a downward adjustment of projected spending

Figure B-1.

Comparison of CBO's 2017 and 2018 Projections of Federal Debt Held by the Public and the Deficit in the Extended Baseline

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

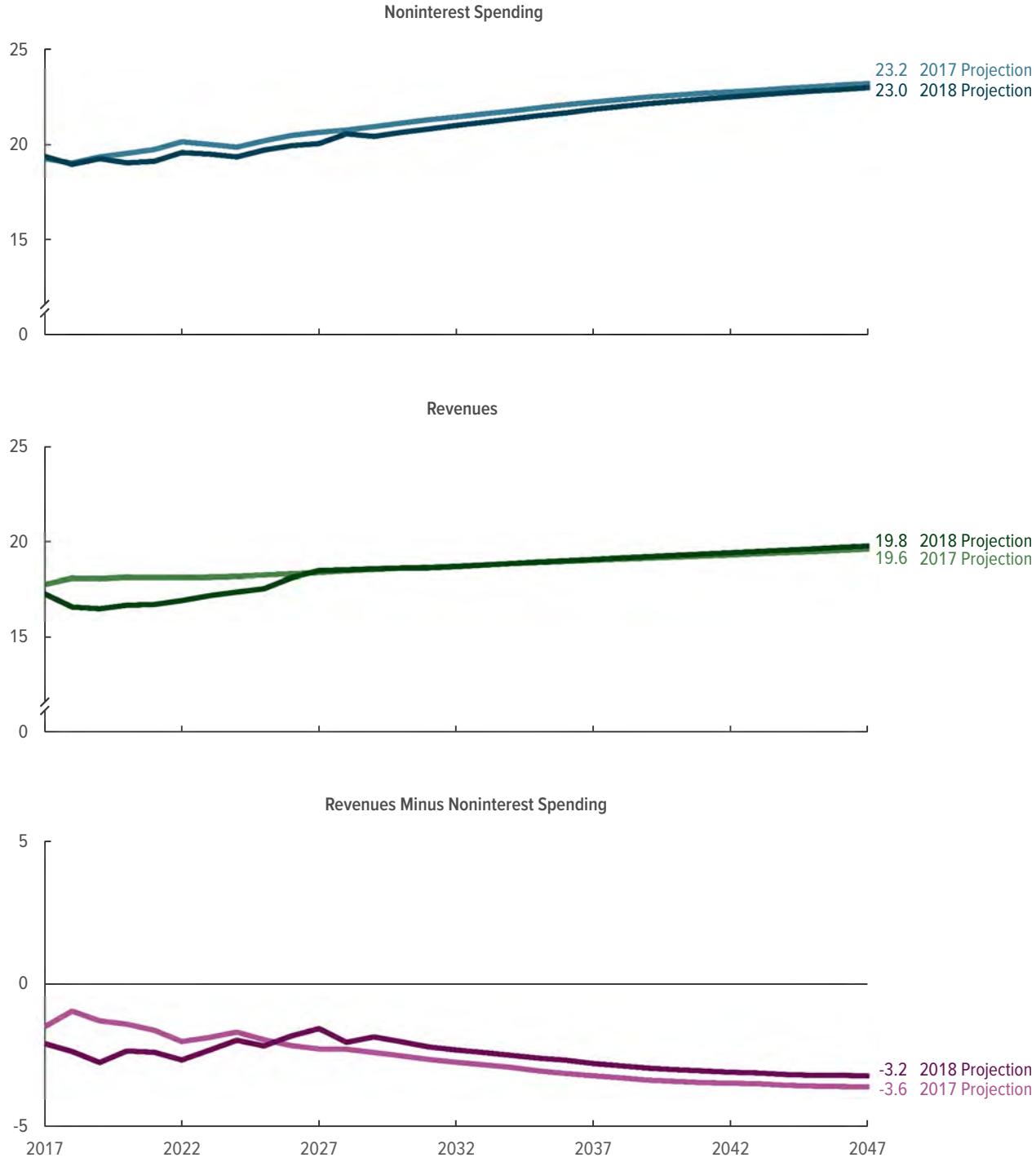
on Disability Insurance (DI), which is a component of the Social Security program, and lower projections of average wage rates through 2020. The DI projections are lower mainly because caseloads have been lower than anticipated over the past year, which led CBO to reduce its projection of the number of DI beneficiaries initially as well as projections of growth in the number of beneficiaries over the next several years. The projections of average wage rates are lower because of downward revisions to historical data. (Lower projections of average wage rates reduce projected spending on Social Security benefits because the earnings on which initial benefits are based are indexed to growth in average wages. When that growth is lower, the resulting benefits are also lower.)

Major Federal Health Care Spending. CBO's current long-term projection of federal spending for the major health care programs, measured as a percentage of GDP, is lower than last year's projection. Spending for Medicare net of offsetting receipts (that is, premiums paid by beneficiaries) is now projected to equal 2.9 percent of GDP in 2018 (0.1 percent of GDP lower than projected last year) and then to rise steadily to 5.8 percent of GDP in 2047 (0.3 percent of GDP

Figure B-2.

Comparison of CBO's 2017 and 2018 Projections of Spending and Revenues in the Extended Baseline

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

lower than projected last year). That reduction occurred mostly because CBO has increased its projections of GDP. Outlays for Medicaid and the Children's Health Insurance Program (CHIP), combined with spending to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending, are projected to be lower than previously anticipated through the late 2030s and higher thereafter, totaling 3.3 percent of GDP in 2047, slightly larger than the sum projected last year. That larger ultimate amount results from faster growth of Medicaid spending in the second and third decades than projected a year ago.

To project long-term spending for the major health care programs, CBO used the same method that it used last year. Namely, it combined estimates of the number of people who are projected to receive benefits from those programs with fairly mechanical estimates of the growth of spending per beneficiary (adjusted to account for demographic changes to the beneficiaries in each program). CBO has estimated such growth by combining projected growth in potential GDP per person with projected excess cost growth for each program.[5] (From 2018 to 2027, potential GDP per person is projected to grow at an average rate of about 3.4 percent per year, up from the 3.1 percent estimated last year; from 2018 to 2047, the average growth rate is projected to be about 3.4 percent per year, roughly the same as last year's estimate.)

For each category of spending except CHIP, through 2028, CBO used the rate of excess cost growth implicit in the agency's 10-year baseline projections.[6] For 2029, the rate equals the average rate from 2024 to 2028 (the last 5 years of the 10-year baseline projections). The rates of excess cost growth for Medicare, Medicaid, and private health insurance therefore all differ in 2029. After 2029, the rate for each category moves linearly, by the same fraction of a percentage point each year, from that category-specific rate to a rate of 1.0 percent in 2048.[7]

5. Potential GDP is the maximum sustainable output of the economy. Excess cost growth is the extent to which health care costs per person, after being adjusted for demographic changes, grow faster than potential GDP per person.

6. Spending for CHIP is projected differently. Outlays for CHIP are projected to be a constant percentage of GDP after 2028.

7. For more information, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 3, www.cbo.gov/publication/51580.

For Medicare, the average annual rate of excess cost growth implicit in CBO's baseline projections is about 1.0 percent from 2019 through 2028, slightly lower than last year's average of 1.1 percent from 2018 through 2027. The rate of excess cost growth for 2029 is 1.2 percent, the same as last year's estimate. Excess cost growth is projected to average 1.1 percent over the full projection period, the same as last year's estimate but lower than the historical average of 1.3 percent from 1985 to 2016.

For Medicaid, the average annual rate of excess cost growth implicit in CBO's baseline projections for the federal share of such spending is 1.5 percent from 2019 through 2028, up by 0.3 percentage points from last year's estimate for 2018 through 2027. The rate for 2029 is 1.6 percent, up by 0.9 percentage points from last year's estimate. That change was the cumulative result of many updates that CBO made to its baseline projections for legislative, economic, and technical reasons—with the largest contribution resulting from an update to CBO's methods that made the agency's estimates of growth in costs per beneficiary more consistent throughout the 10-year projection period. The rate of excess cost growth is projected to average 1.4 percent over the full projection period, which is 0.4 percentage points higher than last year's estimate and 0.4 percentage points higher than the 1985–2016 average.

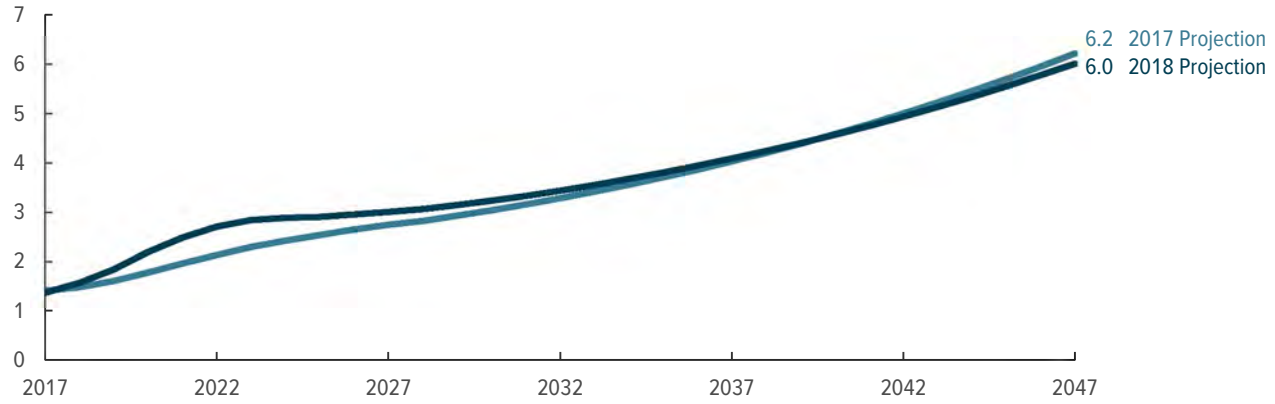
For private health insurance premiums, which CBO uses as an input to its calculation of marketplace subsidies, the average annual rate of excess cost growth implicit in CBO's baseline projections is about 2 percent from 2019 through 2028 (the same as last year's estimate). The rate for 2029 is also about 2 percent, which again is similar to last year's estimate. The rate is projected to decline from 2029 to 2048 and to be lower in 2048 than its historical average.

Other Noninterest Spending. Over the next 10 years, other noninterest spending—total federal spending on everything other than Social Security, the major federal health care programs, and net interest—is projected to be slightly higher as a percentage of GDP than projected last year and roughly the same thereafter. For most of the next 10 years, the part of that spending that is mandatory is slightly lower than previously projected as a share of GDP because CBO has revised its projections of GDP upward. But that decline is more than offset

Figure B-3.

Comparison of CBO's 2017 and 2018 Projections of Net Spending for Interest in the Extended Baseline

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

by an increase in projected discretionary spending. That increase stems primarily from legislative changes that increased funding for defense and nondefense spending limited by caps on annual appropriations and that increased funding for emergency requirements.

Beyond 2028, other noninterest spending as a share of GDP is projected to be about the same as projected last year, reflecting lower projections of other mandatory spending offset by higher projections of discretionary spending. The projections of other mandatory spending as a percentage of GDP are lower because such spending is projected to be slightly smaller after 10 years, and CBO projects that it will decline in relation to GDP at the same rate by which it is projected to fall between 2023 and 2028, although at a slightly slower rate than last year. The projections of discretionary spending are higher than they were last year because such spending, at the end of the 10-year period, is now higher than it was in last year's projections. (CBO assumes that discretionary spending will remain roughly constant as a share of GDP after 2028.)

Interest Costs

In CBO's projections, net interest costs are higher through the late 2030s and lower thereafter than they were a year ago (see Figure B-3). Those costs are higher initially because the agency's projections of interest rates and federal debt held by the public are likewise higher. After the late 2030s, smaller deficits and eventually smaller debt result in lower net interest costs. For the coming decade, net interest costs are projected to average 2.5 percent of GDP; last year, the projected average was 2.2 percent. They are projected to equal 3.1 percent of GDP by 2028 (up 0.2 percentage points from last year's projections) and 6.0 percent of GDP by 2047 (down 0.2 percentage points from last year's projections).

Changes in Projected Revenues

In CBO's current projections, revenues measured as a percentage of GDP are lower through 2026 than they were in last year's projections, similar for most of the following two decades, and then slightly higher by the end of the 30-year projection period. They equal 16.6 percent of GDP this year (which is 1.5 percentage points lower than last year's estimate) and then rise to 18.1 percent of GDP in 2026 (which is 0.2 percentage points lower than last year's estimate). Those downward revisions are the result of recently enacted legislative changes and increased projections of GDP. In particular, provisions of the 2017 tax act temporarily reduced individual income tax rates, nearly doubled the standard deduction, modified or eliminated certain deductions or exemptions, and temporarily allowed firms to deduct the cost of capital investments immediately.

Measured as a share of GDP, revenues in 2027 are projected to be largely the same as in last year's projections,

following the scheduled expiration of most of the individual income tax provisions of the 2017 tax act.[8] From 2027 to 2038, projected revenues average 18.8 percent of GDP (which is equal to last year's estimate). But by 2047, revenues are projected to be 0.2 percentage points higher than projected a year ago. That is because individual income taxes are now projected to grow more quickly through most of the projection period as a result of a change in the price index that is used to adjust tax brackets.[9] As a consequence, income will be pushed into higher tax brackets more quickly than projected a year ago.

Those effects are partially offset by a change in CBO's projection of the distribution of earnings. Specifically, the agency has lowered its projection of the share of earnings that will accrue to the highest earners over the next 30 years (though it still projects that earnings will grow more quickly for higher-income people than for others). The change causes a smaller share of income to be taxed at higher rates under the individual income tax, reducing receipts from that tax source. That decrease is largely offset by an increase in projected payroll taxes, as a smaller increase in the share of income accruing to the highest earners results in more earnings falling below the maximum amount subject to Social Security payroll taxes.

Changes in Social Security's Projected Finances

A common measure of the sustainability of a program that has a trust fund and a dedicated revenue source is its estimated actuarial balance over a given period—that is, the sum of the present value of projected tax revenues and the current trust fund balance minus the sum of the present value of projected outlays and a year's worth of benefits at the end of the period.[10] When that balance is negative, it is a deficit.

The 75-year actuarial deficit currently projected for Social Security is 1.5 percent of GDP (which is the same as estimated last year) or 4.4 percent of taxable payroll (which is smaller than last year's estimate of 4.5 percent). That reduction resulted from a number of factors. CBO has lowered its projection of nominal outlays for Social Security over the next 10 years and increased its projection of the share of earnings that are subject to Social Security payroll taxes over the next 30 years.[11] In addition, the agency projects slightly higher interest rates over the 75-year period. Partially offsetting those effects is an increase in the actuarial deficit that results each year from incorporating another year of relatively large deficits into the analysis.[12]

Another commonly used measure of Social Security's sustainability is its trust funds' date of exhaustion. CBO projects that if current law did not change, the Disability Insurance Trust Fund would be exhausted in fiscal year 2025, the Old-Age and Survivors Insurance (OASI) Trust Fund would be exhausted in calendar year 2032, and the combined trust funds would be exhausted in calendar year 2031. Last year, those exhaustion dates were two years earlier for the DI trust fund, one year earlier for the OASI trust fund, and one year earlier for the combined funds. The changes in those dates are the result of the lower projections of nominal outlays from the trust funds, the higher projections of interest rates on balances in the trust funds, and higher projections of revenues into the trust funds. The revenues are projected to be higher because of increased projections of earnings relative to last year and because the projected share of earnings that is subject to Social Security payroll taxes has grown.

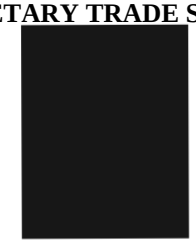
8. For more information about the effects of the 2017 tax act, see *The Budget and Economic Outlook: 2018 to 2028* (April 2018), Appendix B, www.cbo.gov/publication/53651, and Box 1 on page 26 of this report.

9. Beginning in 2018, the measure used for adjusting most parameters of the tax system will be changed from the standard consumer price index for urban consumers (CPI-U) to the chained CPI-U. The chained CPI-U tends to grow more slowly than the standard CPI-U because it uses a formula that better accounts for households' tendency to substitute similar goods and services for each other when relative prices change and because, unlike the CPI-U, it is little affected by statistical bias related to the sample sizes that the Bureau of Labor Statistics uses in computing each index. Historically, inflation as measured by the chained CPI-U has been 0.25 percentage points lower, on average, than inflation as measured by the standard CPI-U. CBO's projections reflect that average difference between the two measures.

10. A present value is a single number that expresses a flow of past and future income or payments in terms of an equivalent lump sum received or paid at a specific time. The value depends on the rate of interest, known as the discount rate, used to translate past and future cash flows into current dollars at that time. To account for the difference between the trust fund's current balance and the balance desired for the end of the period, the balance at the beginning is added to projected tax revenues, and an additional year of costs at the end of the period is added to projected outlays.

11. Beyond the 30-year projection period, the share of earnings subject to Social Security payroll taxes is held constant in CBO's projections.

12. The actuarial deficit includes the trust fund balance at the beginning of the projection period, and that balance represents the present value of all income and costs to the trust funds since their beginning.



List of Tables and Figures

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About This Document

This volume is one of a series of reports on the state of the budget and the economy that the Congressional Budget Office issues each year. In keeping with CBO's mandate to provide objective, impartial analysis, the report makes no recommendations.

Overseen by Julie Topoleski and prepared with guidance from Devrim Demirel, Ed Harris, John Kitchen, John McClelland, David Weaver, and Jeff Werling, the report represents the work of many analysts at CBO. Stephanie Hugie Barello wrote the main text of the report. Aaron Betz, Edward Gamber, and Charles Pineles-Mark wrote Appendix A. Ricci Reber wrote Appendix B. Susan Beyer, Barry Blom, Tom Bradley, Sebastien Gay, Lori Housman, Jamease Kowalczyk, Sarah Masi, Eamon Molloy, Sam Papenfuss, Lisa Ramirez-Branum, Dan Ready, Robert Stewart, and Rebecca Yip contributed to the analysis.

Michael Simpson developed the long-term budget simulations with assistance from Stephanie Hugie Barello, Marina Miller, Xiaotong Niu, and Charles Pineles-Mark. Aaron Betz and Robert Shackleton prepared the macroeconomic simulations. Ed Harris coordinated the revenue simulations, which were prepared by Paul Burnham, Shannon Mok, Cecilia Pastrone, Kurt Seibert, and Joshua Shakin. Justin Lee, Claire Sleigh, and Adam Staveski fact-checked the report. The report builds on the 10-year projections of the economy and budget that CBO released earlier this year, which reflected the contributions of more than 100 people at the agency.

Wendy Edelberg, Mark Hadley, Jeffrey Kling, and Robert Sunshine reviewed the report. Christine Bogusz, Benjamin Plotinsky, and Elizabeth Schwinn edited it, and Casey Labrack prepared it for publication. Charles Pineles-Mark and Ricci Reber prepared the supplemental data.

The report is available on CBO's website (www.cbo.gov/publication/53919).

Keith Hall
Director
June 2018

ECONOMIC REPORT OF THE PRESIDENT

Together With

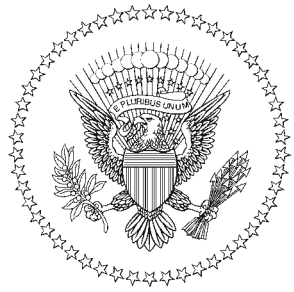
THE ANNUAL REPORT

of the

COUNCIL OF ECONOMIC ADVISERS

JANUARY 2017

ECONOMIC REPORT OF THE PRESIDENT



JANUARY 2017

TOGETHER WITH

THE ANNUAL REPORT OF THE COUNCIL OF ECONOMIC ADVISERS

C O N T E N T S

*For a detailed table of contents of the Council's Report, see page 11.

ECONOMIC REPORT
OF THE
PRESIDENT

ECONOMIC REPORT OF THE PRESIDENT

To the Congress of the United States:

Eight years ago when I took office, our economy was in crisis. We were just months into the worst recession since the Great Depression, with unemployment rising rapidly toward a peak of 10 percent. Nearly 800,000 Americans were losing their jobs each month, and home prices and the stock market had plummeted. The auto industry was on the verge of collapse. Many American families struggled to pay their bills, and millions had lost their homes.

Faced with this crisis, my Administration acted quickly, taking steps to shore up the financial system; cut taxes for working families; invest in infrastructure, clean energy, and teacher jobs; help families refinance their homes; and rescue the auto industry. These actions stemmed the tide of the crisis and laid the foundation for a stronger economy over the long term.

Today, thanks to the resilience of the American people, our economy has emerged as the strongest and most durable in the world. By nearly every economic measure, America is better off than when I took office. We are in the midst of the longest streak of job growth on record. U.S. businesses have added 15.6 million jobs since early 2010. The unemployment rate has been cut by more than half from its peak, falling much faster than economists expected. Rising home prices have brought millions of homeowners back above water, we are less reliant on foreign oil than we have been in nearly three decades, and we have cut our budget deficit by two-thirds as a share of the economy.

Most importantly, wages have begun to rise again for working families. In 2015, median household income rose at the fastest rate on record, with the typical family earning an additional $2,800. The poverty

rate fell by more than any year since 1968. And data indicate that these gains have continued in 2016, with wages rising over 2.7 percent at an annual rate so far this year, much faster than inflation.

While American families have made remarkable progress during the recovery, my Administration has also strengthened the long-term foundation of our economy and worked to ensure that every American has a fair chance to succeed if they work hard. We enacted the Affordable Care Act (ACA) and reshaped our healthcare system, expanded opportunity by making education more affordable and our tax code fairer, and increased our economy's resilience by strengthening the financial system and addressing climate change. These efforts have yielded undeniable results.

Today, 20 million more American adults have health insurance. On top of that, more than 3 million additional children have health insurance today than in 2008, thanks in large part to the ACA and other actions under my Administration. Our uninsured rate has hit its lowest level ever, and insurance companies can no longer discriminate against those with pre-existing conditions. At the same time, we have slowed the growth of health costs dramatically. The average premium for a family who gets coverage on the job is $3,600 lower today than it would be if premium growth had matched the decade before the ACA. All of these changes pay dividends for our economy.

We have also worked to ensure that all American families can share in the benefits of the economy, not just those at the top, and we have succeeded in rolling back some of the rise in inequality since the 1970s. Tax changes since 2009 have increased the share of income going to the bottom 99 percent of families by more than any Administration since at least 1960. These tax changes and the ACA will boost incomes for our lowest-income families by 18 percent, or $2,200.

Over the long term, education provides the surest path to increasing economic opportunity. During my Administration, we have increased access to early childhood education, lifted high school graduation rates to record highs, and encouraged States to adopt higher standards and provide better training for teachers. And to help make college more affordable, we have doubled investments in Pell Grants and college tax credits; simplified the application for Federal student aid; and helped more than 5 million borrowers cap their monthly student loan payments.

Finally, we have made our economy more resilient against future challenges. After the financial crisis, we passed the toughest Wall Street

reforms in history. Banks have sharply increased the size of their capital buffers, there are new tough limits on risky behavior by banks, and we have brought dark corners of the shadow banking industry under the regulatory umbrella, all of which make another crisis less likely. We have new tools to guard against another "too big to fail" scenario and a new consumer watchdog to hold financial institutions accountable.

Sustainable economic growth also requires addressing climate change, and since 2008, we have seen U.S. emissions fall even as our economy has grown. America's economy is becoming more energy efficient and less carbon intensive. Our policies helped to catalyze this change: In 2009, the Recovery Act made a historic investment in clean energy, and we have since increased incentives for renewable energy like wind and solar, improved energy efficiency, and implemented the first-ever greenhouse gas standards for power plants, cars, and trucks. And America's leadership on climate issues helped pave the way for the Paris Agreement, in which almost 200 countries committed to take concrete steps to reduce emissions.

Our economic progress over the past eight years has been nothing short of remarkable, and I am proud of everything my Administration has accomplished. But I have always acknowledged that the work of perfecting our union, and making our economy work for every American, would take far longer than my time in office.

As I pass the baton to my successor, much work remains to continue strengthening our economy and, most importantly, lifting wages for working families. It is no secret that our openness to new ideas and inclusivity are part of what make the United States the most resilient economy in the world. Continuing our technological progress and innovation, engaging with the world economy through trade, and welcoming immigrants and new American families will create shared growth and help define our economy for the coming decades.

The first step is to make smart, long-term investments that raise productivity, like boosting funding for infrastructure and research and development. We must also promote competition and innovation in the economy and open new markets for American businesses through high-standards trade agreements.

But strengthening economic growth is only half of the equation. We must also make sure that workers can share in that prosperity by creating new, well-paid jobs and preparing workers for them. That means investing

in education from Pre-K all the way through college and increasing access to apprenticeships and other career pathways. It means giving workers a bigger voice and setting fair rules of the road by strengthening collective bargaining, raising the Federal minimum wage, expanding access to paid leave, and supporting retirement savings. And it means making our tax system fairer so that those at the top pay their fair share.

Finally, we must ensure that growth is sustainable by continuing to address the global risk of climate change, by increasing the safety and accountability of our financial system, and by making responsible fiscal decisions.

Over the past eight years, our country has come back from a once-in-a-lifetime economic crisis and emerged even stronger. For all the work that remains, a new foundation has been laid. A new future is ours to write. I have never been more optimistic about America's future, and I am confident that this incredible journey that we are on as Americans will continue.

The White House
December 2016

THE ANNUAL REPORT
OF THE
COUNCIL OF ECONOMIC ADVISERS

LETTER OF TRANSMITTAL

COUNCIL OF ECONOMIC ADVISERS
Washington, D.C., December 15, 2016

MR. PRESIDENT:

The Council of Economic Advisers herewith submits its 2017 Annual Report in accordance of the Employment Act of 1946 as amended by the Full Employment and Balanced Growth Act of 1978.

Sincerely yours,

Jason Furman
Chairman

Sandra E. Black
Member

Jay C. Shambaugh
Member

C O N T E N T S

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CHAPTER 1

EIGHT YEARS OF RECOVERY AND REINVESTMENT

As the 2017 *Economic Report of the President* goes to press, the United States is eight years removed from the onset of the worst economic crisis since the Great Depression. Over the two terms of the Obama Administration, the U.S. economy has made a remarkable recovery from the Great Recession. After peaking at 10.0 percent in October 2009, the unemployment rate has been cut by more than half to 4.6 percent as of November 2016, below its pre-recession average. Real gross domestic product (GDP) per capita recovered fully to its pre-crisis peak in the fourth quarter of 2013, faster than what would have been expected after such a severe financial crisis based on historical precedents. As of the third quarter of 2016, the U.S. economy was 11.5 percent larger than at its peak before the crisis. As of November 2016, the economy has added 14.8 million jobs over 74 months, the longest streak of total job growth on record. Since private-sector job growth turned positive in March 2010, U.S. businesses have added 15.6 million jobs. Real wage growth has been faster in the current business cycle than in any since the early 1970s. Meanwhile, from 2014 to 2015, median real household income grew by 5.2 percent, the fastest annual growth on record, and the United States saw its largest one-year drop in the poverty rate since the 1960s.

Other indicators at the end of 2016 also show substantial progress. Rising home prices have helped bring millions of homeowners back from negative equity. Real, or inflation-adjusted, household net worth exceeds its pre-recession peak by 16 percent. Since 2008, the United States has tripled the amount of energy harnessed from wind and increased solar generation thirtyfold. The United States is less reliant on foreign oil than it has been in nearly three decades. Since the Affordable Care Act (ACA) became law in 2010, health care prices have risen at the slowest rate in 50 years. Measured as a share of the economy, the Federal budget deficit has been cut by about two-thirds since 2009.

The forceful response of the Federal Government to the crisis in 2008 and 2009 helped stave off a potential second Great Depression, setting the U.S. economy on track to rebuild, reinvest, and recover. Recovery from the crisis alone, though, was never the President's sole aim. The Administration has also addressed the structural barriers to sustained, shared prosperity that middle-class families had faced for decades—rising health care costs, limited access to higher education, slow growth in incomes, high levels of inequality, a reliance on oil and other sources of carbon pollution, and more—so that the U.S. economy would work for all Americans. Thanks to these policy efforts, eight years later, the American economy is stronger, more resilient, and better positioned for the 21st century than ever before.

The 2017 *Economic Report of the President* reviews the economic record of the Obama Administration, focusing both on how its policies have promoted economic growth that is robust and widely shared and on the challenges the U.S. economy still faces in the years ahead.

The Recovery in Review

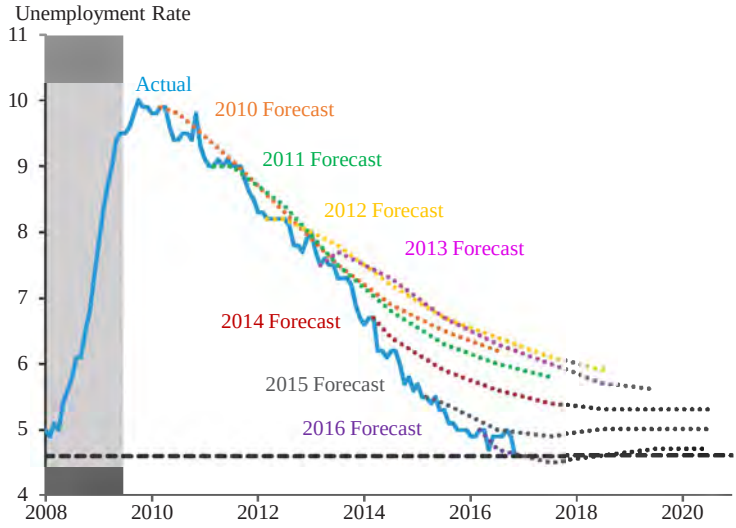
Across a broad range of macroeconomic measures, the U.S. economy has made remarkable progress in the eight years since one of the most tumultuous and uncertain periods in its history.

Employment and Wages

The Great Recession was well underway when President Obama took office in January 2009. In that month, the unemployment rate stood at 7.8 percent, already elevated from its average of 5.3 percent in the 2001-07 expansion period. The unemployment rate would continue to increase until it peaked at 10.0 percent in October 2009. The long-term unemployment rate—the share of the labor force unemployed for 27 weeks or more—rose to an all-time high of 4.4 percent, as did the share of Americans working part-time for economic reasons (that is, those working part-time who would prefer a full-time position), which doubled to 6.0 percent from its pre-recession average.

From its peak, the unemployment rate recovered to its pre-recession average in mid-2015 and continued to fall, standing at 4.6 percent as of November 2016. This rapid decline came far more quickly than most economists predicted: as recently as March 2014, private forecasters expected the unemployment rate to remain above 5.0 percent until at least 2020 (Figure 1-1). All but one of the broader measures of labor underutilization published by the Bureau of Labor Statistics (BLS) have recovered fully to their respective pre-recession averages. Further, the labor force participation rate, which

Figure 1-1
Actual and Consensus Forecast Unemployment Rate, 2008–2020



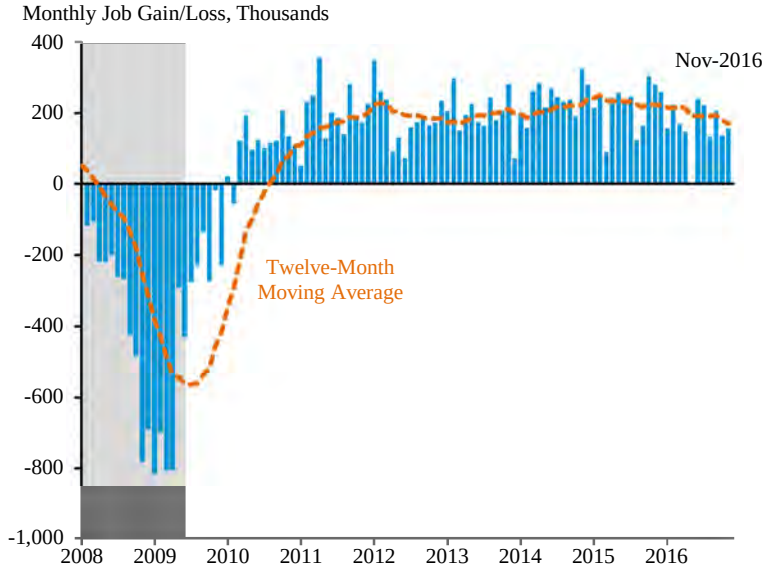
Note: Annual forecasts are current as of March of the stated year. Black dashed line represents November 2016 value (4.6 percent). Shading denotes recession.
Source: Bureau of Labor Statistics, Current Population Survey; Blue Chip Economic Indicators.

has been subject to downward pressure due to the aging of the U.S. population, has been broadly stable since the end of 2013, as the strengthening labor market recovery has led workers to enter (or reenter) the workforce, offsetting downward pressure from demographic trends.

Total nonfarm employment peaked in January 2008 before falling by 8.7 million jobs, or 6.3 percent, to its trough in February 2010; over the same period, private-sector employment fell by 8.8 million jobs, or 7.6 percent. In the first quarter of 2009 alone, total job losses averaged 772,000 a month, larger than the populations of a number of U.S. States. While job losses were broad-based across industries, several sectors were particularly hard-hit. From January 2008 to February 2010, employment in the manufacturing sector declined by 16.6 percent, while employment in the construction sector declined by 26.4 percent.

Nonfarm job growth turned consistently positive beginning in October 2010. Since then, the U.S. economy has added jobs for 74 straight months, the longest streak of total job growth on record; over this period, nonfarm employment growth has averaged 199,000 jobs a month. Total nonfarm employment recovered to its pre-recession peak in 2014—the best year for job creation since the 1990s—and, as of November 2016, exceeded its pre-recession peak by 6.7 million jobs. Since private-sector job growth

Figure 1-2
Private-Sector Payroll Employment Growth, 2008–2016



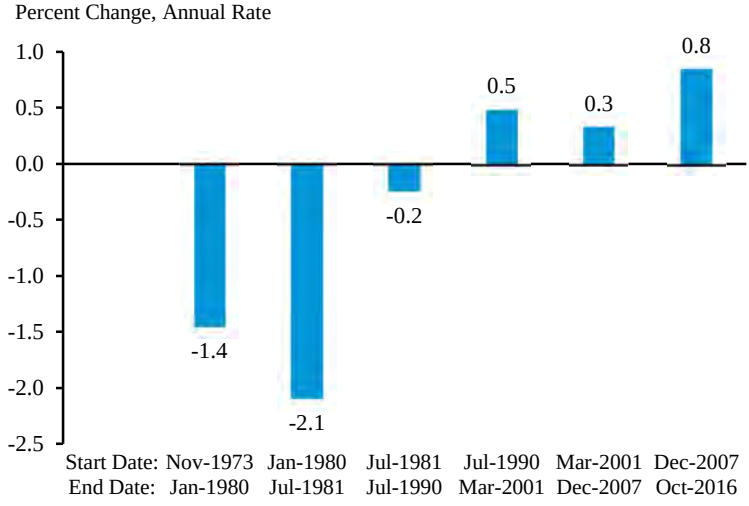
Note: Shading denotes recession.
Source: Bureau of Labor Statistics, Current Employment Statistics; CEA calculations.

turned positive in March 2010, U.S. businesses have added 15.6 million jobs (Figure 1-2). The manufacturing sector has added over 800,000 jobs since February 2010, the industry's fastest growth since the 1990s (see Box 1-2). And since June 2009, when Chrysler and General Motors (GM) emerged from bankruptcy, the automobile industry (manufacturing and retail) has added nearly 700,000 jobs, the industry's strongest growth on record.

As the labor market has strengthened, the recovery has translated into real wage gains for American workers. Due to both an acceleration in nominal wage growth and low inflation, since the end of 2012 private production and nonsupervisory workers, who comprise about 80 percent of private-sector employment, have seen their real hourly earnings increase by 5.3 percent, more than the total cumulative real wage gains for these workers from 1980 to 2007. Overall, real hourly wage growth since the business cycle peak in December 2007 has averaged 0.8 percent a year for these workers, the fastest growth of any business cycle (measured peak-to-peak) since the 1970s (Figure 1-3).

The combination of robust employment growth and accelerating real wage growth has translated into strong growth in household incomes. From 2014 to 2015, real median household income grew 5.2 percent, or $2,800, the fastest growth on record. Moreover, these income gains have been widely

Figure 1-3
Real Hourly Wage Growth Over Business Cycles, Cycle Peak to Cycle Peak



Note: Wages for private production and nonsupervisory workers.
Source: National Bureau of Economic Research; Bureau of Labor Statistics, Real Earnings; CEA calculations.

shared: households at the bottom and middle of the income distribution saw faster real income gains from 2014 to 2015 than did households at the top of the income distribution.

While the labor market has made major improvements, some challenges still remain. The share of employees working part-time for economic reasons, and, accordingly, the broadest measure of underemployment, the U-6 rate (of which this share is a component), remain modestly elevated relative to their respective pre-recession averages. As discussed below, labor force participation, particularly for many workers in their prime working years, has been declining for decades, a key challenge for the U.S. labor market in the years ahead. And while real wage growth has picked up in recent years, more work remains to reverse decades of limited income growth for many middle-class families.

Output and Economic Growth

Like employment, economic output contracted sharply in the Great Recession. Real GDP peaked in the fourth quarter of 2007 before falling rapidly over the following year. In the fourth quarter of 2008 alone, real GDP contracted at an annualized rate of 8.2 percent. As discussed in Box 1-1, this drop was more severe than initially estimated: the first estimate of GDP

growth in the fourth quarter of 2008 was a contraction of 3.8 percent. All told, real GDP fell 4.2 percent, from its peak in the fourth quarter of 2007 to its trough in the second quarter of 2009. Since the U.S. population continued to grow over this period, real GDP per capita fell by an even greater amount, 5.5 percent.

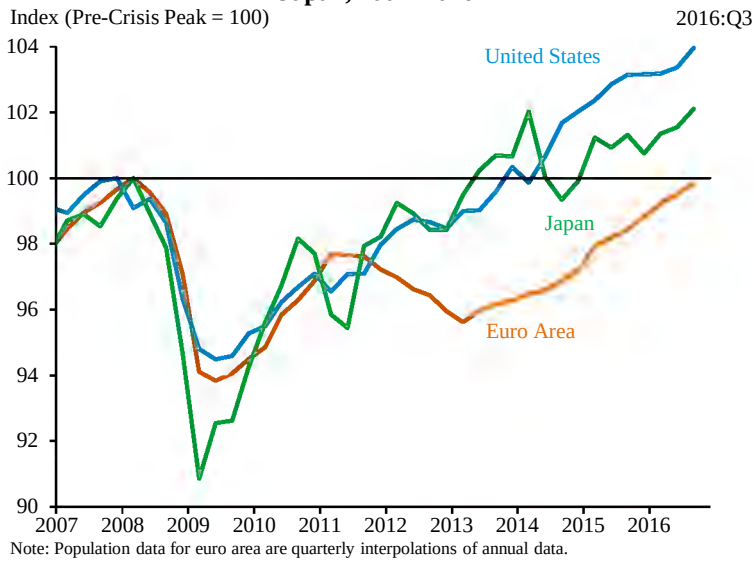
By the fourth quarter of 2013, per-capita real GDP had fully recovered to its pre-recession peak, and by the third quarter of 2016, per-capita GDP exceeded its pre-crisis peak by 4 percent. This rebound occurred much more quickly than in most other advanced economies, many of which also experienced systemic financial crises in 2007-08. For example, Japan, which recovered relatively quickly, has seen growth level off in recent years, and while the euro area economy has improved noticeably over the last two years, the area is on the verge of missing nearly an entire decade of growth, as it still has not attained 2008 levels of income per capita (Figure 1-4). Not only has the U.S. economy outperformed those of other advanced economies in the current global business cycle, but the recovery from the Great Recession compares favorably with historical recoveries in countries experiencing systemic financial crises (Reinhart and Rogoff 2014). Still, a number of trends—including demographic changes resulting in slower workforce growth and a slowdown in productivity growth—have presented headwinds to U.S. output growth over the recovery.

Equity Markets, House Prices, Household Wealth, and Other Measures

The collapse of the housing bubble and the financial crisis of 2007-08 manifested in steep declines in both house and equity prices. From their peak in February 2007 to their trough in January 2012, house prices (as measured by the S&P CoreLogic Case-Shiller Home Price Index) fell by 26 percent. The S&P 500 index, meanwhile, fell by more than half between August 2007 and March 2009. These steep declines in asset prices caused stark drops in overall household wealth: real household net worth—the assets of U.S. households minus their liabilities, net of inflation—fell 21 percent from its peak in 2007 to its trough in 2009.

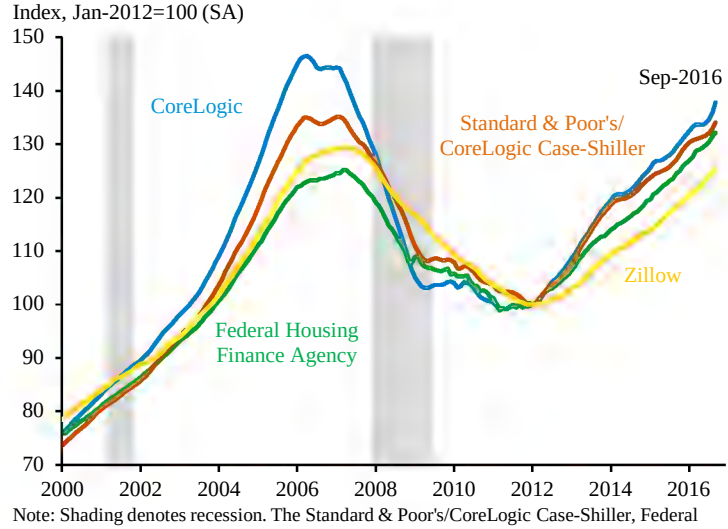
By the end of 2016, the landscape was much improved. From March 2009 to November 2016, the S&P 500 index increased 186 percent. Since their January 2012 trough, home prices have increased 34 percent as of September 2016, and have nearly recovered to their February 2007 nominal peak (Figure 1-5). As of the second quarter of 2016, rising home prices since the end of 2012 have helped to lift almost 7.9 million households out of negative equity, and the number of homes in foreclosure has declined dramatically. The combination of rising employment and wages, rebounding asset prices,

Figure 1-4
Real GDP per Capita: Euro Area, United States, and Japan, 2007–2016



Note: Population data for euro area are quarterly interpolations of annual data.
Source: National sources via Haver Analytics; CEA calculations.

Figure 1-5
National House Price Indexes, 2000–2016



Note: Shading denotes recession. The Standard & Poor's/CoreLogic Case-Shiller, Federal Housing Finance Agency, and CoreLogic indexes all adjust for the quality of homes sold but only cover homes that are bought or sold, whereas Zillow reflects prices for all homes on the market. All indexes are seasonally adjusted.
Source: Zillow; CoreLogic; Federal Housing Finance Agency; Standard & Poor's.

and diligent efforts to pay down debts has left American households with their strongest net worth position on record: as of the third quarter of 2016, real household net worth exceeded its pre-recession peak by 16 percent.

Other indicators show a similar pattern of strong progress. Since the ACA was signed into law in 2010, health care prices have risen at the slowest pace in 50 years. Since 2008, the United States has tripled the amount of energy harnessed from wind and has increased solar generation thirtyfold. Today, the United States is less reliant on foreign oil than it has been in nearly three decades. The Federal budget deficit in fiscal year (FY) 2016 was 3.2 percent of GDP, about a third of the 9.8 percent of GDP deficit recorded in 2009 and equal to the average over the last 40 years.

The Crisis and the Response

After eight years of recovery, it is easy to forget how close the U.S. economy came to an outright depression during the crisis. Indeed, by a number of macroeconomic measures, the first year of the Great Recession in the United States saw larger declines than at the outset of the Great Depression in 1929-30. However, the forceful policy response by the Federal Government—including the efforts of the Bush Administration, the Obama Administration, the Federal Reserve, Congress, and others—combined with the resilience of American businesses and families and coordination with our international partners to help stave off a second Great Depression.

A Once-in-a-Lifetime Crisis

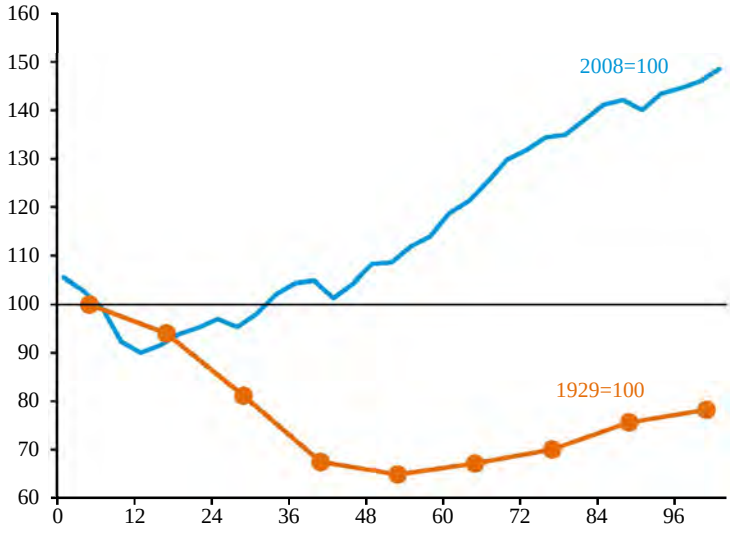
In the run-up to the 2007-09 recession, the country experienced a dramatic escalation in home prices, fueled in part by lax mortgage underwriting standards and a financial system that channeled too much funding into housing. The rapid increase in home prices came to an abrupt halt in late 2006. Home prices stopped rising and then started falling rapidly within a year. Millions of homeowners found themselves "underwater"—that is, their mortgage loan balances exceeded the value of their homes—and many were unable to make scheduled mortgage payments.

Fallout from the housing crisis quickly spread to the broader economy through a complex web of opaque financial instruments tied to housing and questionable business practices of some financial firms, including excessive leverage and an overreliance on short-term debt (Financial Crisis Inquiry Report 2011). Investors pulled back from risky assets and, during one fateful week in September 2008, the investment bank Lehman Brothers went out of business, a prominent money market fund "broke the buck" (meaning that depositors could no longer count on getting their money back in its entirety,

Figure 1-6

Household Net Worth in the Great Depression and Great Recession

Index, 1929/2008=100



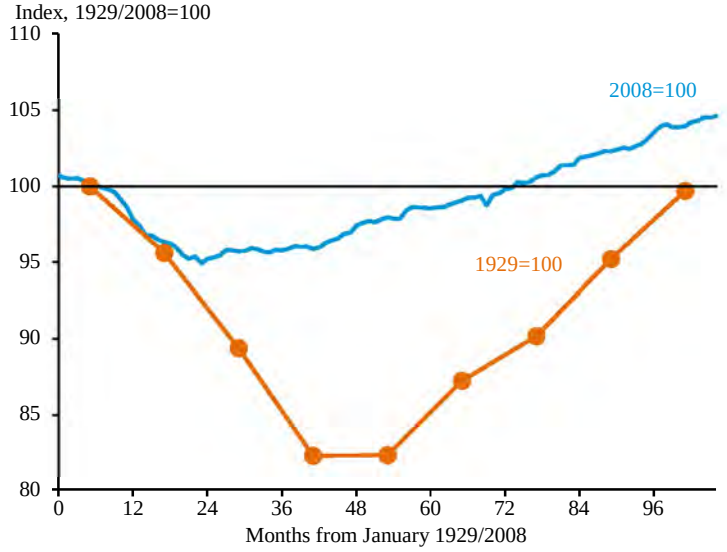
Note: Orange markers represent annual averages.
Source: Federal Reserve Board of Governors; Mishkin (1978).

an almost unprecedented event), and the large insurance firm American International Group (AIG) teetered on the edge of bankruptcy until the U.S. Government provided $85 billion in financial support.

The dramatic fall of asset prices—due to both the collapse of the housing bubble and the resulting financial turmoil—was, by many measures, deeper than at the outset of the Great Depression in 1929-30. Home prices in the United States fell 5.6 percent between 2008 and 2009, outpacing the 4.3-percent decline from 1929 to 1930. Between 2008 and 2009, the S&P 500 Index declined 23 percent on an annual average basis, exceeding the 1929-30 decline of 19 percent. As a result of these steep declines in asset prices, nominal household net worth declined by a total of $13 trillion, or 19 percent of total U.S. household wealth, from its peak in 2007 to its trough in 2009. The decline in wealth in the early stages of the Great Recession was far larger than the reduction experienced at the onset of the Great Depression (Figure 1-6).

Faced with a drop in demand for their goods and services and extraordinary uncertainty about their economic futures, businesses stopped hiring and laid off workers: employment declined 4 percent from 2008 to 2009, nearly the same rate as from 1929 to 1930 (Figure 1-7). Businesses also

Figure 1-7
Civilian Employment in the Great Depression and Great Recession



Note: Civilian employment of those ages 16 and older for 2008 series; ages 14 and older for 1929 series. Orange markers represent annual averages.
Source: Bureau of Labor Statistics,; CEA calculations.

shelved investment plans and consumers cut back on spending. The financial crisis also had wide-ranging effects abroad, and global trade suffered a much more drastic fall between 2008 and 2009 than during the first year of the Great Depression (Figure 1-8). In short, as the Obama Administration began, the United States faced an economic crisis of historic proportions.

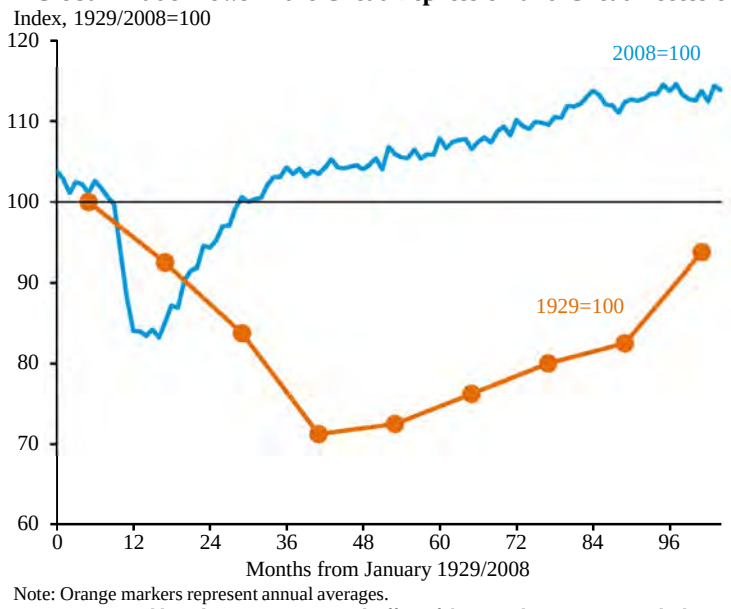
The Policy Response

The short-term policy response in the United States to the global financial crisis in 2008-09 was aggressive, swift, and—by the preponderance of evidence from many private-sector, academic, and government analyses—effective. It included a combination of aggressive aggregate demand management driven by expansionary fiscal and monetary policy and short-term financial stability measures that prevented the risks of the crisis from compounding further.

Fiscal Policy

The fiscal response began in early 2008, well before the height of the financial crisis, as the economy began to slide into recession. Congress and the Bush Administration enacted the Economic Stimulus Act in February 2008, cutting taxes for low- and middle-income households while providing

Figure 1-8
Global Trade Flows in the Great Depression and Great Recession



Note: Orange markers represent annual averages.
Source: CPB World Trade Monitor; Statistical Office of the United Nations; CEA calculations.

tax incentives to encourage business investment. The value of the cuts in the Act totaled $124 billion over 11 years, with nearly all of the cuts concentrated in FY 2008. The Act was designed to counteract a short recession by providing brief, temporary support to consumer spending—including electronic payments to households that began less than three months after passage of the Act—but it was insufficient to reverse the emerging distress and, by design, did not have long-lasting effects.

In December 2008, then-President-elect Obama proposed an outline of what would become the American Recovery and Reinvestment Act of 2009, also known as the Recovery Act or "ARRA." The Recovery Act was the first bill introduced in the House of Representatives just days after the President's inauguration, and the President signed it into law less than a month after he took office. As the name of the Act suggests, the intention was for the bill to both generate recovery from the crisis and to be an important investment in the future of the economy.

Several principles guided the new Administration's fiscal policy. First, the fiscal effort was to be implemented quickly. Second, it should be large, given the scope of the economic problem. Finally, it should be a sustained effort that would not only provide immediate fiscal support over the first two years, but would also provide smaller levels of temporary support

Box 1-1: Revisions to Crisis-Era Data

Policymakers face a number of challenges in assessing the state of the economy in real time. First, macroeconomic indicators are only available on a lagged basis, since it takes time for the Federal statistical agencies—such as the Census Bureau, the Bureau of Economic Analysis (BEA), and the Bureau of Labor Statistics (BLS)—to collect and analyze the data underlying their estimates. Initial estimates of gross domestic product (GDP) for a given quarter, for example, are released several weeks after that quarter ends. Second, more timely data generally tend to be incomplete and can only present a partial snapshot of the economy. Third, and perhaps most importantly, though subsequent revisions to macroeconomic data—particularly estimates of employment and output—often do not receive the same attention as initial estimates, they can often be large and economically meaningful, especially around turning points in the business cycle (when extrapolations and assumptions underlying some initial estimates can turn out badly wrong).

These challenges confronted the Obama Administration in determining the response to the 2008 crisis. When President Obama took office on January 20, 2009, BEA had not yet released its advance estimate of GDP growth in the fourth quarter of 2008, a critical measure for understanding how much the financial crisis had affected real economic activity. Yet what data were available at that point showed an economy facing a substantial and protracted decline in economic output, and the incoming Administration had proposed the contours of what would become the American Recovery and Reinvestment Act in December 2008. When BEA released its advance estimate of GDP growth for the fourth quarter of 2008 in late January 2009—a contraction of 3.8 percent at an annual rate, the largest quarterly decline since 1982—it confirmed the need for a vigorous response from the Federal Government.

Table 1-i
Revisions to Crisis-Era Output Data

Estimate Date	Real GDP Growth, 2008:Q4 (Percent, Annual Rate)
January 2009 (Advance Estimate)	-3.8
February 2009 (Second Estimate)	-6.2
March 2009 (Third Estimate)	-6.3
July 2009	-5.4
July 2010	-6.8
July 2011	-8.9
July 2013	-8.3
July 2014	-8.2

Source: Bureau of Economic Analysis, National Income and Product Accounts.

Subsequent revisions to fourth-quarter GDP growth, however, have revealed that early estimates greatly *underestimated* the extent of output losses in the immediate aftermath of the financial crisis. As shown in Table 1-i, BEA's most recent estimate is that real GDP decreased by 8.2 percent at an annual rate in the fourth quarter of 2008, the largest one-quarter drop since 1958.

Labor market data show a similar pattern, with initial estimates of job losses in the fourth quarter of 2008 subsequently revised further downward, as shown in Table 1-ii. In January 2009, contemporary estimates of nonfarm employment losses from September to December 2008 totaled 1.5 million jobs. As of 2016, BLS estimates that 1.9 million Americans lost their jobs during those months.

All told, subsequent revisions to crisis-era data have revealed that the state of the U.S. economy in early 2009 was even worse than initial data indicated. The revisions have also helped to confirm both the historic nature of the economic downturn that policymakers faced in the early months of 2009 and the role that policy played in helping to avert a second Great Depression.

Table 1-ii

Revisions to Crisis-Era Employment Data

Estimate Date	Change in Total Nonfarm Employment, September 2008 to December 2008 (Thousands)
January 2009	-1,531
February 2009	-1,554
March 2009	-1,658
February 2010	-1,955
February 2011	-1,930
February 2012	-1,953
February 2013	-1,952
February 2014	-1,936
February 2015	-1,937

Source: Bureau of Labor Statistics, Current Employment Statistics.

thereafter. The new approach would require a mix of policy instruments such as tax cuts and other temporary assistance that put cash in the hands of households who needed it immediately and who were likely to spend it, boosting aggregate demand. Other measures provided States with funding to continue providing necessary services and to help them avoid cutting their own budgets drastically in the face of fiscal shortfalls. Additional components, such as investments in infrastructure and innovation, would be more lagged but would be more likely to have larger cumulative countercyclical impacts and greater longer-run benefits. In all cases, however, the

measures would end and would not have long-term impacts on the Federal Government's primary budget deficit.

To ensure that the fiscal stimulus would be as effective as possible, the Recovery Act utilized a variety of spending, tax, and incentive channels. Recovery Act policies were fairly evenly distributed across individual tax cuts and business tax incentives (29 percent), aid to directly impacted individuals and State fiscal relief (34 percent), and public investments in infrastructure, education, job training, energy, and health information technology (37 percent).

When passed, the Congressional Budget Office (CBO) estimated that the Recovery Act would cost $787 billion, though that estimate would increase as the full impact of the recession became apparent (CBO 2009). The most recent CBO estimate shows that the fiscal support from the Recovery Act will total $836 billion through 2019 (CBO 2015). Between calendar years 2009 and 2012, the period for which the Recovery Act had the largest impact, the Act provided a total fiscal impulse of approximately $700 billion.[1]

Importantly, while the Recovery Act provided a considerable short-term boost to aggregate demand, its investments were targeted for their long-term growth potential, helping ensure that the United States climbed out of the crisis stronger than before. The provisions of the Recovery Act were tailored to deepen the United States' stock of private physical capital (through business tax incentives), public physical capital (through investments in transportation infrastructure), human capital (through extensive education investments), and intellectual capital (through research and development investments).

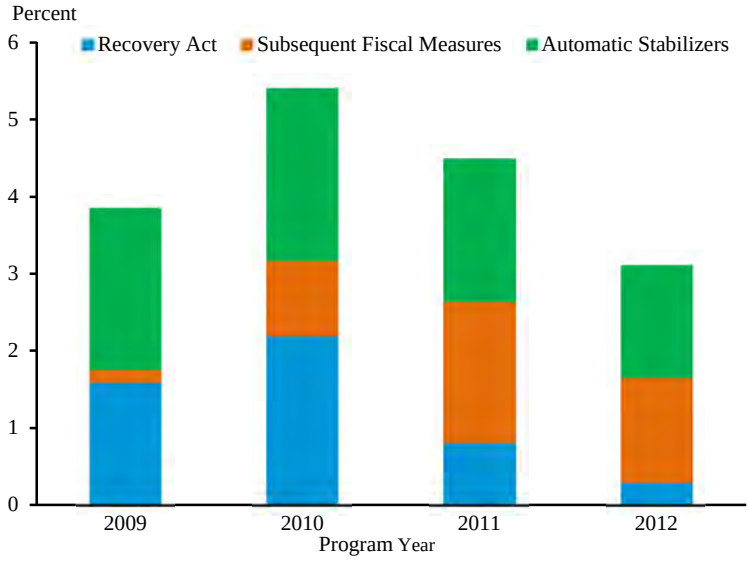
More than a dozen subsequent fiscal measures extended certain Recovery Act provisions and introduced additional countercyclical policies, such as the temporary payroll tax cut in effect during 2011 and 2012. In total, discretionary fiscal stimulus from 2009 through 2012 totaled $1.4 trillion and averaged around 2 percent of GDP. Together with automatic stabilizers, the total fiscal stimulus over these four years averaged 4 percent of GDP (Figure 1-9). The initial U.S. fiscal response exceeded the response by the euro area or Japan, one of the reasons the United States recovered sooner and more strongly (Furman 2016a).

Monetary Policy

The Federal Reserve's independent decision to take a vigorous approach to monetary stabilization was another major driver of the United

[1] This figure excludes a routine set of patches for the Alternative Minimum Tax (AMT). This part of the Recovery Act, a continuation of a longstanding practice, is best thought of as ongoing fiscal policy, not as a temporary fiscal impulse designed specifically to counter the effects of an economic recession.

Figure 1-9
Fiscal Expansion as Share of GDP, 2009–2012



Source: Congressional Budget Office (2016); Bureau of Economic Analysis, National Income and Product Accounts; CEA calculations.

States' recovery. The traditional tool of monetary policy—the Federal Funds target rate—was reduced to nearly zero by the end of 2008, after which the Federal Reserve turned to a program of unconventional policy in an effort to reduce long-term interest rates. The Federal Reserve used two principal mechanisms to achieve this end: forward guidance, by which it provided an indication of its plan for the future path of short-term interest rates, and asset purchases (commonly known as "quantitative easing"). As part of its forward guidance, the Federal Reserve assured market participants that it would maintain its near-zero interest rate policy for an extended period of time. As part of its quantitative easing program, the Federal Reserve purchased long-term debt instruments, including mortgage-backed securities and U.S. Treasury bonds, expanding its balance sheet from $900 billion to $4.5 trillion between 2008 and 2014. In contrast, the European Central Bank initially did not cut rates to zero, raised rates in 2011, and did not undertake nearly as large a balance sheet expansion as the Federal Reserve.

Stabilizing Financial Markets

In addition to expansionary fiscal and monetary policy, the Bush and Obama Administrations and the Federal Reserve implemented a package of short-term measures to stabilize financial markets. In late 2008, the Treasury

Department established a temporary guarantee program for money market mutual funds while the Federal Deposit Insurance Corporation (FDIC) expanded its guarantee on bank deposits and debt to avoid runs on banks and other financial institutions. The Bush Administration also proposed, and Congress approved, the Troubled Asset Relief Program (TARP), providing up to $700 billion to stabilize troubled banks. Meanwhile, the Federal Reserve instituted a number of programs designed to provide liquidity to borrowers, investors, and financial market participants. These early policy responses helped stem a plunge in consumer confidence, credit flows, and corporate balance sheets that could have been much worse.

Within three weeks of President Obama taking office, the new Administration released its Financial Stability Plan. Building on the initial action of the Bush Administration, the plan included a host of new measures designed to continue to shore up financial markets and increase credit flows. Ultimately, over 700 banks received capital through TARP, and the Obama Administration also expanded the use of TARP funds to help millions of families affected by the housing crisis, restructure the automobile industry, and support small businesses. It is important to note, however, that TARP gave the Federal Government authority to recoup any returns on asset purchases or equity investments made under the program. To date, the Federal Government has collected 103 percent of the $412.1 billion spent on investment programs, as well as an additional $17.5 billion from Treasury's equity stake in AIG, for a total return of about $28 billion.

In addition to expanding and effectively managing the TARP program, the Administration established comprehensive stress tests of the Nation's 19 largest financial institutions to reduce uncertainty regarding their solvency, stabilize the financial system, and ensure the banks were able to continue lending. By using TARP funding as a backstop for firms unable to raise necessary capital, the Administration moved the financial system rapidly toward a better-capitalized system where financial institutions and investors knew that institutions were solvent, so normal financial activity could resume.

Rescuing the Automobile Sector

In addition to stabilizing the financial market, the Administration provided substantial support to automobile companies to keep them from failing during the Great Recession. At the height of the financial crisis, capital markets would have been unable to oversee the orderly restructuring of the automobile companies necessary to preserve their viable assets. The ensuing job losses and the concentrated, severe impact on specific communities would also have resulted in large economic hardship as well as

substantial costs to the Federal Government for Medicaid, unemployment insurance, and other social assistance programs. In these circumstances, the Federal Government took extraordinary steps to avoid the unmanaged bankruptcy of the largest automobile manufacturers, failures that likely would have cascaded through supply chains, threatening even more firms.

The Administration guided two of America's largest automobile manufacturers—GM and Chrysler—through a targeted bankruptcy and comprehensive restructuring. In the spring of 2009, the Administration's Auto Task Force worked with these two firms to produce plans for viability. For both companies, a quick, targeted bankruptcy was judged to be the most efficient and successful way to restructure. Chrysler filed for bankruptcy on April 30, 2009; GM, on June 1. In addition to concessions by all stakeholders, including workers, retirees, creditors, and suppliers, the Federal Government invested funds to bring about an orderly restructuring. By the end of 2013, the Federal Government had disposed of all of its investments in Chrysler and GM. To date, American taxpayers have recovered $71 billion of the $80 billion invested in the automobile industry, and the Federal Government continues to receive proceeds from the bankruptcy liquidations of Old Chrysler and Old GM.

Supporting the Housing Market

The loss in household wealth from the collapse in housing prices was a significant factor slowing the economy in the recession, and financial products linked to real estate valuations were central to many aspects of the global financial crisis. The short-term policy response did not lose sight of this key fact. By establishing the Home Affordable Refinance Program (HARP), the Obama Administration helped more than 3 million borrowers refinance their loans and save hundreds of dollars each month. The Administration also eliminated additional barriers to refinancing and proposed reforms so that all responsible borrowers with loans insured by Fannie Mae and Freddie Mac would have access to simple, low-cost refinancing.

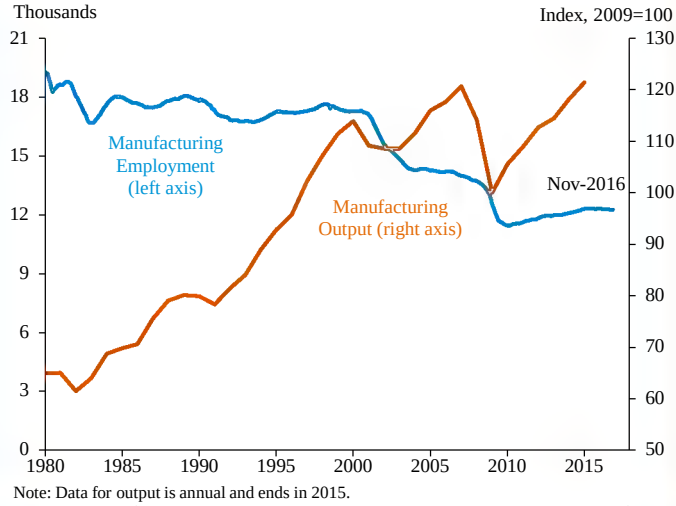
In addition to helping millions of Americans refinance, the Administration created the Home Affordable Mortgage Program (HAMP) to provide millions of homeowners who are behind on their payments an opportunity to modify their mortgages in order to reduce their monthly payments and avoid foreclosure. The Administration also provided over $7 billion in targeted support to the hardest-hit communities who experienced the sharpest declines in home prices. These funds were intended to help manage vacant and foreclosed properties that bring down local home values, support unemployed and underwater homeowners, and convert foreclosed properties into rentals.

Box 1-2: The Manufacturing Sector

A robust manufacturing sector acts as a galvanizing force for America's economic well-being, as it is linked to productivity growth, innovative capacity, and high-quality jobs. The average worker employed in the domestic manufacturing sector earns an hourly wage that is 2 to 9 percent higher than the overall average worker (Nicholson and Powers 2015). Further, the manufacturing sector houses a great deal of innovation, accounting for nearly 80 percent of private-sector research and development (R&D) and the vast majority of patents issued in the United States. The high-quality jobs and innovative capacity of the manufacturing industry, supported by the Administration, serve as investments in a strong macroeconomy and broad-based growth. In the last two decades of the 20th century, manufacturing employment followed a slight downward trend, while manufacturing output rose quickly (Figure 1-i). However, throughout the first decade of the 21st century, employment fell sharply. By the time that the Great Recession hit, the manufacturing sector had already lost 3.5 million jobs relative to January 2000. By the beginning of 2010, the sector had shed another 2.3 million jobs.

Given the importance of the manufacturing sector to the U.S. economy, the Obama Administration made revitalizing domestic performance in this sector a central component of its economic agenda and

Figure 1-i
Manufacturing Output and Employment, 1980–2016



Note: Data for output is annual and ends in 2015.
Source: Bureau of Economic Analysis, National Income and Product Accounts; Bureau of Labor Statistics, Current Employment Statistics; CEA calculations.

worked to promote innovation and invest in manufacturing workforce skills.

The Administration's commitment to manufacturing was manifested in its decision to save the automobile industry. The President made the crucial, early decision to not only rescue, but to also restructure and rebuild American automobile manufacturing and its many connected industries. Yet, support for manufacturing went beyond this rescue. Creating the Manufacturing USA initiative in 2012 marked another significant action taken to support manufacturing. The Federal Government has committed over $600 million—which has been matched by over $1.3 billion in non-Federal investment—to fund the development of world-leading manufacturing capabilities with technologies such as 3D printing, integrated photonics, and smart sensors. In the four years since its establishment, Manufacturing USA has grown from one institute with 65 members to a network of nine institutes and over 1,300 members.

Further, the Administration has taken steps to reinvest in our manufacturing workforce to prepare it for a more competitive, global economy. First, the Administration awarded nearly $2 billion in Trade Adjustment Assistance Community College Career Training grants to help community colleges expand and improve programs that prepare workers for high-paying, high-skill occupations. To date, nearly 300,000 participants have enrolled in retraining programs through these grants, and 160,000 credentials have been awarded. Second, the Administration has prioritized apprenticeships. Research shows that apprenticeships tend to lead to high-paying jobs and provide a strong return on investment for employers. Recent Department of Labor data indicate that after completing her programs, the average registered apprentice earns a starting wage above $60,000, and 89 percent of registered apprenticeship program completers enter employment after exiting. To these ends, the Administration has allocated $265 million toward grants aimed at expanding apprenticeships in the United States. Since 2014, active apprenticeships have increased 31 percent, with an estimated 20,000 new apprentices in the manufacturing industry.

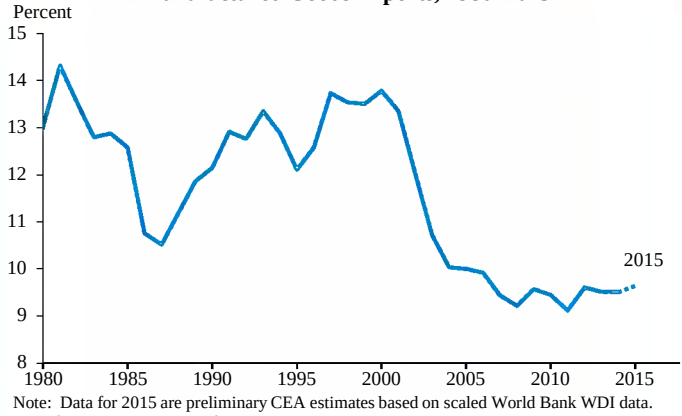
Ultimately, U.S. manufacturing output since the Great Recession has recovered at twice the pace of the overall economy since the third quarter of 2009. This marks the longest period in which manufacturing has outpaced U.S. economic output in 50 years. Contrary to the pattern in all other U.S. expansions since 1982, the current expansion has seen an increase in manufacturing output as a share of U.S. value-added. Notably, the U.S. manufacturing sector's job growth since the Great Recession is a marked departure from last decade, when the sector

struggled to recover the jobs lost in the 2001 recession. Since February 2010, U.S. manufacturing has added over 800,000 new jobs.

Following the strong manufacturing recovery in the expansion after the Great Recession, the manufacturing sector has seen lackluster output and employment growth since 2014. The sector is inextricably tied to the global economy, and as global demand has slowed and energy-related capital expenditure has fallen, U.S. manufacturing has suffered. Global economic output, as one of the key drivers of export demand, is particularly important to manufacturing, as it is a far more trade-exposed sector than other parts of the economy. For example, while manufacturing represents roughly 12 percent of value added in the economy, manufactured exports have maintained a share of more than 60 percent of U.S. exports. Real exports rebounded swiftly after the crisis, helping the manufacturing sector. But recently, real exports of goods and services have fallen slightly, tied in large part to slower foreign GDP growth and a strong U.S. dollar. Moreover, recent declines in energy prices have affected many manufacturing industries that serve as significant upstream suppliers for the energy sector, such as steel manufacturers that supply oil producers.

Yet, even despite these headwinds, manufacturing job growth over the last two years is comparable with its *best* two years in the previous

Figure 1-ii
U.S. Manufactured Goods Exports as a Share of World Manufactured Goods Exports, 1980–2015



Note: Data for 2015 are preliminary CEA estimates based on scaled World Bank WDI data. Manufactured exports are defined by SITC sections 5, 6, 7, and 8 (which includes iron and steel, chemicals, machinary and transport vehicles, and textiles), but exclude division 68 (non-ferrous metals) and group 891 (arms and amunition). This differs from the Census definition of manufacturing, which is based on NAICS codes 31-33.
Source: World Trade Organization; IMF International Financial Statistics; Eurostat Comext; World Bank.

expansion, a period of low production and negative employment growth in the sector. Further, the underlying structure of the sector is robust. One clear piece of evidence regarding the continued resilience of the U.S. manufacturing industry is that the United States has stabilized its market share in global manufacturing exports (Figure 1-ii). This stabilization is all the more notable given that the U.S. share of world manufacturing exports fell precipitously in the first half of the 2000s. These are signs that the headwinds that the U.S. manufacturing sector is facing are likely temporary and will subside as the underlying strength of the sector continues to support the U.S. macroeconomy.

The Impact of the Policy Response

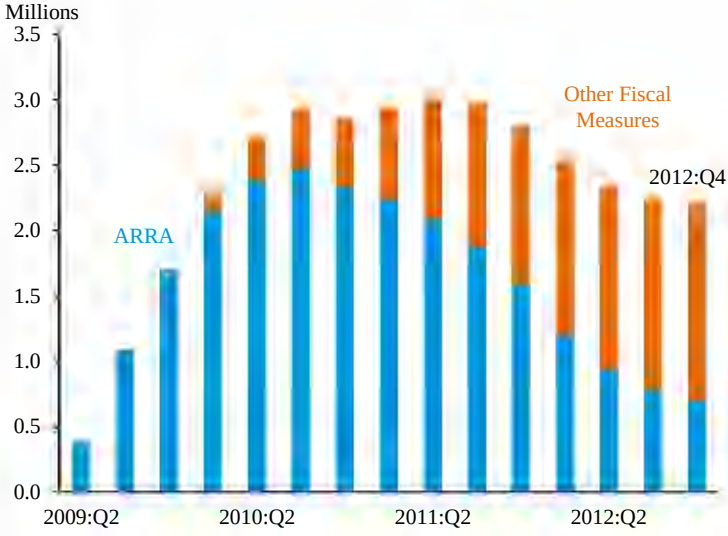
A number of studies adopting a wide range of approaches to measuring the effect of the Recovery Act and subsequent fiscal measures find a large positive impact on output and employment (CEA 2014). Overall, CEA estimates that the Recovery Act saved or created about 6 million job-years (where a job-year is the equivalent of one full-time job for one year) through 2012 and raised the level of GDP by between 2 and 2.5 percent in FY 2010 and part of FY 2011. Combining effects of the Recovery Act and additional countercyclical fiscal legislation that followed, CEA estimates that the cumulative gain in employment was about 9 million job-years through the end of 2012 (Figure 1-10a). The cumulative boost to GDP from 2009 to 2012 was equivalent to about 9.5 percent of the level of GDP in the fourth quarter of 2008 (Figure 1-10b).

CEA's results are consistent with outside estimates, including those from CBO and academic researchers. These include studies that focus on portions of the Recovery Act that provided relief to States in ways that were not tied to current conditions (Feyrer and Sacerdote 2011; Chodorow-Reich et al. 2012), as well as those taking a broader view of the Federal policy response to the crisis and recession. Blinder and Zandi (2015) find that in the absence of policy actions by the Bush and Obama Administrations, Congress, and the Federal Reserve, the peak-to-trough decline in real GDP would have been nearly 14 percent (instead of 4 percent), the unemployment rate would have risen to nearly 16 percent (instead of 10 percent), and real output would have contracted for 13 quarters (instead of six).[2]

[2] For a more comprehensive discussion of methods of estimating the impact of the Recovery Act and subsequent fiscal measures, see Chapter 3 of the 2014 *Economic Report of the President*.

Figure 1-10a

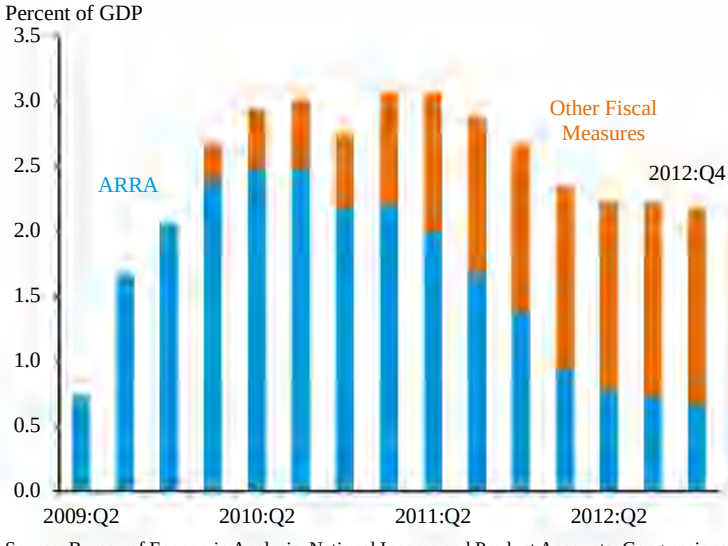
Quarterly Effect of the Recovery Act and Subsequent Fiscal Measures on Employment, 2009–2012



Source: Bureau of Economic Analysis, National Income and Product Accounts; Congressional Budget Office; CEA calculations.

Figure 1-10b

Quarterly Effect of the Recovery Act and Subsequent Fiscal Measures on GDP, 2009–2012



Source: Bureau of Economic Analysis, National Income and Product Accounts; Congressional Budget Office; CEA calculations.

The 2017 *Economic Report of the President*: Promoting Stronger, More Inclusive, and More Sustainable Growth

The response of the Federal Government to the crisis averted a sharper and more prolonged downturn and put the U.S. economy back on a path to growth. Even so, a number of decades-long trends that preceded the crisis—rising inequality, insufficient health insurance coverage, high health care costs, and growing costs for higher education—still remained, preventing middle-class Americans from seeing gains in their incomes, economic security, and standards of living. Addressing these barriers to inclusive growth has been the cornerstone of the Obama Administration's economic policy, which has been focused not only on returning the U.S. economy back to stability, but on setting it on a firmer path to sustained growth that is broadly shared among all American families.

The Administration's reforms—and their effects on the U.S. economy and American families—are the main topic of this year's *Economic Report of the President*. Following a summary of macroeconomic developments in the last year (Chapter 2), each subsequent chapter focuses on a different aspect of the Obama Administration's economic record, describing the great strides that the Nation has made in building a stronger foundation for future prosperity.

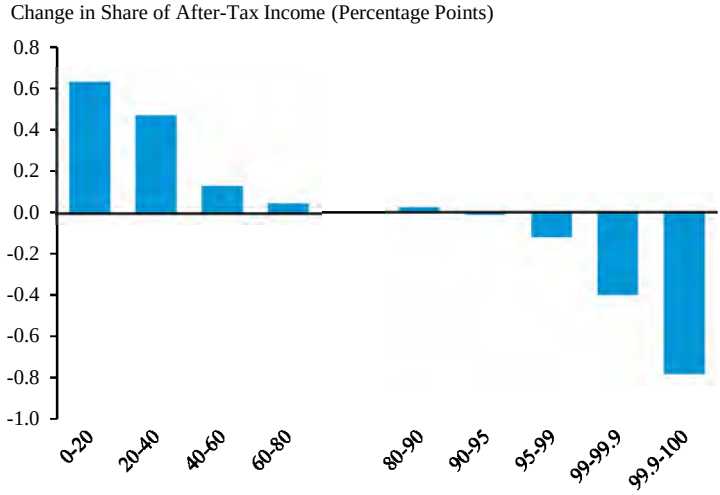
Chapter 3: Reducing Inequality

The legislation President Obama fought for and signed into law represents a historic accomplishment in reducing inequality. The Administration has achieved its most substantial and immediate success in this respect in three areas: restoring economic growth, expanding health insurance coverage, and enacting a fairer tax code.

The policy response to the Great Recession served a dual role in reducing inequality. It reduced inequality in after-tax incomes directly through progressive tax and spending policies, such as temporary tax cuts for working and middle-class families and extensions of unemployment insurance, and it reduced wage inequality indirectly by boosting employment. By reducing unemployment, these policies offset roughly half of the increase in wage inequality that would otherwise have occurred if more workers lost their jobs and saw their wages fall to zero.

In addition to providing substantial gains in health insurance coverage (see below), the ACA also led to a large reduction in inequality in after-tax incomes. Meanwhile, progressive changes in tax policy have increased

Figure 1-11
Change in Share of After-Tax Income by Income Percentile: Changes in Tax Policy Since 2009 and ACA Coverage Provisions, 2017



Source: U.S. Treasury, Office of Tax Analysis.

tax rates for the highest-income Americans and increased the generosity of tax credits for working families, reducing inequality in after-tax incomes.

Together, changes in tax policy and the ACA coverage provisions will increase the share of after-tax income received by the bottom quintile of households in 2017 by 0.6 percentage point, or 18 percent—equivalent to more than a decade of average income gains—and the share received by the second quintile by 0.5 percentage point, or 6 percent. At the same time, they will reduce the share received by the top 1 percent by 1.2 percentage points, or 7 percent (Figure 1-11). These changes will increase average tax rates for the top 0.1 percent of families, a group projected to have average pre-tax incomes over $8 million, by nearly 7 percentage points.

The impacts of these policies are large relative to previous Federal policy actions. Tax changes enacted since 2009 have boosted the share of after-tax income received by the bottom 99 percent of families by more than the tax changes of any previous administration since at least 1960. President Obama has overseen the largest increase in Federal investment to reduce inequality since the Great Society programs of the Johnson Administration. However, while these accomplishments are historically large, they have offset only a fraction of the decades-long increase in inequality, and much more work remains to be done.

Chapter 4: Reforming the Health Care System

The Obama Administration has made dramatic progress in ensuring that all Americans have access to affordable, high-quality health care by expanding and improving health insurance coverage and reforming the health care delivery system.

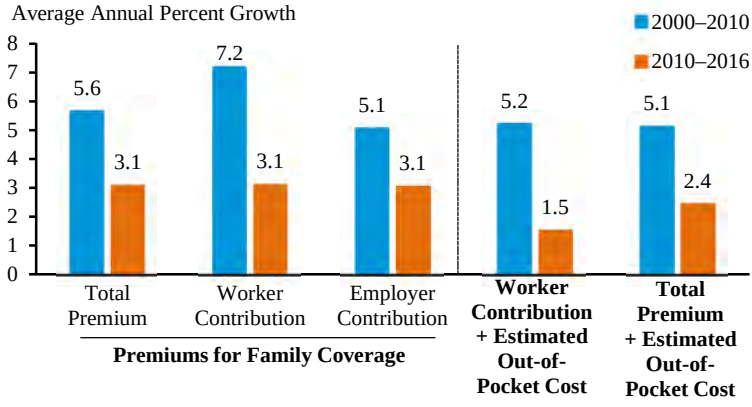
In his first month in office, President Obama signed legislation improving the Children's Health Insurance Program (CHIP). Slightly more than a year later, the President signed into law the ACA, which reformed the individual health insurance market to ensure that all Americans, including people with pre-existing health conditions, could find affordable, high-quality coverage; provided generous financial support to States that expand their Medicaid programs to cover more low-income Americans; and allowed young adults to remain on a parent's plan until age 26, among other reforms. The ACA also improved financial security and access to care for those already insured, including by ensuring that everyone with private insurance has an annual limit on out-of-pocket spending and closing the Medicare Part D coverage gap.

Together, these actions have led to a historic expansion of health insurance coverage. Because of the ACA, an estimated 20 million additional adults now have health insurance. In addition, thanks in large part to the ACA and improvements to CHIP, the uninsured rate among children has fallen by almost half since the President took office, providing health insurance to more than 3 million additional children. As of 2016, the uninsured rate stands at its lowest level ever. Evidence demonstrates that broader insurance coverage is improving access to care, health, and financial security for the newly insured, while reducing the burden of uncompensated care for the health care system as a whole, without the adverse effects on the labor market that critics of the ACA had predicted.

The ACA and related legislation have also implemented comprehensive reforms to make the health care delivery system more efficient and improve the quality of care. The ACA achieved significant near-term savings by better aligning payments to medical providers and private insurers in Medicare with the costs of providing services. The law also began a long-term process of deploying alternative payment models (APMs) that, unlike existing fee-for-service payment systems, reward providers who deliver efficient, high-quality care, rather than just a high quantity of services. As of early 2016, more than 30 percent of traditional Medicare payments were associated with APMs, up from virtually none in 2010. The tools provided by the ACA, enhanced by the bipartisan physician payment reform legislation enacted in 2015, will enable further progress in deploying APMs in the years ahead.

Figure 1-12

Growth in Real Costs for Employer-Based Family Coverage, 2000–2016



Note: Out-of-pocket costs were estimated by first using the Medical Expenditure Panel Survey to estimate the out-of-pocket share in employer coverage for 2000–2014 and then applying that amount to the premium for each year to infer out-of-pocket spending. The out-of-pocket share for 2015 and 2016 was assumed to match 2014. Inflation adjustments use the GDP price index. GDP price index for 2016 is a CBO projection.
Source: Kaiser Family Foundation/Health Research and Educational Trust Employer Health Benefits Survey; Medical Expenditure Panel Survey, Household Component; CEA calculations.

Health care costs have grown exceptionally slowly since the ACA became law. Prices of health care goods and services have grown at a slower rate under the ACA than during any comparable period since these data began in 1959, and recent years have also seen exceptionally slow growth in per-enrollee spending in both public programs and private insurance. The reforms implemented in the ACA have made an important contribution to these trends. CBO estimates imply that the ACA has reduced the growth rate of per-beneficiary Medicare spending by 1.3 percentage points per year from 2010 through 2016, and "spillover" effects of these reforms have subtracted an estimated 0.6 to 0.9 percentage points per year from the growth rate of per-enrollee private insurance spending over the same period. Moreover, there is reason to believe that the ACA has had systemic effects on trends in costs and quality that go beyond these estimates.

Because of slow growth in costs in employer coverage, illustrated in Figure 1-12, the average costs for a family with employer-based coverage in 2016 were $4,400 below where they would have been had costs grown at their pace over the decade before the ACA became law. Similarly, the premium and cost sharing amounts incurred by the typical beneficiary enrolled in traditional Medicare in 2016 are about $700 below 2009 projections, even before accounting for reductions in cost sharing for prescription drugs due

to the ACA and other factors. The ACA and the accompanying slow growth in health costs have also driven dramatic improvements in the Nation's long-term fiscal outlook, while at the same time adding 11 years to the life of the Medicare Trust Fund.

In parallel, the ACA's reforms have helped drive major improvements in health care quality. Since 2010, the rate at which patients are harmed while seeking hospital care has fallen by 21 percent, which is estimated to have led to approximately 125,000 avoided deaths through 2015. Payment incentives created in the ACA have also driven a substantial decline in the rate at which patients return to hospital after discharge, corresponding to an estimated 565,000 avoided readmissions from April 2010 through May 2015.

Chapter 5: Investing in Higher Education

The Obama Administration made great strides to help students make more effective investments in higher education. To help expand college opportunity, the President doubled investments in higher education affordability through Pell Grants and the American Opportunity Tax Credit (AOTC). To help more students choose a college that provides a worthwhile investment, the Administration provided more comprehensive and accessible information about college costs and outcomes through the College Scorecard, simplified the Free Application for Federal Student Aid (FAFSA), and protected students from low-quality schools through a package of important consumer protection regulations including the landmark Gainful Employment regulations. To help borrowers manage debt after college, income-driven repayment options like the President's Pay as You Earn (PAYE) plan have allowed borrowers to cap their monthly student loan payments at as little as 10 percent of discretionary income to better align the timing of student loan payments with the timing of earnings benefits from attending college (Figure 1-13).

Moreover, Administration efforts to improve PreK-12 outcomes have helped to better prepare students for success in college and in their careers. The wide-ranging set of policies have included increasing funding for educators in the Recovery Act; expanding funding for high-quality early education programs; improving the research evidence base with Investing in Innovation (i3) grants and better data systems; closing gaps in opportunity with School Improvement Grants and other programs at disadvantaged schools; and encouraging excellence for all students with higher standards and stronger teaching.

The benefits of some of these policies are already evident, while many more will be realized over the coming decades. For example, CEA analysis finds that the Pell Grant expansions since 2008-09 enabled at least 250,000

Box 1-3: The Administration's Record in the Technology Sector

The technological advancements of the 21st century, like cloud computing, personalized medicine, and advanced materials, not only improve our daily lives, but also have the potential to increase productivity growth, one of the most important factors in raising standards of living and incomes. The Obama Administration has been dedicated to laying the groundwork for technology to improve the lives of all Americans. It has created and updated essential infrastructure for providing more equitable access to technology and worked to modernize America's institutions so that they support, rather than inhibit, innovation. The Administration has also placed a large emphasis on preparing Americans for the 21st century economy. (For a discussion of the economic impact of a number of these policies, see Chapter 5 of the 2014 *Economic Report of the President* and Chapter 5 of the 2016 *Economic Report of the President*.)

The Administration has worked to ensure that the technological infrastructure is in place, and the rules of the road are set, so that all Americans can benefit from technology. The American Recovery and Reinvestment Act provided funding to deploy or upgrade more than 114,000 miles of new broadband infrastructure, consistent with the President's goal of enhancing consumer welfare, civic participation, education, entrepreneurial activity, and economic growth through greater access to broadband. The Recovery Act financed additional broadband projects totaling $2.9 billion, bringing high-speed Internet access to 260,000 more rural households, 17,500 businesses, and 1,900 community facilities. Indeed, average home Internet speed in the United States has tripled over the past four years.

In addition, the Administration has taken unprecedented action to free up spectrum—the airwaves that carry our wireless communications—with Presidential Memoranda directing the Department of Commerce, through the National Telecommunication and Information Administration, to collaborate with the Federal Communications Commission (FCC) to make available 500 MHz of spectrum for mobile broadband use by 2020 and to accelerate spectrum sharing efforts. The Nation is halfway to the 500 MHz goal, thanks to the hard work of nearly two dozen Federal agencies to free up spectrum for auction and innovative new plans to share the airwaves. The FCC's 2015 spectrum auction was its most successful ever, raising more than $40 billion in revenue for the Federal Government while spurring the deployment of faster wireless and mobile broadband. Thanks in large part to these efforts, we have achieved the President's 2011 State of the Union goal that more

than 98 percent of Americans should have access to fast 4G/LTE mobile broadband.

Further, the President supported FCC rules to protect net neutrality—the concept that Internet providers must treat all Internet traffic equally. By putting into effect strong net neutrality rules, the FCC has helped ensure that the Internet remains open, fair, and free.

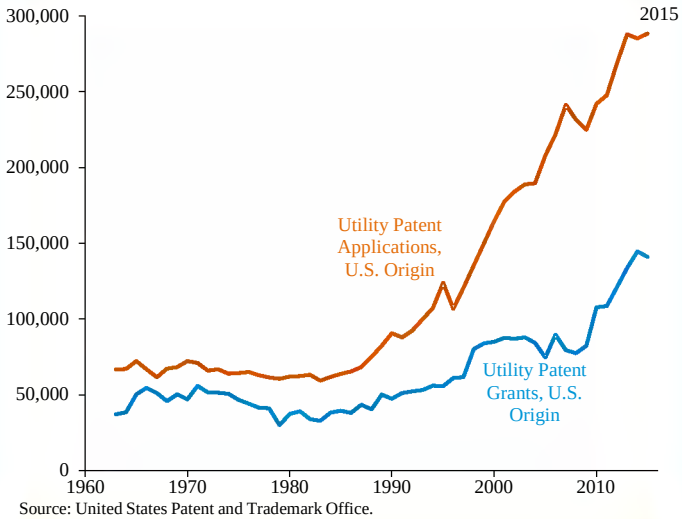
In addition to updating physical infrastructure, the Administration set about making sure that America's institutions better support innovation. For example, the Administration recognized that the U.S. patent system needed to be updated to address the needs of America's entrepreneurs. From excessive wait times, to decreasing patent quality, to overly aggressive Patent Assertion Entities, the patent system was doing more to stifle innovation than promote it. The America Invents Act (AIA) of 2011 helped reform the patent system, leading to a 20 percent reduction in patent wait times from 2011 to 2016 and establishing a tribunal-based process for patent disputes, leading to an increase in patent quality. These reforms help ensure that all entrepreneurs will have fair and easy access to the patent system and increased incentives to innovate, supporting a roughly 30 percent increase in U.S. patents granted from 2011 to 2015 (Figure 1-iii).

Finally, President Obama prioritized education and training to ensure that everyone is able to fully enjoy the benefits of today's technological progress. Over half a million of today's open jobs are in technology fields such as software development and cybersecurity—many of which did not even exist a decade ago. The average salary in a job that requires technology skills is 50 percent more than the average private-sector job. For this reason, the Administration has prioritized investing in America's youngest generation so that they have the necessary skills to succeed in science, technology, engineering, and math (STEM) fields.

The U.S. technology sector has thrived since 2009, with rapidly growing new sectors like the "app economy," rising valuations and venture capital for technology firms, robust growth in technology employment, and the positioning of major U.S. technology firms as global leaders. And technology employment and investment are not limited to the computer hardware, software, and Internet industries. Advanced manufacturing, health care, and many other industries increasingly employ software engineers and data specialists, and have seen parallel improvements. These successes are due to the innovation and skills of American businesses and workers, and the Administration has worked to ensure that government has played its role to enable these successes.

Administration efforts have secured more than $1 billion in private investment in STEM education and, since 2008, STEM degrees as a

Figure 1-iii
Utility Patent Applications and Grants, 1963–2015

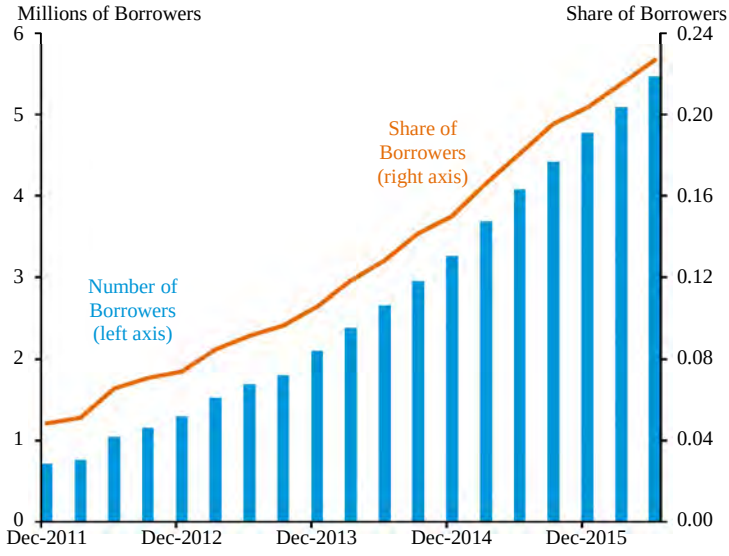


Source: United States Patent and Trademark Office.

share of total degrees awarded have grown 12.4 percent overall, and 20.3 percent for women. More than 100,000 engineers are graduating from American schools every year, a new record, and the Nation is 30 percent of the way to achieving the President's goal of training 100,000 new STEM educators. Further, the Administration has helped workers get the skills and training they need for jobs in the 21st century. The TechHire initiative—which works to expand local tech sectors by providing training assistance through grants and public-private partnerships and has now been rolled out to 50 communities with 600 employers participating—is actively drawing on people from all backgrounds, including young adults who are disconnected from school and work, the long-term unemployed, and those living in rural areas where access to technology training is scarce. In support of TechHire, the Department of Labor awarded 39 grants—totaling $150 million—for programs in 25 States and Washington, DC to support innovative ways to get more than 18,000 participants on the fastest paths to well-paying jobs in in-demand sectors such as information technology (IT), healthcare, advanced manufacturing, and financial services.

Figure 1-13

Borrowers in Income Driven Repayment Over Time



Note: Data are restricted to Federally-managed debt.
Source: Department of Education

students to access or complete a college degree in 2014-15, leading to an additional $20 billion in aggregate earnings. This represents a nearly two-to-one return on the investment. While more work remains, these policies taken together represent a significant step forward in building an educational system that supports and encourages all Americans who wish to invest in an affordable, high-quality college education to do so.

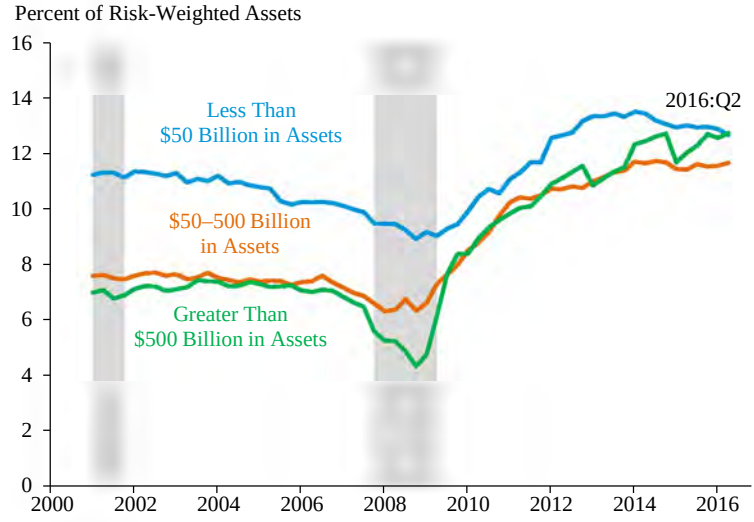
Chapter 6: Strengthening the Financial System

The 2007-08 financial crisis revealed a number of fault lines in the U.S. financial system. Many banks were inadequately capitalized, did not have enough liquidity, and took too many risks. Many non-bank financial firms faced the same risks as banks, but lacked the same regulatory supervision or protection against runs. In addition, gaps in the regulatory architecture meant that financial regulators lacked a holistic view of the risks in the system.

Responding quickly, the Obama Administration, Congress, and Federal regulators addressed these failures by adopting necessary reforms to the financial system. Financial reform included measures aimed to improve the safety and soundness of individual financial institutions by not only increasing their capital and liquidity but also decreasing risky behavior.

Figure 1-14

Tier 1 Common Equity Ratios for U.S. Banks by Bank Size, 2001–2016



Note: Shading denotes recession. Includes data for U.S. bank holding companies (BHCs) and "stand-alone" banks not controlled by a BHC, but not savings bank holding companies, branches and agencies of foreign banks, or nonbanks that are not held by a U.S. BHC.
Source: Federal Reserve Bank of New York; Haver Analytics.

These reforms should increase the banking sector's ability to absorb shocks arising from financial and economic stress. Other reforms included measures aimed at reducing systemic risk in the financial system by bringing more of the financial system under a regulatory umbrella, improving financial regulatory coordination, and ensuring that individual financial institutions can fail without derailing the system. Also included were specific measures designed to increase transparency and accountability in financial markets in addition to providing additional consumer and investor protections.

Financial reform has helped make the financial system more secure by requiring financial firms to have less unstable funding, more liquid assets, higher capital levels (Figure 1-14), and reduced risk-taking. The recovering economy and implementation of financial reform have been accompanied by strong performance of a wide variety of financial market indicators. Not only have financial markets recovered from the losses suffered during the crisis, but banks are healthier and stronger, regulators are on the lookout for systemic risk, once-opaque derivatives markets are safer and more transparent, credit ratings agencies are subject to more effective oversight and increased transparency, and investor protections have been strengthened. The recovery of markets—particularly those that serve a core role in the economy, such as equity and housing markets—is also an indicator of the

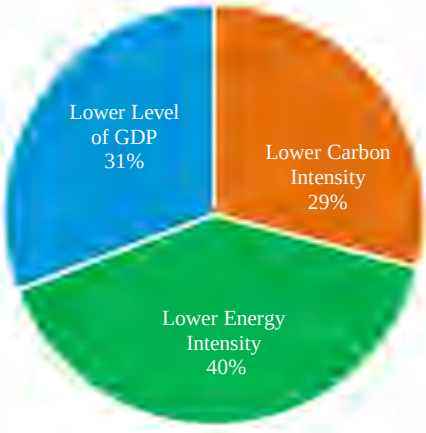
success of the financial rescue and reform efforts in this Administration. Banks and other financial institutions now face different rules designed to make them safer and less of a threat to the overall system. In many ways, these longer-run reforms have reshaped and ensured greater resilience in the financial regulatory system of the United States.

Chapter 7: Addressing Climate Change

The Obama Administration has also demonstrated a commitment to fighting climate change through a diverse set of policy approaches. In 2009, the Administration made a historic investment of more than $90 billion in clean energy in the Recovery Act, helping to spur both a dramatic increase in clean energy capacity and advances in clean energy technology. The President's 2013 Climate Action Plan mapped out a new framework for the transformation to a more energy-efficient economy with lower greenhouse gas emissions. Related policies and initiatives included the first-ever Federal greenhouse gas pollution standards for power plants, light-duty cars and trucks, and commercial trucks, buses, and vans; investments in research and development to support innovative clean energy technologies; enhanced incentives for renewable energy and improvements in the energy efficiency of homes and appliances; and stronger international cooperation to drive down greenhouse gas emissions and limit increases in global temperatures. The Administration has worked to ensure that environmental regulations are undertaken in an efficient and cost-effective manner, as documented by rigorous regulatory impact analysis.

The Administration's policies have supported a considerable shift toward clean energy resources. From 2008 to 2015, energy intensity, energy consumed per dollar of real GDP, fell by 11 percent; carbon intensity, the amount of carbon dioxide emitted per unit of energy consumed, declined by 8 percent; and, as a result, carbon dioxide emitted per dollar of GDP declined by 18 percent. In fact, U.S. carbon dioxide emissions from the energy sector fell by 9.5 percent from 2008 to 2015, and in the first six months of 2016 they were at their lowest level in 25 years. This encouraging drop in carbon intensity was not anticipated, even as recently as 2010, and was driven both by an increase in renewable energy and increased use of cleaner fossil fuels like natural gas. CEA analysis shows that more than two-thirds of the decline in emissions relative to 2008 can be attributed to decreased energy intensity (40 percent) and carbon intensity (29 percent), with the remaining 31 percent of the emissions decline due to the lower-than-expected level of GDP after unanticipated shocks such as the Great Recession (Figure 1-15).

Figure 1-15
Decomposition of Total CO_2 Emission Reductions, 2008–2015



Source: Bureau of Economic Analysis, National Income and Product Accounts; Energy Information Administration, Monthly Energy Review (August 2016) and Annual Energy Outlook (2008); CEA Calculations.

Box 1-4: Administration Actions in the International Economy

The Obama Administration moved on several international fronts to promote America's prosperity and security. These include: global policy leadership and cooperation; expanding opportunities for U.S. businesses, farmers, entrepreneurs, and consumers through trade; and, advocating for more inclusive global economic growth, development and health, including in the most vulnerable areas of the world.

Global economic cooperation. Elevating the G-20 to be the premier forum for international economic cooperation was a critical part of the Obama Administration's economic strategy. The elevation of the G-20 has advanced the goal of a more representative and inclusive global economic governance, allowing leaders representing approximately 85 percent of global economic output to work together towards the shared objective of strong, sustainable, balanced, and inclusive global growth. The G-20 in turn worked to launch reforms that modernized and strengthened the international financial architecture, including historic recapitalization and reform across multilateral development banks and commitment to reform of the quota and governance system of the International Monetary Fund (IMF). Taken together, these steps have

reinforced U.S. leadership in the rules-based global economic system that has prevailed since the end of World War II.

Within months of taking office, in April 2009, the President joined the second-ever summit meeting of the G-20 leaders. At that time, the global economy was shrinking for the first time in half a century as the world dealt with the financial crisis and its aftershocks. Together, the G-20 countries mobilized trillions of dollars in fiscal stimulus and expanded the resources of the IMF and Multilateral Development Banks by $1 trillion. The G-20 created the Financial Stability Board, which has helped to coordinate the G-20's financial reform agenda and to put in place international policies to end "too-big-to-fail." This has made the global economy better able to weather financial shocks and to prevent these shocks from causing broader economic damage on Main Street and across borders. The G-20 countries agreed to refrain from beggar-thy-neighbor competitive devaluation of currencies and to take actions against tax havens and profit shifting. By 2016, both the U.S. and global economies are substantially stronger than they were—though more work remains to be done.

In addition to immediate crisis response, the G-20 is taking steps to build a framework for strong, sustainable, balanced, and inclusive growth in the long term. These have included commitments to increase female labor force participation, phasing-out of fossil fuel subsidies, implementing strategies to create jobs and boost investment, and commitments to promote sustainable development. In 2010, the Obama Administration hosted the first meeting of G-20 labor and employment ministers in Washington and committed to spur action to create quality jobs, lift living standards, and promote broadly shared prosperity. Since then, G-20 member nations have committed to bring more women into the labor force, reduce income inequality, address youth unemployment, and invest in workforce sustainable development, including through quality apprenticeships and other measures. They have also improved financial transparency and made significant progress to address corruption around the world.

Expanding opportunities for U.S. businesses, farmers, entrepreneurs, and consumers through trade. The United States has initiated and strengthened high-standards trade agreements with countries across the world, seeking to open foreign markets to U.S. goods and services and ensure a level playing field for workers and businesses. At the same time, U.S. consumers enjoy opportunities to shop from the world, expanding their choices and stretching their budgets further.

- Free Trade Agreements (FTAs) with Korea, Panama, and Colombia were signed, approved by Congress, and entered into force in

2012. From 2009 to 2015, U.S. export growth was substantially higher to FTA partners than to non-FTA partners.

- President Obama called for global free trade in environmental goods in his Climate Action Plan in 2013 and, the following year, the Administration commenced negotiations on the Environmental Goods Agreement with a group of countries that accounts for more than 85 percent of global trade in environmental goods.
- The Obama Administration lifted sanctions on Cuba and Myanmar (formerly known as Burma), laying the path for increased economic engagement and U.S. investment.
- The Trans-Pacific Partnership (TPP) agreement would eliminate over 18,000 tariffs, establish the highest labor and environmental standards of any trade agreement in history, enhance opportunities for small and medium enterprises, promote Internet-based commerce, protect American workers and businesses from unfair competition from foreign state-owned enterprises, and strengthen transparency and anti-corruption.

Global development and health. President Obama has also worked intensively to elevate global development as a central pillar of our national security policy, on par with diplomacy and defense, as articulated in Presidential Policy Directive 6 on U.S. Global Development Policy. In 2015, the United States joined the rest of the world in adopting the 2030 Agenda for Sustainable Development, which sets out an ambitious global development vision and priorities for the next 15 years that strive to end extreme poverty and to prioritize policies and investments that have long-term, transformative impact. The Administration has harnessed donor assistance, domestic resource mobilization, and private-sector capital to promote the development agenda in health, livelihoods, food security, and energy.

Programs building domestic resources have taken a variety of forms. The Addis Tax Initiative, launched by the United States in July 2015, is an example of how the Administration has worked to help developing countries mobilize and effectively use their own domestic resources for sustainable development. In a similar vein, the U.S. Government's Feed the Future program helped over 9 million smallholder farmers, food producers, and rural families adopt innovations and new practices to improve domestic agricultural productivity in 2015 alone. Also in 2015, the President and the First Lady launched Let Girls Learn to address the challenges preventing adolescent girls from obtaining a quality education and to empower them to reach their full potential, building crucial human capital in vulnerable communities. In 2011, President Obama joined with seven other heads of state to launch the Open Government

Partnership (OGP), a global partnership between governments and civil society to advance transparency and accountability, bolster citizen engagement, and leverage new technologies to strengthen governance.

The Administration also has promoted new public- and private-sector efforts to harness cutting-edge technologies, including to accelerate research and scale innovations to support sustainable development. In 2015 alone, USAID maintained over 360 active public-private partnerships that, over their active lifetimes, have leveraged over $5.9 billion from the private sector and other partners. Through FY 2014, the Overseas Private Investment Corporation (OPIC) supported more than $35 billion in private investment in developing and emerging markets. The Administration's Power Africa initiative has successfully built a broad coalition of more than 130 bilateral, multilateral, and private-sector partners who have collectively committed to invest more than $52 billion in the energy sector in sub-Saharan Africa, where two-thirds of the population lack access to electricity.

The Administration also has fought aggressively for global health by building on successful existing programs and launching new initiatives. President Obama built on the President's Emergency Program for AIDS Relief (PEPFAR) launched by President George W. Bush, bringing the prospect of an AIDS-free generation within sight. Over the past 15 years, investments in the President's Malaria Initiative, the Global Fund to Fight AIDS, Tuberculosis, and Malaria, and other partnerships have averted an estimated 6.2 million malaria deaths. In addition, the Obama Administration has challenged the world to end preventable child and maternal deaths, and, since 2008, efforts by USAID have helped save the lives of 4.6 million children and 200,000 mothers.

Four Continued Structural Challenges: Productivity, Inequality, Participation, and Sustainability

The Obama Administration has taken great strides in addressing many structural barriers to inclusive growth over the last eight years, working to ensure both that growth is stronger in the future and that the benefits of this growth are more widely shared among American households. However, these efforts have only started to address the structural obstacles to future prosperity for middle-class families. Many of these barriers have been decades in the making, and many are shared across a wide range of advanced economies. Addressing four of these structural challenges—boosting productivity growth, combatting rising inequality, raising labor force

participation, and building a resilient economy that does not grow today at the expense of the future—will be critical in the years ahead.

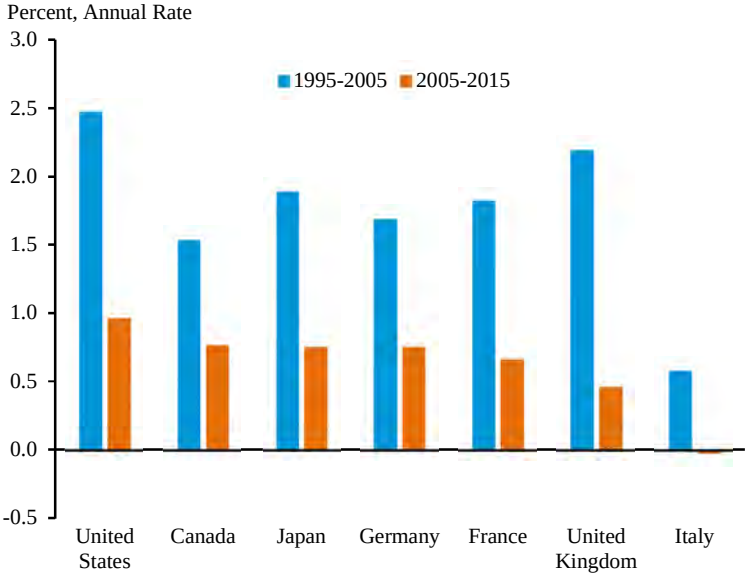
Productivity Growth

The single most important determinant of living standards, across countries and over time, is labor productivity—the amount of output a worker can produce in an hour of work. The evolution of labor productivity growth in the United States since World War II can be roughly partitioned into four regimes. Labor productivity in the nonfarm business sector rose by an average of 2.8 percent a year between 1948 and 1973. Beginning in the early 1970s, though, productivity growth slowed sharply, averaging only 1.4 percent annually between 1973 and 1995. Productivity growth did not rebound meaningfully until the mid-1990s, when information technology advanced at a startling rate. Productivity growth surged, rising 3.0 percent at an annual rate between 1995 and 2005 in the nonfarm business sector. However, from 2005 to 2015, labor productivity growth averaged just 1.3 percent a year, due to slowdowns in both capital deepening and in growth in total factor productivity (a measure of how much output can be produced from a given combination of labor and capital, with increases largely representing advancements in technology, management, and institutions).

The recent slowdown in productivity growth has also been seen in other advanced economies. Average annual productivity growth in advanced economies slowed to less than 1 percent from 2005 to 2015, roughly half the rate of the previous decade—with productivity slowing in 30 of 31 advanced economies, including all of the G-7 economies, as shown in Figure 1-16. Despite its sharp slowdown, the United States has had the strongest record in terms of productivity growth in the last decade among the G-7 economies.

Productivity growth is critical to the long-run health of the U.S. economy because it is a necessary component of both potential GDP growth and real increases in household incomes, and thus living standards. A range of policies can help boost labor productivity growth. These include increasing public investment in infrastructure; providing greater funding for research and development; reforming the business tax code to better incentivize innovation and investment; promoting high-skilled immigration; continuing to improve education and worker training; and expanding trade, which can boost innovation through the spread of ideas across borders, greater specialization in innovative activities, access to larger markets by high-productivity firms, and expanded competition.

Figure 1-16
Labor Productivity Growth, G-7 Countries



Source: Conference Board, Total Economy Database; CEA calculations.

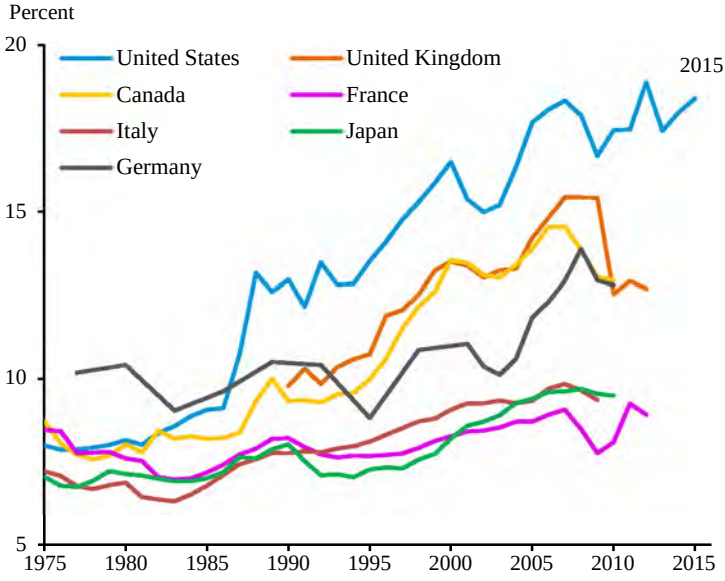
Income Inequality

In the long run, productivity growth is the most important factor in increasing earnings. But income growth for households across much of the distribution also depends on the degree to which economic gains are shared, or, in other words, on the degree of income inequality. Here, too, the trend among advanced economies has been unfortunately similar, with the majority seeing increased inequality in recent decades. However, the United States has the highest levels of inequality, and has seen a faster increase in inequality, than any of the G-7 economies, as shown in Figure 1-17.

As discussed in Chapter 1 of the 2016 *Economic Report of the President*, traditional economic explanations of inequality are grounded in competitive markets, wherein workers receive wages commensurate with their productivity. According to this explanation, a combination of skill-biased technological change, a slowdown in the increase in educational attainment, and globalization have increased the demand for highly skilled workers at the same time that their relative supply has not kept pace—resulting in higher wages for these workers and greater inequality. However, a growing body of evidence has pointed to economic rents as a potential additional source of inequality. Rents occur whenever capital owners or workers receive more income than they would require to undertake their production or work.

Figure 1-17

Share of Income Earned by Top 1 Percent, 1975–2015



Source: World Wealth and Income Database.

Rents could play a role in rising inequality either to the degree that the division of rents is becoming increasingly unequal or to the degree that they are increasing and being captured by capital or by high earners (Furman and Orszag 2015).

Despite the historic progress in rolling back rising inequality over the last eight years described above, more work remains to combat high levels of inequality in the United States in both pre-tax-and-transfer and after-tax-and-transfer incomes. Policies like expanded access to quality education, increasing the minimum wage, providing greater support for collective bargaining and other forms of worker voice, and reforming barriers to mobility like occupational licensing requirements and land-use restrictions to reduce rents can all play a role in reducing inequality. Meanwhile, making the fiscal system more progressive by, for example, expanding tax credits for low-income workers financed by higher tax rates on high-income households would reduce inequality in after-tax incomes. A growing body of evidence has also found that a more progressive fiscal system does not just increase after-tax incomes for low- and moderate-income households; when fiscal transfers (such as programs for health, nutrition, cash assistance, and housing support) are focused on children, they can also increase future earnings and educational outcomes (Furman and Ruffini 2015).

Labor Force Participation

Household incomes also depend on the labor force participation rate: the share of the adult population working or actively in search of work. In recent years, the participation rate has faced substantial downward pressure from the aging of the U.S. population as members of the baby-boom generation begin to retire. This demographic trend implies a decrease in the overall participation rate of about a quarter of a percentage point a year. However, the participation rate has been broadly stable since the end of 2013, as the strong recovery of the U.S. labor market has pulled workers into the labor force and offset the downward pressure from the aging of the population.

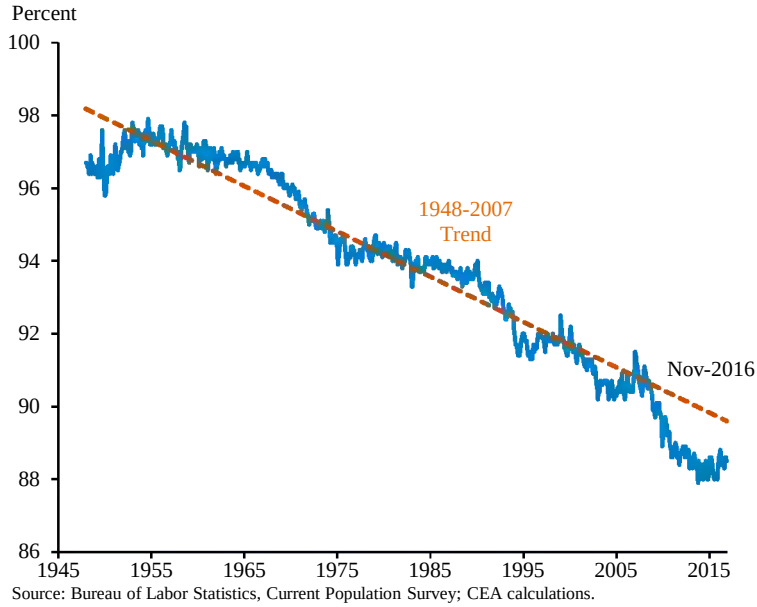
But the United States faces an additional long-run challenge of declining participation among "prime-age" workers, those between the ages of 25 and 54. This troubling pattern in labor force participation goes back for more than a half-century for men and about a decade and a half for women. In 1953, 3 percent of prime-age men did not participate in the labor force. In November 2016, the fraction stood at 12 percent (Figure 1-18a). Nonparticipation has been even higher in recent years for men with less educational attainment: in 2015, 17 percent of prime-age men with a high school degree or less did not participate in the workforce. Meanwhile, 25 percent of prime-age women do not participate in the labor force today, compared to 23 percent in 1999 (Figure 1-18b). Over the second half of the 20th century, the decline in prime-age male labor force participation was largely obscured in aggregate data by rising female participation and favorable demographics. But as the trend for prime-age women plateaued and then reversed, the impact of declining prime-age participation on the overall labor force participation rate has been far clearer in recent years. (For an expanded discussion of the decline in prime-age labor force participation, see Box 2-3.)

The reduced participation rate for prime-age workers in the United States presents a number of challenges, both for these workers' long-term employment prospects and well-being and for the U.S. macroeconomy. Policies to help boost participation include strengthening the "connective tissue" in the U.S. labor markets by, for example, modernizing the unemployment insurance system and expanding wage insurance; promoting work by expanding tax credits for low-income workers and raising the minimum wage; and increasing workplace flexibility by increasing access to paid leave and affordable child care.

Economic Sustainability

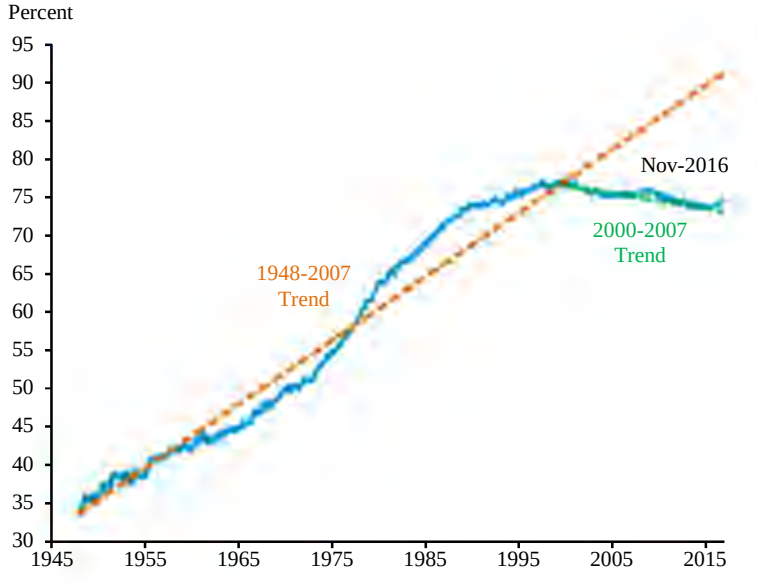
Even as work remains to boost productivity growth and labor force participation and to combat rising inequality, the Nation must take a

Figure 1-18a
Prime-Age Male Labor Force Participation Rate, 1948–2016



Source: Bureau of Labor Statistics, Current Population Survey; CEA calculations.

Figure 1-18b
Prime-Age Female Labor Force Participation Rate, 1948–2016



Source: Bureau of Labor Statistics, Current Population Survey; CEA calculations.

number of steps to ensure that economic growth is sustainable and does not come at the expense of future prosperity.

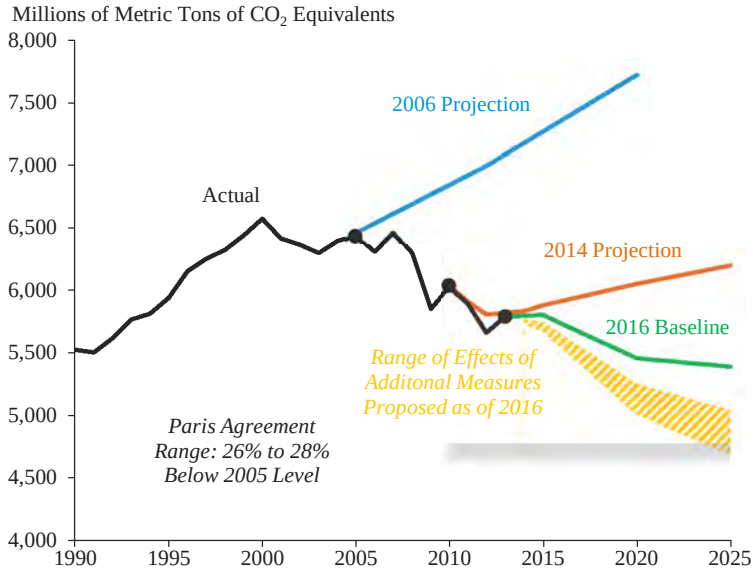
Given the current strong position of the U.S. economy in the business cycle, steps should be taken to protect against future recessions, helping to ensure that just as we avoided a second Great Depression, we are able to avoid a second Great Recession. In particular, modifying the design of automatic stabilizers like unemployment insurance such that they are automatically expanded or extended during downturns would provide better countercyclical support for the economy during recessions (CEA and DOL 2014; Furman 2016b). Moreover, as demonstrated by the Obama Administration's efforts, it is possible to combine short-run fiscal expansion with medium- and long-run fiscal consolidation to maintain fiscal discipline. Further curbs to the growth of entitlement costs that build on the ACA's progress in reducing health care costs, as well as limiting tax breaks for those at the top of the income distribution, can also help address our long-term fiscal challenges without sacrificing investments in growth and opportunity.

Finally, sustainable economic growth also requires addressing both the short- and long-run effects of climate change, which presents large risks not just to our environment but also to economic growth and fiscal sustainability. As discussed above, the Administration has taken ambitious steps to reduce carbon emissions and move toward a clean energy economy, including agreeing to reduce net emissions to between 26 and 28 percent of their 2005 level by 2025 in the historic Paris Agreement (Figure 1-19). But more work remains to ensure that the effects of manmade climate change do not endanger future prosperity. As President Obama has acknowledged, even as the Paris accord has established an enduring framework for confronting the climate crisis, its ambitious goals are not sufficient. More will need to be done to invent new technologies, generate energy from low-carbon sources, and reduce the energy and carbon intensity of our economy so that damage from climate change does not undermine the economy and living standards in the future. As the last eight years have demonstrated, efficient policies tailored to fight climate change can be implemented in ways that support, and do not hinder, economic growth.

Conclusion

The actions undertaken by the Obama Administration in the midst of the crisis not only helped prevent a second Great Depression, they set the U.S. economy on a path to becoming stronger, more resilient, and better positioned to face the economic challenges of the 21st century. In the pages that follow, the 2017 *Economic Report of the President* reviews the efforts of

Figure 1-19
U.S. Net Emissions, 1990–2025



Note: Projections for 2014 and 2016 shown are the "high-sequestration" scenario for each year.
Source: Department of State (2016).

the Obama Administration to ensure economic growth that is both robust and broadly shared among all American families. As the Nation emerges from the shadow of the Great Recession, promoting inclusive, sustainable growth will remain the key objective in the years ahead. While several structural challenges for shared growth remain, the experience of the past eight years shows that, by acting decisively and by choosing the right policies, the United States can build a stronger and more prosperous economy for generations to come.

CHAPTER 2

THE YEAR IN REVIEW AND THE YEARS AHEAD

The U.S. economy continued to grow in 2016, as the recovery extended into its seventh year with strong gains in employment and real wages, low inflation, and moderate output growth. Robust employment growth and moderate output growth imply low labor productivity growth, an important challenge in the years ahead. Strong employment gains along with rising real wages in 2016 were a continuation of the trends in 2015 that helped contribute to the fastest real median income growth on record and, in conjunction, a falling poverty rate.

Real gross domestic product (GDP) increased at an annual rate of 1.8 percent during the first three quarters of 2016 (the latest data available as this *Report* goes to press), down slightly from the 1.9-percent growth during the four quarters of 2015.[1] During the first three quarters of 2016, real consumer spending, which grew at an annual rate of 2.9 percent, exceeded real GDP growth as personal saving rates fell. Residential investment contributed positively to overall real GDP growth in the last quarter of 2015 and the first quarter of 2016, but subtracted from growth in the second and third quarters of 2016. The weakness in residential investment is surprising given the solid fundamentals: low mortgage interest rates, favorable demographic trends, rising real wages, and rising house prices. Business fixed investment contracted in the last quarter of 2015 and the first quarter of 2016, but has since returned to contributing positively, though weakly, to overall growth. Inventory investment—one of the most volatile components of GDP—subtracted from GDP during the five quarters prior to 2016:Q3, in particular in 2016:Q2, before rebounding in the third quarter. Net exports contributed positively to growth in each of the first three quarters of 2016 after subtracting from growth in in the four quarters of 2014 and 2015. Government

[1] The *2017 Economic Report of the President* only discusses the first three quarters of GDP and employment gains through November. It was finalized in December: only the second estimate of 2016:Q3 GDP and the November employment report had been released. Previous *Economic Reports of the President* were finalized in February.

purchases have been roughly neutral in their effect on overall GDP during the first three quarters of 2016.

The economy added 2.3 million jobs during the 12 months ended in November 2016, extending the streak of consecutive months of positive nonfarm employment growth to 74 months. During the 12 months ended in November 2016, nonfarm job growth has averaged 188,000 a month, a somewhat more moderate pace than during 2014 and 2015, but similar to the strong pace during 2011-13. The unemployment rate was down 0.4 percentage point during the 12 months ended in November to 4.6 percent (Figure 2-1). The labor force participation rate during the 12 months ended in November 2016 averaged 0.14 percentage point higher than its 2015 average as the labor market continued to strengthen. The labor force participation rate had been falling since 2008 due to the aging of the population into retirement, cyclical factors, and other long-term trends, but it has rebounded slightly to its 2014 level as the strengthening labor market offset some demographic trends.

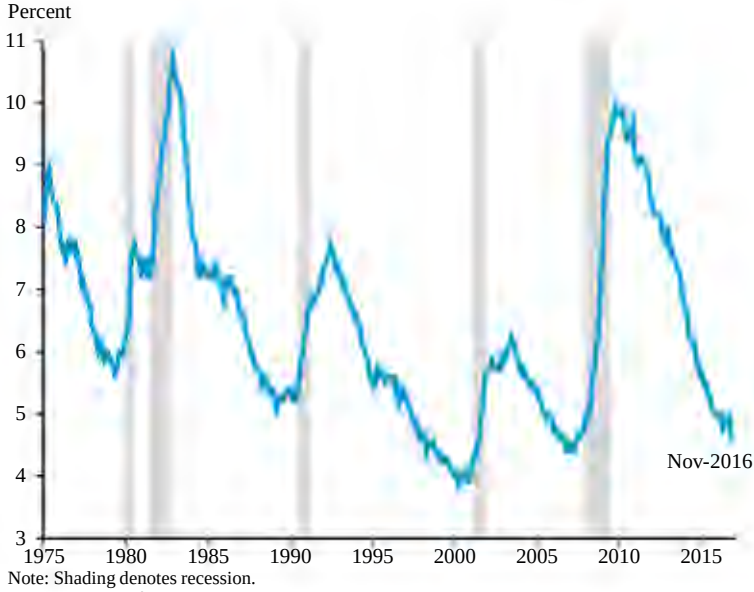
Inflation remained low with consumer price inflation, as measured by the consumer price index (CPI), at only 1.6 percent over the 12 months ended in October 2016. Low energy prices continue to restrain overall inflation. The core CPI, which excludes food and energy, increased 2.1 percent over the 12 months ended in October. Over the same period, core personal consumption expenditure (PCE) inflation increased 1.7 percent, remaining below the Federal Reserve's 2-percent target for overall PCE inflation. Real average hourly earnings of production and nonsupervisory workers rose 0.9 percent over the 12 months ended in October, as nominal wage growth continued to exceed the subdued pace of price inflation, building upon the 2.2-percent gain experienced during 2015 (Figure 2-2). Real median household income increased 5.2 percent in 2015, the fastest growth on record. Households at all income percentiles reported by the Census Bureau saw real gains in income, with the largest gains among households at the bottom of the income distribution.

Challenges remain for 2017 and the longer term, including uncertain prospects for global growth, the low rate of productivity growth, and constraints posed by slowing trend growth in the labor force due to demographic shifts.

The economic recovery that continued in 2016 has been characterized by a robust labor market but modest output growth. The labor market continued to strengthen and, by November 2016, the unemployment rate had fallen to half its peak in October 2009, but the 1.6-percent real output growth during the four quarters ended in 2016:Q3, was slower than its pace in recent years. The dissonance between the robust labor market and moderate output

Figure 2-1

Unemployment Rate, 1975–2016

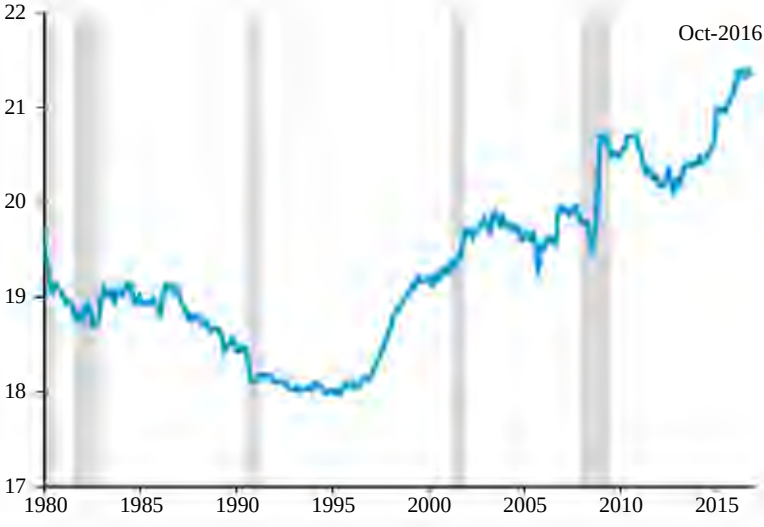


Note: Shading denotes recession.
Source: Bureau of Labor Statistics, Current Population Survey.

Figure 2-2

Real Hourly Wages, 1980–2016

Real Hourly Earnings (2015 Dollars), Private Production and Nonsupervisory Employees



Note: Shading denotes recession. Nominal wages are deflated using the CPI for urban wage earners and clerical workers (CPI-W).
Source: Bureau of Labor Statistics; CEA calculations.

growth reflects slow labor productivity growth during this business cycle relative to its long-term average. Foreign growth showed signs of stabilizing, with the International Monetary Fund (IMF) expecting real output growth over the four quarters of 2016 to be 3.1 percent, the same pace as in 2015 (IMF 2016b). However, the 3.1-percent pace of global growth in 2016 is below the year-earlier expectations (3.6 percent), with slower-than-forecasted growth in both advanced and emerging markets (IMF 2015b). Slow global growth has been a headwind for U.S. exports in recent years (continuing through 2016), especially for U.S. manufacturing, which constitutes 60 percent of U.S. exports, as well as for global trade. However, the outlook is improving in emerging markets with India's growth continuing at a fast pace and with Brazil and Russia likely to return to positive growth in 2017.

The Administration expects real GDP to grow at 2.4 percent during the four quarters of 2017, and 2.2 percent in the long-term, a forecast based on a baseline that assumes enactment of the President's policy proposals. In 2017, consumer spending is expected to continue to support solid growth, along with a pickup in foreign demand. The unemployment rate is projected to fall slightly from its projected fourth-quarter rate of 4.9 percent. Inflation, as measured by the price index for GDP and which was only 1.3 percent during the four quarters through 2016:Q3, is forecasted to creep up gradually to 2 percent, and then to remain at that pace thereafter. The yield on ten-year Treasury notes is projected to edge up from its third quarter level of 1.6 percent toward 3.7 percent in the mid-2020s, partly due to inflation increasing and term premiums returning to more-normal levels.

Policy Developments

Fiscal Policy

Fiscal restraint in the United States continued in fiscal year (FY) 2016 with the Federal Budget deficit (expressed as a share of nominal GDP) rising a moderate 0.7 percentage point to 3.2 percent. The deficit-to-GDP ratio is about equal to the average over the past 40 years, and has fallen by 67 percent since FY 2009. The Federal deficit-to-GDP ratio had declined 1.9 percentage points a year from FY 2012 to FY 2014, but has flattened out in the 2-to-3 percent of GDP range in FY 2015 and FY 2016 under Administration policies.

The President signed three pieces of significant fiscal legislation in 2015. The first was the Bipartisan Budget Act (BBA) of 2015, signed in October, which set discretionary spending limits for the FY 2016 and FY 2017, providing a moderate $80 billion in total sequestration relief, thus

allowing for additional investments in education, job training, research, and health care, as well as postponing reaching the statutory limit on the Federal debt (Somanader 2015). Second, the Fixing America's Surface Transportation (FAST) Act signed into law in December 2015 funded surface transportation including roads, bridges, and rail for five years, authorizing $306 billion in spending—or an increase of roughly 4 percent in highway investment and 7 percent in transit investment in real terms—while increasing predictability of funding (CEA 2016b). Third, the Protecting Americans from Tax Hikes (PATH) Act signed into law in December 2015 ensured that the expansions enacted in 2009 of the Earned Income Tax Credit and Child Tax Credit, and the American Opportunity Tax Credit (which provides a tax credit for students in higher education) are permanent features of the tax code. These tax credits now provide tax cuts of about $1,000 for about 24 million families each year (Leibenluft 2015). The PATH Act also made permanent tax incentives for investment in research and experimentation and small business investment (through expensing capital purchases). In addition, in September 2016, Congress approved a spending bill funding the government through December 9 and provided $1.1 billion in the fight against Zika, as well as additional funding for military infrastructure and housing.

Federal

Over the four quarters ended in 2016:Q3, real Federal purchases grew 1.1 percent. At the Federal level, government purchases—including consumption and gross investment—contributed weakly, but positively, to four-quarter GDP growth (0.1 percentage point), approximately the same as during the four quarters of 2015. This modest contribution is accounted for by decreases in other spending which partly offset the sequester relief under the BBA. On a quarterly basis, real Federal purchases can be volatile (Figure 2-3). Federal purchases picked up in the third quarter after falling in the first two quarters of 2016.

State and Local

After strong contributions to real GDP during the four quarters of 2015, State and local government purchases—consumption plus gross investment—are on track to have a negligible impact in 2016. Real State and local government purchases contracted 0.2 percent in the four-quarters ended in 2016:Q3, after growing 2.5 percent during the four-quarters of 2015 (Figure 2-3).

The State and local share of nominal GDP fell from its historical peak of 13.0 percent in 2009 to 11.0 percent in 2016, a level not seen since the late 1980s, as State and local governments cut their purchases in the face of

budget pressures (Box 2-1).[2] In 2016, State and local government purchases were about 60-percent larger than Federal purchases and three-times larger than Federal nondefense purchases (Figure 2-4). The roughly 90,000 state and local governments employ roughly 13 percent of nonfarm workers, and added about 159 thousand jobs in the twelve months ended November 2016. Changes in State and local purchases can be as important as changes in Federal purchases.

Monetary Policy

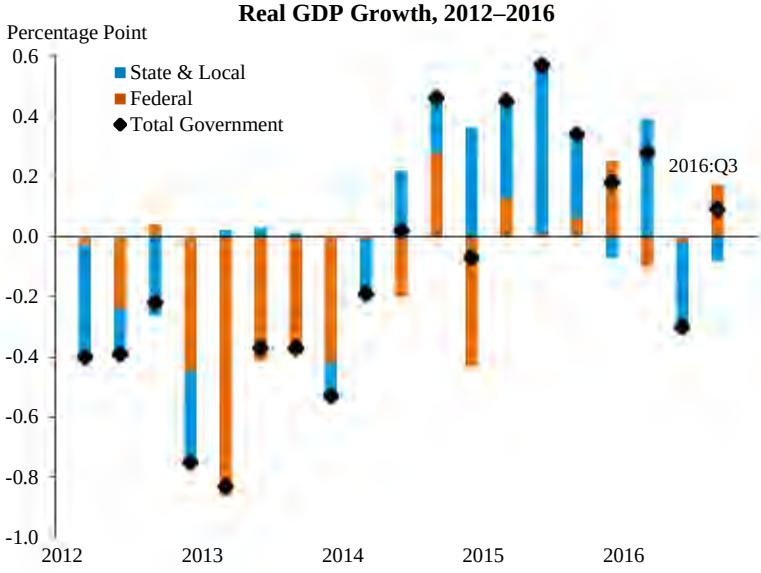
In December 2015, the Federal Open Market Committee (FOMC) increased the target range for the federal funds rate by 0.25 percentage point, ending seven years with the effective federal funds rate maintained at a level just above the zero lower bound. The FOMC's decision to tighten monetary policy was based on its judgment that labor markets had improved considerably and that it was reasonably confident that inflation would move up over the medium term to its 2-percent objective. Through the first 11 months of 2016, the FOMC did not raise the target range for the federal funds rate.

As was the case in previous years, the Federal Reserve's realized pace of raising rates in 2016 was below the median forecasted pace of FOMC participants at the close of the previous year. In December 2015, the median of FOMC participant projections was four 25-basis point rate hikes in 2016. In March 2016, the median forecast of the federal funds rate from FOMC participants for the end of 2016 fell to 0.9 percent, implying just two hikes in 2016. Throughout 2016, the FOMC continued to maintain the target range for the federal funds rate at between 0.25 and 0.50 percent, as inflation remained below target, U.S. economic growth was subdued, global growth prospects remained weak, and some financial market turmoil emerged in early 2016. Britain's vote to leave the European Union in June introduced more uncertainty about global growth and financial conditions. Throughout the year, the market-implied federal funds rate for the end of 2016 was below the median forecast of FOMC participants at the time. Importantly, the FOMC emphasized throughout the year that monetary policy is not on a "preset path"[3] and that the projections of FOMC participants are only an indication of what they view as the most likely path of interest rates given beliefs on the future path of the economy.

[2] Forty-nine out of fifty states have constitutions or statutes mandating a balanced budget and many local governments have similar provisions (National Conference of State Legislatures 2010). This does not prevent them from running deficits. Many of those balanced budget statutes apply only to the operating budget, while deficits may be allowed on their capital accounts. Also, spending from "rainy day funds" appears as a deficit on the government balance sheet in the national income and product accounts.

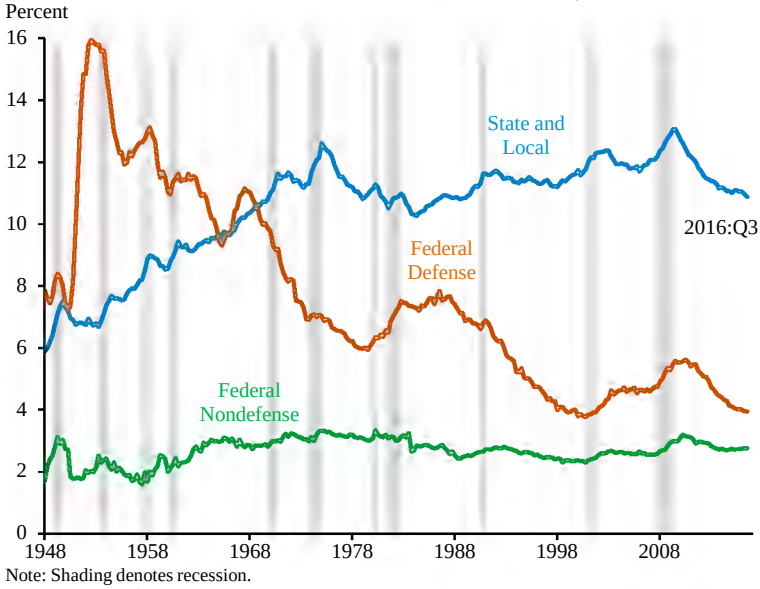
[3] See Transcript of Chair Yellen's Press Conference, September 21, 2016 (Yellen 2016a).

Figure 2-3
Quarterly Contribution of Government Purchases to Real GDP Growth, 2012–2016



Source: Bureau of Economic Analysis.

Figure 2-4
Government Purchases as Share of Nominal GDP, 1948–2016



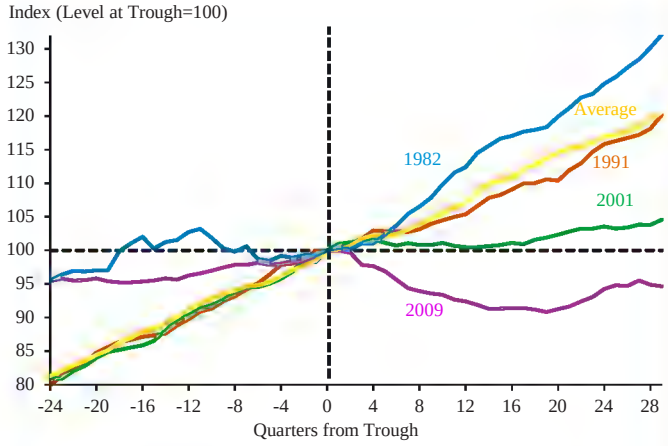
Note: Shading denotes recession.
Source: Bureau of Economic Analysis.

Box 2-1: Challenges in the State and Local Sector

During the current expansion, growth in State and local purchases has been the weakest of any business-cycle recovery in the post-World War II period (Figure 2-i). Although in a typical recovery State and local spending tends to grow quickly and at a similar pace as in the pre-recession period, in the current business cycle, State and local spending sharply contracted and, after seven years, has still not rebounded to its pre-crisis levels. During the four quarters of 2010, State and local purchases subtracted 0.5 percentage point from GDP growth, and then subtracted about another 0.3 percentage point in both 2011 and 2012. Spending in this sector stabilized in 2013, added modestly to GDP growth during the four quarters of 2014 and 2015, and had a negligible impact on GDP during the three quarters of 2016.

Real State and local government consumption expenditures, gross investment (particularly investment in structures), and employment (particularly in the education sector) remain below their pre-crisis levels (Figure 2-ii). Real State and local government consumption expenditures—which consists of spending to produce and provide services to the public, largely public school education—remains 2.8 percent below its peak in 2009:Q3. Real State and local government gross investment—which consists of spending for fixed assets that directly benefit the

Figure 2-i
Real State and Local Government Purchases During Recoveries, 1960–2016



Note: "Average" indicates average across recessionary periods from 1960–2007, excluding the 1980 recession due to overlap with the 1981–1982 recession.
Source: Bureau of Economic Analysis, National Income and Product Accounts; National Bureau of Economic Research; CEA calculations.

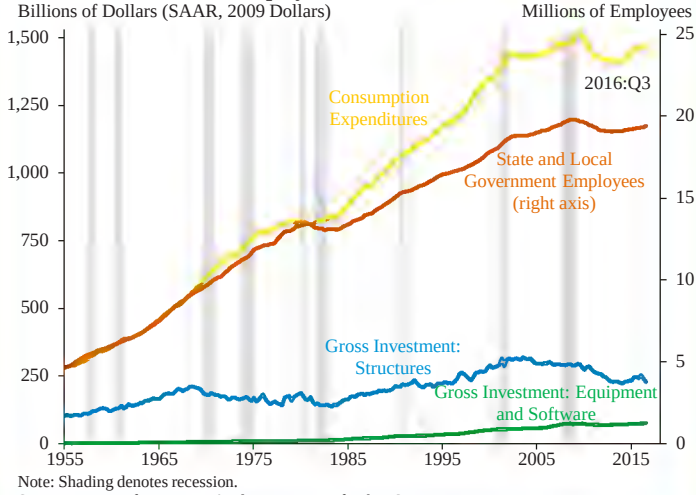
public, largely highway construction and maintenance—remains 17.3 percent below its peak in 2009:Q2.

As of November 2016, the roughly 90,000 State and local governments have added 371 thousand jobs since January 2013. Even so, employment in this sector remains 367 thousand below its previous high in July 2008, with almost half of this net job loss in educational services. The 1.7-percent decline in education employment exceeded the 1.0-percent decline in the school-age population (ages 5 to 19) over the 2008-15 period. This disparity implies a rising student-teacher ratio.

Despite some recovery in 2016, there are still factors likely to restrain State and local spending growth. State and local governments continue to spend more than they collect in revenues, and their aggregate deficit during the first three quarters of 2016 amounted to about 1 percent of GDP. This deficit has shrunk, however, during the recovery (Figure 2-iii). During 2016, State and local expenditures (including transfers and interest payments, as well as purchases) were roughly flat at about 14 percent of GDP, and revenues held at about 13 percent of GDP. Until 1990, State and local governments only ran deficits during recessions. Since then, State and local governments have frequently run deficits.

Unfunded pension obligations—the shortfall between benefits promised to government workers and the savings available to meet those

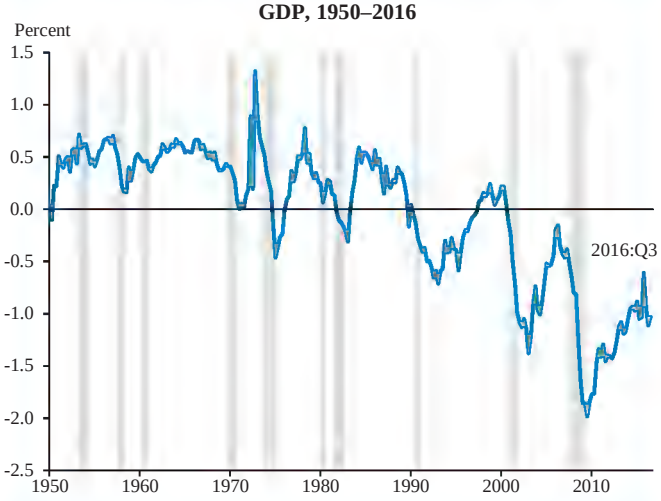
Figure 2-ii
Real State and Local Consumption, Investment, and Employment, 1955–2016



Note: Shading denotes recession.
Source: Bureau of Economic Analysis; Bureau of Labor Statistics.

Figure 2-iii

State and Local Government Surplus as Percent of Nominal GDP, 1950–2016



Note: Shading denotes recession.
Source: Bureau of Economic Analysis.

obligations—place a burden on finances for many State and local governments. Unfunded liabilities, measured on a net-present value basis, equal the difference between liabilities (the amount the governments owe in benefits to current employees who have already accrued benefits they will collect in the future) and assets held in public pension funds, and indicate the amount of benefits accrued for which no money is set aside. The size of these unfunded pension liabilities relative to State and local receipts ballooned immediately after the recession driven by a combination of factors, including underfunding and lower-than-expected investment returns, and remain elevated at a level that was about 80 percent of a year's revenue in the first three quarters of 2016. Assets may fall short of liabilities when governments do not contribute the full annual required contribution (ARC), when they increase benefits retroactively, or when returns on investments are lower than assumed. Additionally, unfunded liabilities can grow if actuaries' assumptions do not hold true. For example, if beneficiaries live longer than anticipated, they will receive more benefits than predicted, even if the government has been paying the ARC consistently. Unfunded liabilities will eventually require the government employer to increase revenue, reduce benefits or other government spending, or do some combination of these.

The size of the Federal Reserve's balance sheet at the end of November 2016 was $4.45 trillion—over five times its size at the end of 2006, largely reflecting several large-scale asset purchase programs (quantitative easing) from 2008 to 2014, which are estimated to have lowered long-term interest rates by about a percentage point (Ihrig et al. 2012; D'Amico et al. 2012; Engen, Laubach, and Reifschneider 2015).[4] Since the conclusion of its large-scale asset purchase program in 2014, however, the Federal Reserve's asset holdings have remained at $4.4 trillion as maturing bonds were replaced with purchases of new issues.

In recent years, FOMC participants have tended to lower their estimates of the longer-run level for the federal funds rate. As of September, the median of FOMC participants' projections of the long-run federal funds rate was 2.9 percent, down from 3.5 percent in December 2015. The downward revisions are consistent with downward trends in long-term interest rates in U.S. and global financial markets.

The natural rate of interest is the real interest rate that should prevail when the economy is producing at its long-run potential level and has attained full employment. Both cyclical factors (such as unconventional monetary policies, fiscal austerity measures, and private sector deleveraging) and structural factors (such as slowing productivity growth, changing demographics) could be contributing to the decline in the natural rate of interest.[5] An interest-rate decline implies that monetary policy may now have less room to provide accommodation during recessions than in the past because it has less room to lower rates.[6] In light of this, some have argued that stabilization policy could benefit from greater use of countercyclical fiscal policy and perhaps changes in the approach to monetary policy such as targeting nominal GDP or adopting a higher inflation target.[7]

[4] See Ihrig et al. (2012) for a discussion of how interest rates paid on excess reserves and overnight reverse repurchase agreement have replaced open market operations—the buying and selling of Treasury securities—as the way in which the Federal Reserve achieves its target policy rate.

[5] See CEA 2015d for a survey on the nature and sources of the decline in long-term interest rates.

[6] Yellen (2016b) has argued that a low equilibrium federal funds rate does not mean that the Federal Reserve's current toolkit will be ineffective. She points out that a recent paper using simulations from a Federal Reserve model finds that forward guidance and asset purchases should be sufficient to combat most recessions "even if the average level of the federal funds rate in the future is only 3 percent."

[7] See Williams (2016), Summers (2014), Yellen (2016b), Fischer (2016), Bernanke (2013), Goodfriend (2016).

Labor Market

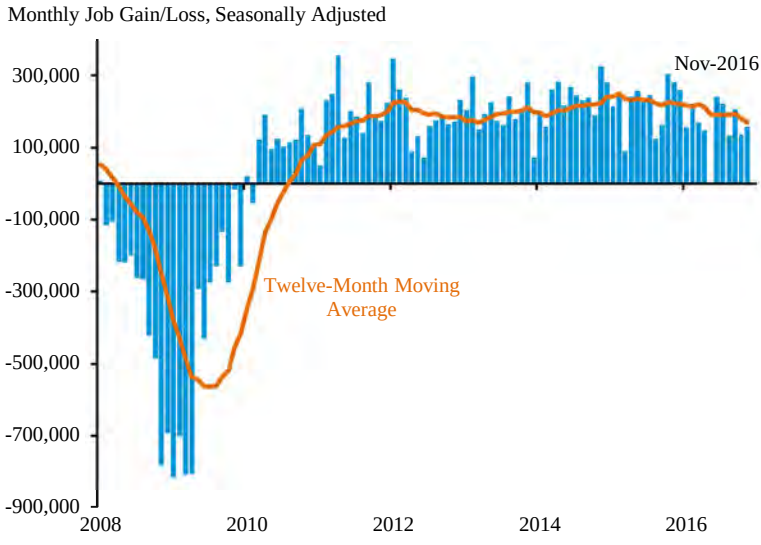
The labor market continued to improve in 2016, with many measures of labor-market performance having recovered to, or near to, their pre-recession levels. From November 2015 to November 2016, the economy added 2.3 million jobs, continuing the longest streak of total job growth on record. American businesses have now added 15.6 million jobs since private-sector job growth turned positive in March 2010, and the unemployment rate has fallen to 4.6 percent, cut by more than half from its peak in October 2009. Moreover, the pace of nominal earnings growth picked up in 2016, with average hourly earnings up at a 2.7 percent annual rate through November 2016. This progress has translated into broad-based gains, but some slack likely remains in the labor market, including a somewhat elevated rate of those who are working part-time but would like to work full time.

Private employment increased by 2.0 million jobs from November 2015 to November 2016, after rising by 2.7 million jobs in 2015 (Figure 2-5). Over the 12 months through November 2016, more than half of private-sector job gains came from "professional and business services" and "education and health services," both of which have been major drivers of job growth in this recovery. These sectors account for a large part of growth despite making up only about 35 percent of private-sector jobs in the economy. Education and health services added 581,000 jobs in the 12 months through November 2016 and professional and business services added 571,000 jobs, consistent with its growth over the course of this recovery.

Despite overall strength, particularly in the services sector, some industries faced specific headwinds that held down growth in 2016. Mining, which includes oil and gas extraction, lost 87,300 jobs in the 12 months through November 2016, largely due to industry cutbacks in the face of the sharp fall in oil prices, and reverted to its employment level at the beginning of the labor market recovery in early 2010 (Box 2-2). Manufacturing also experienced a weak year, losing 54,000 jobs or 0.44 percent, likely reflecting dampened demand for U.S. exports, which are disproportionately composed of manufactured goods, amid slow and declining growth among our trading partners. In fact, after excluding the mining and manufacturing sectors, job growth since 2014 has been at its strongest since the late 1990s.

The labor market's improvement was apparent in the continued decline of the unemployment rate. By November 2016, the unemployment rate had fallen to 4.6 percent, declining an average of 0.9 percentage point a year from 2010 to 2016, and dropping below its pre-recession average

Figure 2-5
Private-Sector Payroll Employment, 2008–2016



Source: Bureau of Labor Statistics, Current Employment Statistics; CEA calculations.

of 5.3 percent earlier than most forecasters expected.[8] As of March 2014, economists generally expected the unemployment rate to remain above 5.0 percent until at least 2020 (Figure 2-6). Many economists have revised down their estimates of the "natural" rate of unemployment as unemployment fell to low levels without an accompanying increase in the inflation rate. Still, given today's low unemployment rate, further declines are expected to moderate during 2017.

Although the overall unemployment rate was below its pre-recession average and mirrored other indicators of labor-market strength in November 2016, some indicators of labor-market slack remained above their pre-recession levels. For example, the long-term unemployment rate, or the share of those unemployed for 27 weeks or more, was 1.2 percent in November 2016, roughly its lowest point since 2008 but above its pre-recession average of 1.0 percent (Figure 2-7). If the long-term unemployment rate continues to fall at the same pace as it has over the past year, it will reach its pre-recession average in 2017. Looking historically across recoveries, the long-term unemployment rate is typically among the last labor-market indicators to return to normal (CEA 2010).

Similarly, the share of the labor force working part-time for economic reasons (those working part-time but who would prefer full-time

[8] Throughout this section, pre-recession average refers to the average from December 2001 to December 2007.

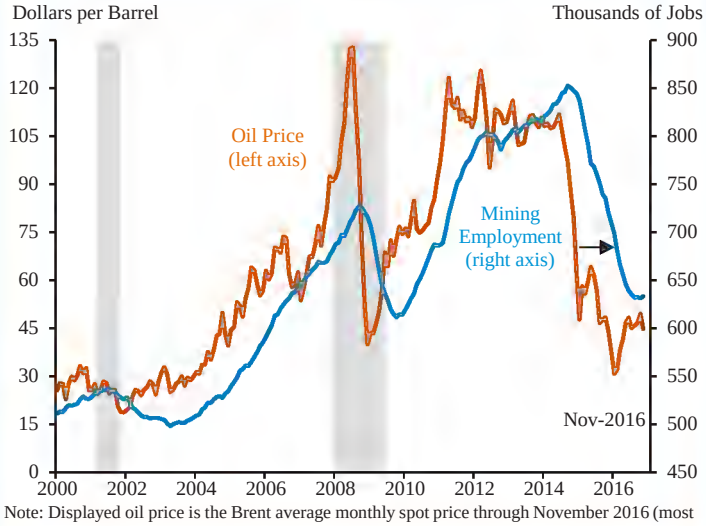
Box 2-2: Oil Prices and Employment in Related Industries

Oil prices were more than 100 dollars-per-barrel as recently as September 2014. While the decline in oil prices has benefitted consumers and the economy overall, it has weighed heavily on mining employment, which includes oil and gas extraction. (See Box 2-1 of the 2016 Report or CEA 2015c for a more in-depth discussion of the impact of oil price declines on spending and production). Employment in the mining industry fell 26 percent from September 2014 to November 2016, though the pace of decline has slowed in recent months as the price of oil has stabilized. Oil and gas workers make up about 60 percent of the mining industry; though, they represent just 0.3 percent of total U.S. nonfarm employment. The level of mining employment is closely correlated with the price of oil, with shifts in employment usually following price changes (Figure 2-iv). Since 2000, mining employment has been most closely correlated with the lagged price of oil, suggesting that the stabilization in oil prices in the 40-50 dollar-per-barrel range since April 2016 may translate into a stabilization of employment in this sector in 2017.

Employment in the mining sector is more directly correlated with the oil and gas rig count—a measure that reflects the rate of drilling for new oil and natural gas—which also tend to lag oil prices. The rig count

Figure 2-iv

Oil Prices and Mining Employment, 2000–2016



Note: Displayed oil price is the Brent average monthly spot price through November 2016 (most recent available). Shading denotes recession.
Source: Energy Information Administration; Bureau of Labor Statistics.

fell 80 percent from September 2014 to May 2016, but has grown since May. The partial rebound in the rig count has moderated the decline in mining employment, which has edged down 0.9 percent from June to November. The Energy Information Agency (EIA) forecasted in November that U.S. natural gas production during 2016 will fall 1.9 percent below its 2015 pace, which would be the first decline in average annual production since 2005 (EIA 2016). However, the EIA expects U.S. natural gas production to increase 3.8 percent in 2017.

employment), while falling steadily, remained above its pre-recession average through November 2016 and could indicate continued underutilization of labor. Between December 2007 and December 2009, the share of the labor force working part-time rose from 15.7 to 18.0 percent, driven by a large rise in the share of people working part-time for economic reasons. As the recovery progressed, the share of the labor force working part-time for economic reasons began to recede and, in 2016, fell a further 0.3 percentage point (Figure 2-8)[9]. As of November, the rate stood at 3.6 percent, 2.4 percentage points below its peak in 2010, but still above its pre-recession average of 3.0 percent.

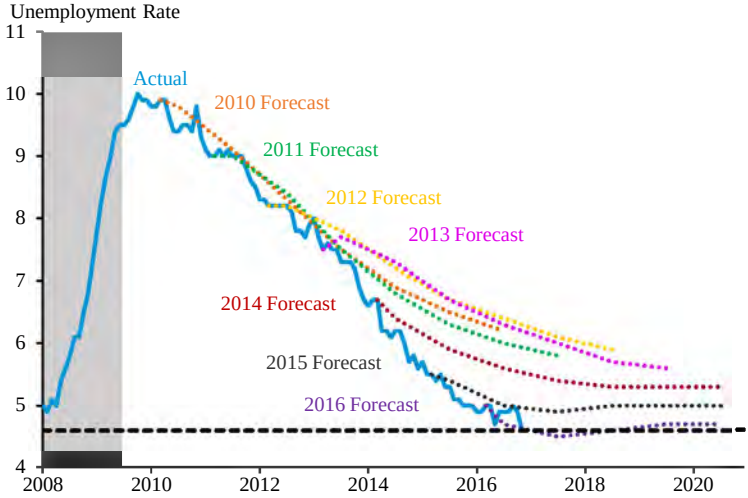
The persistence in the rate of part-time work for economic reasons, especially relative to other measures of slack, is largely responsible for the continued elevation of the U-6 "underemployment" rate. The underemployment rate uses a broader concept of labor market slack than the official unemployment rate (also known as U-3), by including discouraged workers who have given up looking for a job, others who are marginally attached to the labor force, and those employed part-time for economic reasons. In November 2016, the U-6 rate was 9.3 percent, 7.8 percentage points below its recession peak, but still 0.2 percentage points above its pre-recession average. In the 12 months through November 2016, the U-6 rate declined 0.6 percentage point (Figure 2-9).

The labor force participation rate has been roughly stable since October 2013. By CEA estimates, demographic pressure from the aging of

[9] Care must be taken when comparing the share of workers who are part-time for economic reasons before and after the 1994 redesign of the Current Population Survey. CEA used the multiplicative adjustment factors reported by Polivka and Miller (1998) in order to place the pre-1994 estimates of the part-time for economic reasons rate on a comparable basis with post-redesign estimates. For the part-time series for which Polivka and Miller do not report suitable adjustment factors, the pre- and post-redesign series were spliced by multiplying the pre-1994 estimates by the ratio of the January 1994 rate to the December 1993 rate. This procedure generates similar results to the Polivka and Miller factors for series for which multiplicative factors are available.

Figure 2-6

Actual and Consensus Forecast Unemployment Rate, 2008–2020



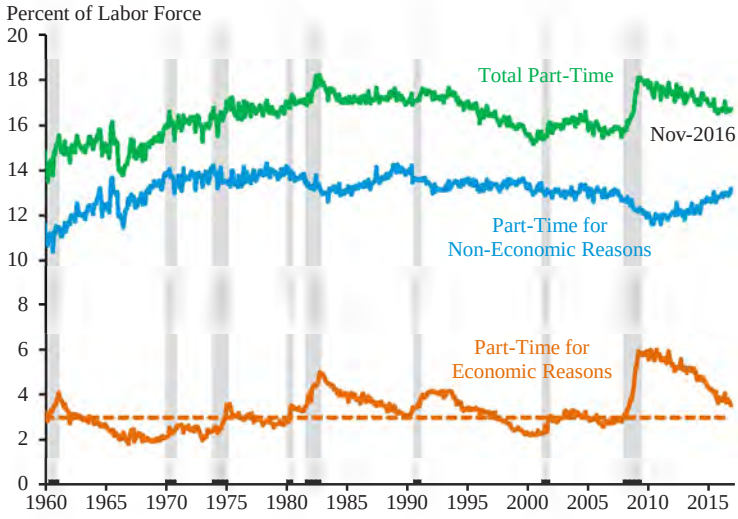
Note: Annual forecasts are current as of March of the stated year. Black dashed line represents November 2016 value (4.6 percent). Shading denotes recession.
Source: Bureau of Labor Statistics, Current Population Survey; and Blue Chip Forecasts

Figure 2-7

Unemployment Rate by Duration, 1990–2016

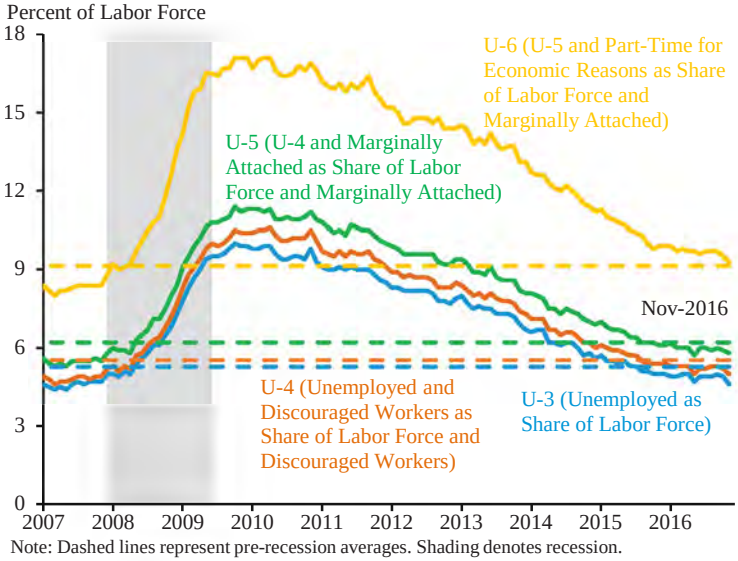
Note: Shading denotes recession. Dashed lines represent averages over 2001–2007.
Source: Bureau of Labor Statistics, Current Population Survey.

Figure 2-8
Rates of Part-Time Work, 1960–2016



Note: Shading denotes recession. Dashed line represents pre-recession average. See footnote 5 for details on comparability over time.
Source: Bureau of Labor Statistics, Current Population Survey; Polivka and Miller (1998); CEA calculations.

Figure 2-9
Alternative Measures of Labor Force Underutilization, 2007–2016



Note: Dashed lines represent pre-recession averages. Shading denotes recession.
Source: Bureau of Labor Statistics, Current Population Survey.

Box 2-3: Male Prime-Age Labor Force Participation[1]

Labor force participation among American men between the ages of 25 and 54, or "prime-age men," has been declining for more than 60 years, from a peak of 98 percent in 1954 to 89 percent today. More recently, over the last 15 years, labor force participation has also declined among prime-age women. These trends have troubling implications not only for overall economic growth, but also for individuals, as prolonged joblessness is linked to worse economic prospects, lower overall well-being and happiness, and higher mortality, as well as negative consequences for families and communities.

The United States has had the second largest decrease in prime-age male participation rates among the Organisation for Economic Cooperation and Development (OECD) countries since 1990. Today, the United States has the third lowest labor force participation rate in that group. Participation has fallen among every birth cohort of prime-age men over time, and the decline has been steeper among less-educated men and among black men. Three classes of explanations for this decline—supply driven, demand driven, and institutional—are explored in turn below.

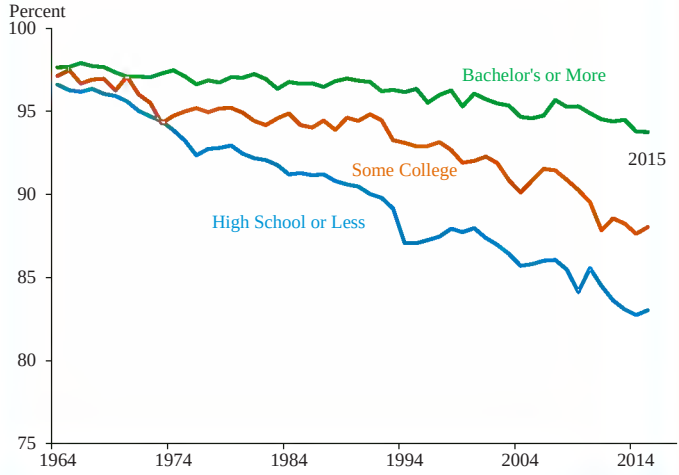
Reductions in labor supply—in other words, prime-age men choosing not to work for a given set of labor market conditions—explain relatively little of the long-run trend. Data show that nonparticipating prime-age men are actually less reliant than in the past on income from spouses or from government assistance. Among prime-age men who are not in the labor force, the share receiving government assistance (excluding Social Security benefits) peaked at about 50 percent in 1975 and has since halved to roughly 25 percent in 2015. In addition, nearly 36 percent of these men lived in poverty in 2014—up from 28 percent in 1968. These patterns cast doubt on the hypothesis that nonparticipation represents a choice enabled by other personal means or income sources.

In contrast, reductions in the demand for labor, especially for lower-skilled men, appear to be an important driver of the decline in prime-age male labor force participation. Consistent with a decline in demand for the labor of less-educated men, the drop in participation has been particularly steep for this group (Figure 2-v) and has coincided with a fall in their wages relative to more-educated men. CEA analysis suggests that when the returns to work for those at the bottom of the wage distribution are particularly low, more prime-age men choose not to participate in the labor force. These relative wage declines are likely due to multiple factors, including a broader evolution of technology,

[1] Analysis in this section is from CEA (2016e). See the report for further discussion on this topic.

Figure 2-v

Prime-Age Male Labor Force Participation by Educational Attainment



Source: Bureau of Labor Statistics, Current Population Survey Annual Social and Economic Supplement; CEA calculations.

automation, and globalization in the U.S. economy and, possibly, also an increase in the wage-setting power of firms (CEA 2016d).

Institutional factors also appear to be important—and may help explain some of the differences in the U.S. experience both over time and compared with other countries. For example, the United States spends only 0.1 percent of GDP on "active labor market policies" such as job-search assistance and job training that help keep unemployed workers connected to the labor force. This is less than nearly every other OECD country and much less than the OECD average of 0.6 percent of GDP. The rapid rise in incarceration may have also played a role, disproportionately affecting low-skilled men and men of color. Although incarcerated men are not counted in the labor force, formerly incarcerated men are in the labor force and they are more likely to experience joblessness after they are released from prison and, in many states, are legally barred from a large number of jobs. For example, according to the American Bar Association, over 1,000 mandatory exclusions bar individuals with records of misdemeanors from professions requiring licenses and nearly 3,000 exclusions barring those with felony records (American Bar Association 2016).

A number of policies proposed by the Administration would help to boost prime-age male labor force participation. These include, but are not limited to, creating new job opportunities for less-educated prime-

age men; reforming unemployment insurance to provide better search assistance and give workers more flexibility to use benefits to integrate into a new job; insuring workers against earnings losses; reforming the U.S. tax system to make participation in the workforce easier; investing in education and reforming the criminal justice and immigration systems; and increasing wages for workers by raising the minimum wage, supporting collective bargaining, and ensuring that workers have a strong voice in the labor market.

the baby-boom cohorts into retirement would have been expected to lower the participation rate by roughly 0.25 percentage point a year, and so this stabilization is consistent with a strengthening economy that has brought people into, and kept people attached to, the workforce. Between 2007 and November 2016, the labor force participation rate fell 3.3 percentage points. CEA analysis finds that nearly three-quarters of this decline was due to the aging of the baby-boom generation into retirement. These demographic-related declines will become steeper in the near term, as the peak of the baby-boom generation retires. Cyclical factors, including the lingering effects of high long-term unemployment rates in the wake of the Great Recession, also played a role in reducing the labor force participation rate and may still be having a small impact. The remaining decline of the labor force participation rate beyond what can be accounted for by demographics likely reflects structural factors, including the longstanding downward trend in participation among prime-age workers, particularly among males but also among females for the past decade-and-a-half (Box 2-3). As demographic shifts and longer-term trends continue to be offset by further cyclical recovery, the participation rate is expected to remain flat in 2017 before resuming its downward trend in 2018.

The Administration has proposed policies to support labor force participation through a range of measures that include promoting more flexible workplaces and paid leave, expanded high-quality pre-school, increased subsidies for child care, and a new proposal for a wage insurance system that would encourage reentry into work. As the recovery in the labor market progresses, the pace of job growth is likely to fall as the unemployment rate begins to plateau, particularly in light of increased retirements of an aging population.

Output

Real GDP grew 1.6 percent over the four quarters ended in 2016:Q3, somewhat below its pace in recent years. Real GDP grew somewhat slower than the 1.8 percent annual rate posted by gross domestic output (GDO)—an average of GDP and gross domestic income that is generally a more accurate measure of output than GDP—during the four quarters through 2016:Q3.[10]

The overall composition of demand during the first three quarters of 2016 shows that most of the growth was accounted for by strong growth in consumer spending, which was partially offset by declines in inventory investment. Contributions from other sectors were generally small. Real consumer spending growth outpaced overall growth, expanding 2.7 percent during the four quarters ended 2016:Q3.

Business fixed investment (non-residential fixed investment) was sluggish, declining 1.4 percent in the four quarters through 2016:Q3. Growth in business investment was hurt by the sharp declines in oil-related investment, which fell 45 percent in the four quarters ended 2016:Q3. Overall, despite weakness in equipment and structures spending, business investment was supported by growth in intellectual property products. Indeed, research and development spending as a share of GDP grew to over 2.6 percent, its highest share since 1992.

Growth in domestic demand was resilient in 2016, while diminishing foreign growth was a headwind. The aggregate of consumption and private fixed investment, known as private domestic final purchases (PDFP), rose faster than overall output at 2.0 percent in the four quarters ended 2016:Q3 (Figure 2-10). The solid pace of PDFP growth in 2016, which is typically a better predictor of future output growth than GDP growth, suggests that near-term U.S. growth prospects are positive. Nevertheless, CEA expects that the components of real GDP that are not in PDFP, such as net exports, will hold back overall real GDP growth in 2017. Despite weak foreign growth and a strong dollar, net exports contributed positively to growth over the four quarters ended in 2016:Q3.

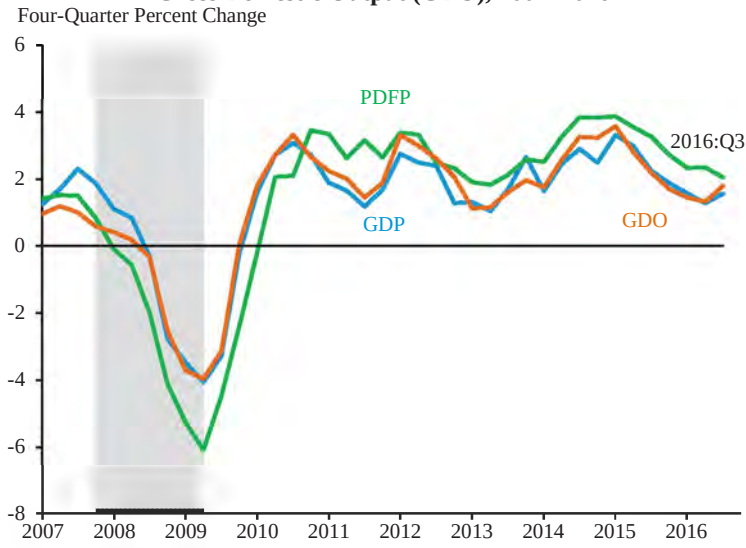
Consumer Spending

Real consumer spending increased 2.7 percent during the four quarters through 2016:Q3. Stronger growth in real disposable income, due in part to rising nominal wages and to the direct impact of lower oil prices, as well as upbeat consumer sentiment and earlier gains in household wealth

[10] Research has shown that GDO can be especially helpful in predicting future revisions to GDP (CEA 2015a). GDO growth is initially estimated to be faster than GDP growth, GDP growth tends to revise up and vice versa (Box 2-4, CEA 2016a).

Figure 2-10

Real Growth in GDP, Private Domestic Final Purchases (PDFP), and Gross Domestic Output (GDO), 2007–2016



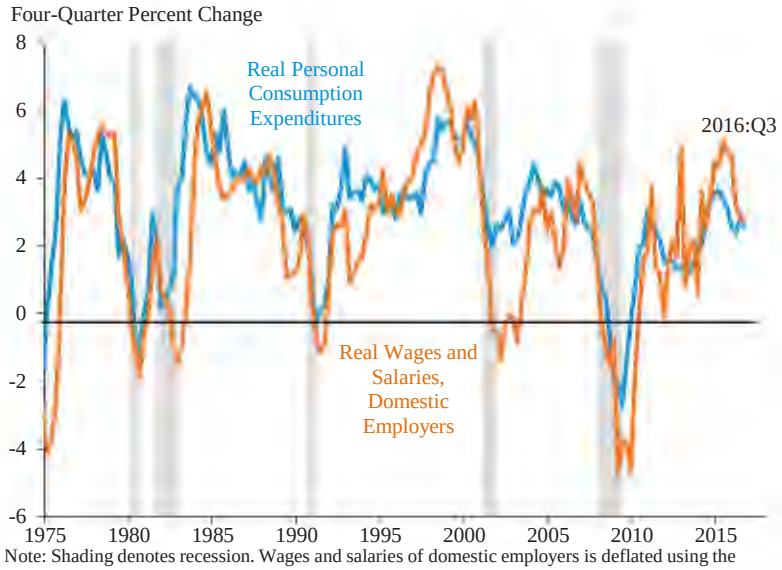
Note: Shading denotes recession.
Source: Bureau of Economic Analysis.

all contributed to the solid pace of consumer spending growth. Low interest rates and improving access to credit, particularly automobile loans, also supported consumer spending. In general, real consumption growth and the wages and salaries component of real income growth tend to track one another well, as has been the case in 2016 (Figure 2-11). Overall, the personal saving rate has been fairly stable at around 5.6 percent of disposable personal income since the beginning of 2013, implying that real consumer spending growth has largely tracked real income growth (Figure 2-12).

During the past four quarters, growth was strong for real household purchases of durable goods (6.1 percent), nondurable (2.1 percent), and services (2.4 percent). Light motor vehicles sold at a 17. 4 million unit annual rate during the 11 months through November, roughly the same pace as the 17.4 million units during 2015, which was the strongest selling pace on record (CEA 2016a). Mirroring the strong selling pace, domestic automakers assembled light motor vehicles at an 11.8 million-unit annual pace during the first 10 months of 2016, while capacity utilization at the automakers was at its highest level since 2000. The inventory-to-sales ratios for domestically produced light motor vehicles were slightly elevated by the end of the third quarter. Consumer sentiment has remained at high levels through 2016, likely due in part to a strong labor market and low inflation. In 2016, the Reuters/University of Michigan's Index of Consumer Sentiment remained

Figure 2-11

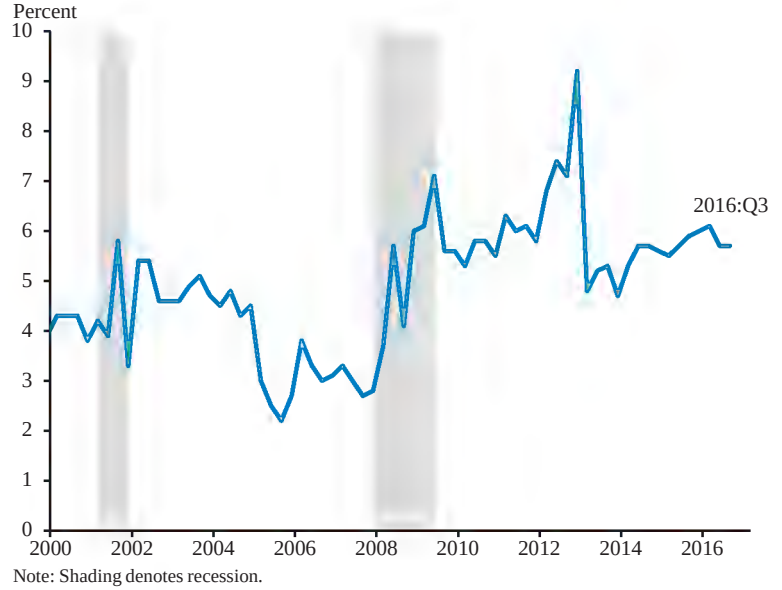
Compensation and Consumer Spending, 1975–2016



Note: Shading denotes recession. Wages and salaries of domestic employers is deflated using the personal consumption expenditure price index.
Source: Bureau of Economic Analysis. CEA calculations.

Figure 2-12

Personal Saving Rate, 2000–2016



Note: Shading denotes recession.
Source: Bureau of Economic Analysis.

Box 2-4: Optimal Weighting for Combining Measures of Economic Activity

The U.S. economy is large, dynamic, and complex; measuring it in real time can be extremely difficult at best. Data on the strength of the economy depend on extensive surveys of households and businesses and administrative data that are necessarily imperfect and incomplete, and the Federal statistical agencies—the Bureau of Economic Analysis (BEA), the Bureau of Labor Statistics (BLS), and the Census Bureau—frequently revise their estimates as newer and better underlying data become available. Given both the uncertainty inherent in any statistical measure and the standard practice of revising estimates, it is often better to look at multiple sources of data when assessing the state of the U.S. economy in real time. For example, as noted in Box 2-4 of the 2016 *Economic Report of the President*, growth in the average of estimates of real gross domestic product (GDP) and real gross domestic income (GDI)—which CEA refers to as real gross domestic output (GDO)—is a better predictor of one-quarter-ahead real GDP growth than are estimates of real GDP growth itself.

However, policymakers must often make decisions in real time, and may not have the ability to wait for multiple rounds of revisions to assess current economic conditions. (See Box 1-1 for a specific example.) As such, they may need to rely on early (incomplete) economic data on employment and output. It is important to note, though, that not all measures contain the same amount of uncertainty: some first-reported estimates come from surveys with large sample sizes and tend to be revised less, while others contain a larger number of statistical assumptions and consequently may undergo more substantial revisions. Consequently, when attempting to understand the current position of the U.S. economy in real time, one should not necessarily weight all current measures equally.

Each month, the BLS reports two estimates of over-the-month changes in employment. The first, known as the "household" estimate, is derived from the Current Population Survey, which samples approximately 60,000 households each month and asks household members about their employment status in the previous month. The second, known as the "establishment" or "payroll" estimate, is derived from a survey of more than 400,000 worksites covering about a third of total nonfarm employment in the United States. Although the establishment survey has a much larger sample size, it suffers both from statistical noise and some systematic errors, especially in recording employment gains at new firms that come into existence and employment losses at old firms that have closed. Moreover, monthly jobs estimates are revised multiple

Table 2-i
Optimal Weighting for Household Employment vs. Payroll Employment

Measure Predicted	Optimal Weight on First-Reported Household	Optimal Weight on First-Reported Payroll	Standard Deviation of Error Using Optimal Weight	Standard Deviation of Error Using Only Payroll
Final Payroll	0.000	1.000	92.303	92.303
State-Space Model	0.084	0.916	135.205	137.826

Note: Data from Jan-1994 to Dec-2014. Excludes data for January in each year.
Source: Bureau of Labor Statistics; CEA calculations.

times following their initial release. In principle, then, both the household and establishment measures of job growth contain some information about the true underlying path of U.S. employment (ignoring some conceptual differences in how employment is defined in each survey).

However, in practice the household survey is so volatile that it contains almost no additional information about monthly changes in employment beyond that contained in the establishment survey. Table 2-i shows the results of CEA analysis of the optimal weighting to put on first-reported employment growth from the household and payroll surveys when attempting to accurately predict "true" monthly employment growth using a weighted average of the two first-reported measures. The difficulty in such an exercise is in defining truth. When using the final-reported figure from the establishment survey—which is based in part on a near-complete census of nonfarm employment in the United States—as the measure of true employment growth, one should optimally put 100 percent of weight on the payroll survey. An alternative is to use a statistical model called a state space model to estimate the truth. This model extracts an unobserved component that is common to, and explains as much as possible of movements in, all variables in the model. When using a state-space model that combines the final-reported household and payroll estimates to derive an estimate of the common movements in employment, one should still place approximately 92 percent of weight on the payroll estimate—with very little difference in error compared with using the payroll survey alone.

More generally, it is possible to combine real-time measures of economic output (GDP, GDI, and their average, GDO) with real-time measures of employment growth to gain a more accurate assessment of broad economic conditions on a quarterly basis. This is particularly important given that quarterly estimates of output growth can see extensive revisions across multiple years as new and more complete data on real economic activity become available to BEA. Table 2-ii repeats the exercise of Table 2-i, this time predicting several final-reported measures

Table 2-ii
Optimal Weighting for Payroll Employment vs. Gross Domestic Output

Measure Predicted	Optimal Weight on 3rd Estimate GDO[1]	Optimal Weight on Preliminary Payroll Employment[2]	Standard Deviation of Error Using Optimal Weight
Final Payroll Employment	0.012	0.988	0.406
Final GDO	0.697	0.303	1.243
State-Space Model	0.000	1.000	0.831
Chicago Fed National Activity Index	0.379	0.621	0.373
Philadelphia Fed Current Economic Activity Index	0.053	0.947	0.543
Conference Board Current Economic Indicators	0.214	0.786	1.176

Note: Data from 1994:Q1 to 2014:Q4. [1] The 3rd estimate GDO is the release of GDO that is published with the 3rd estimate of GDP. [2] Preliminary payroll employment is the release of payroll employment that is published contemporaneous with the 3rd estimate of GDO.
Source: Bureau of Economic Analysis; Bureau of Labor Statistics; Federal Reserve Bank of Chicago; Federal Reserve Bank of Philadelphia; Conference Board; CEA calculations.

of quarterly economic activity: the payroll survey estimate of nonfarm employment growth, growth in real GDO, a state-space model combining payroll employment growth and real GDO growth, and three indexes of economic indicators from the Federal Reserve Bank of Chicago, the Federal Reserve Bank of Philadelphia, and the Conference Board that are designed to measure the state of the economy. In each case, the third estimate of real GDO growth is combined in a weighted average with the payroll-survey estimate of employment growth available at the time of the GDO estimate's release.

Here, too, optimal weighting places a substantial emphasis on the information contained in the early payroll estimates of employment growth. This is particularly true when predicting post-revision employment growth—where early output estimates contribute no information beyond that contained in early payroll estimates—but is true even when assessing output growth. Even when predicting post-revision real GDO growth, one should still place approximately one-third weight on contemporaneous measures of nonfarm employment growth. Optimal weighting for predicting the broader measures of economic activity vary somewhat from index to index, but in all cases more emphasis is placed on early estimates of employment growth than on early estimates of output growth. (CEA (2016f) contains a more extensive table with additional variables and details of these computations.)

No single measure of the economy is perfect, and all measures are subject to measurement error and conceptual challenges. But these

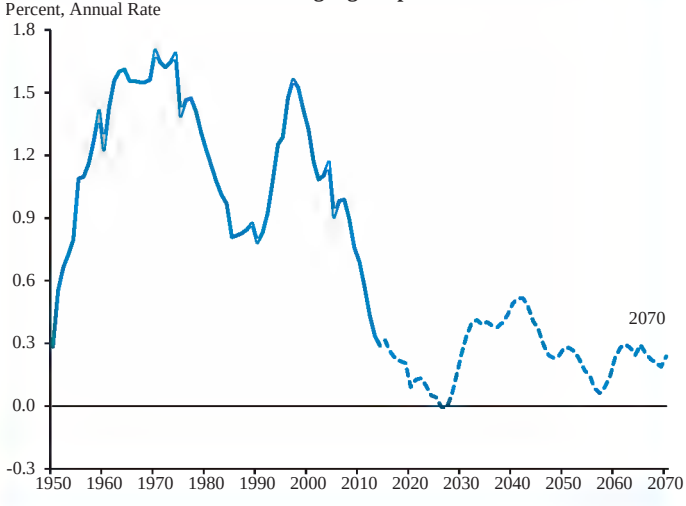
results suggest that, to a first approximation, more emphasis should be placed on contemporaneous estimates of employment growth than on contemporaneous estimates of output growth when attempting to assess the overall current state of the U.S. economy.

Box 2-5: The Economics of Aging

The growth of the working-age population (15-64 year olds) in the United States has been slowing notably, which puts downward pressure on labor force participation, productivity, and real GDP growth. The working-age population grew 1.4 percent at an annual rate in the 1960s through the 1980s, but just 0.6 percent during this recovery. The decline in the growth rate of the working-age population is expected to continue through 2028 (Figure 2-vi). As the working-age population growth rate falls relative to the growth rate of other age groups, it follows that the working-age share of the population should fall as well. Between 2008 and 2015, the share declined from 67.3 percent to 66.3 percent (averaging -0.15 percentage point per year). The working-age share is expected to fall at an increasing rate through 2029, reflecting a growing share of the elderly population (65+). The only age group that is projected to

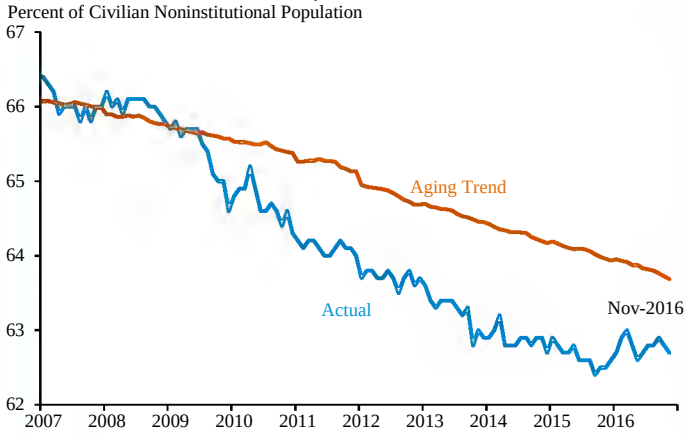
Figure 2-vi

Growth Rate of Working-Age Population, 1950–2070



Source: United Nations World Population Prospects; CEA calculations

Figure 2-vii
Labor Force Participation Rate (LFPR) – Actual vs. Aging Trend, 2007–2016



Note: The demographic trend estimates LFPR by fixing the participation rates for different age groups at their 2007 annual average and updates the LFPR solely based on changes in the distribution of the population across those age groups.
Source: Bureau of Labor Statistics; CEA calculations

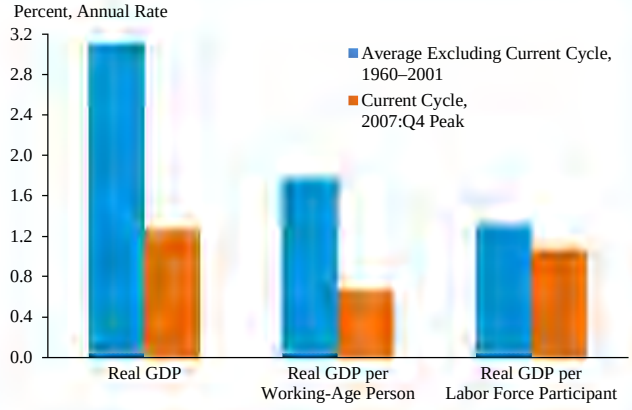
grow as a share of the population over the next 10 years is the 65+ age group.

Much of the recent decline in the labor force participation rate can be explained by the aging of the population. Of the 3.3 percentage points drop in the labor force participation rate between its 2007 average and November 2016, 2.3 percentage points can be explained by a simple demographic trend that only accounts for the aging of the population over this period (Figure 2-vii). Because older workers are less likely to work, the LFPR should decline as the population ages. The remaining 1.0 percentage point gap reflects other long-term trends, such as a declining participation rate among prime-age men (Box 2-3), as well as possibly a cyclical effect from the extraordinarily long duration of unemployment in the aftermath of the recession.

Real GDP has grown more slowly in the current economic recovery than in other cycles, but after taking into account demographic and workforce changes the current recovery looks more typical. Peak to peak, real GDP growth averaged 3.1 percent at an annual rate in prior cycles compared with just 1.2 percent so far this cycle, but comparing across business cycles can be misleading unless one considers demographics. The working-age population (ages 16-64) grew 1.4 percent at an annual rate in the 1960s through the 1980s, but just 0.6 percent during this recovery. In addition, previous recoveries had faster underlying trend

Figure 2-viii

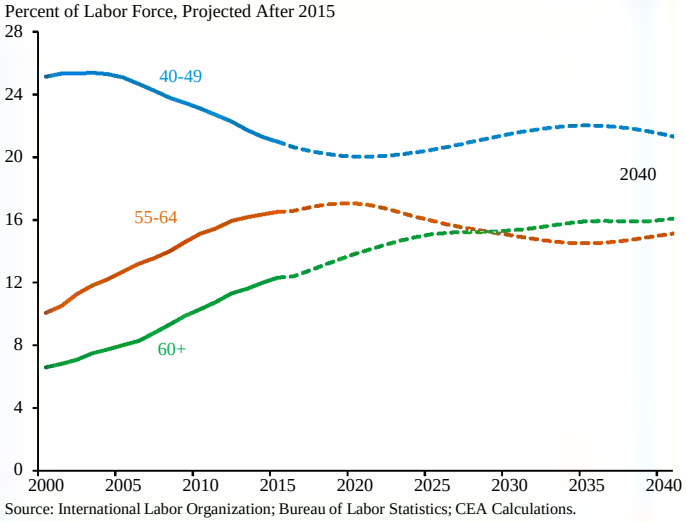
Real GDP, Average and Current Business-Cycle Peak to Peak



Note: Peak start dates: 1960:Q2, 1969:Q4, 1973:Q4, 1980:Q1, 1981:Q3, 1990:Q3, 2001:Q1, 2007:Q4. This Figure supersedes Figure 2-viii in the printed version of the 2017 *Economic Report of the President*, which contained an error.
Source: Bureau of Economic Analysis; National Bureau of Economic Research; Bureau of Labor Statistics; Haver Analytics; CEA calculations.

Figure 2-ix

Actual and Projected Labor Force by Age, 2000–2040



Source: International Labor Organization; Bureau of Labor Statistics; CEA Calculations.

growth in part driven by the rapid shift of women into the labor force. Controlling for the number of people in the labor force, growth in this recovery is quite similar to previous ones (Figure 2-viii).

Beyond the downward pressure on GDP caused by a slower working-age population growth rate, another economic impact of demographic shifts in the United States is that they may have reduced productivity growth. A range of papers finds that higher proportions of certain age groups are correlated with higher productivity growth (Feyrer 2007; Aiyar, Ebeke, and Shao 2016; Maestas, Mullen, and Powell 2016). As the share of these age groups employed in the labor force changes, productivity is affected. In particular, studies find the 40-49 cohort to be correlated with higher productivity (due to a bigger pool of managerial talent) and 55 and older to be less so. Estimates based on these papers suggest that somewhere from 0.2 to 0.8 percentage point of the 1.5 percentage points productivity slowdown from 1995-2005 to 2005-15 could be due to demography. Projections of the composition of the labor force suggest that the drag on productivity from demographics may soon be abating (Figure 2-ix).

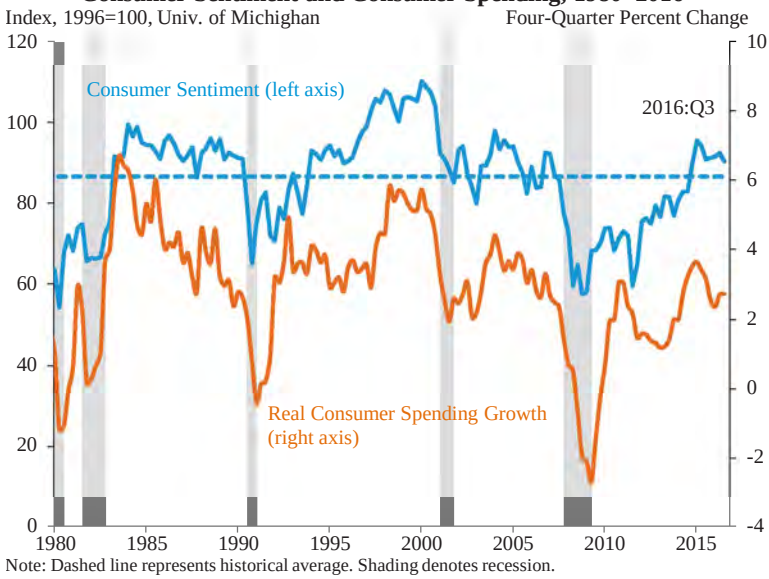
around its pre-recession levels, oscillating between 87 and 95, driving the strong consumption growth (Figure 2-13). The Conference Board index hit its highest level since 2007 in November 2016, although the 2016 average was only somewhat higher than pre-recession levels.

Meanwhile, U.S. household debt relative to income continued to fall (Figure 2-14). Before the financial crisis, household debt relative to income rose dramatically, largely due to net mortgage originations, and then declined sharply after the crisis, a pattern known as "deleveraging." (See Box 2-6 for more on deleveraging.) Charge–offs of delinquent mortgage debt played an important role in lowering household debt, but the decline in new mortgage originations and less consumer borrowing played roles as well (Vidangos 2015). By the end of 2016:Q2, the debt-to-income ratio was at its lowest level since 2002. The level of mortgage debt relative to income continued to decline in 2016, while consumer credit (including credit cards, automobiles, and student loans) relative to income increased slightly.

Moreover, with historically low interest rates, the amount of income required to service these debts has fallen dramatically. Still, it should be noted that estimates based on aggregate data could mask higher debt burdens for some families; that is, the health of personal finances varies substantially across households. Nonetheless, in aggregate, there is evidence of deleveraging as discussed in Box 2-6.

Figure 2-13

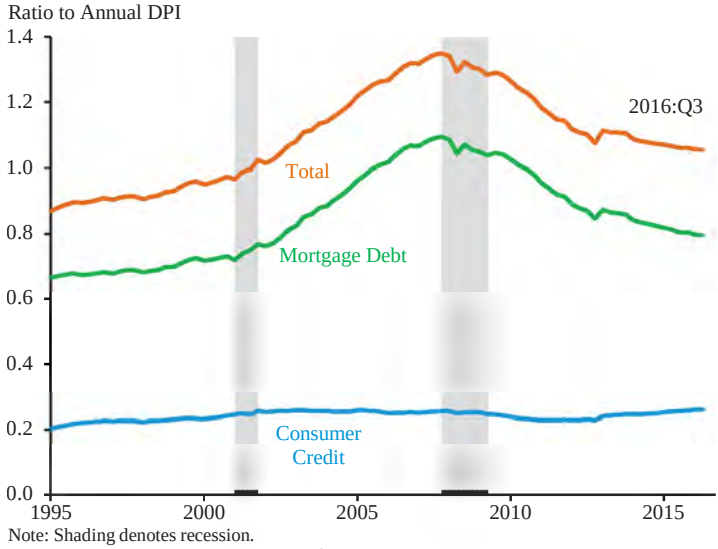
Consumer Sentiment and Consumer Spending, 1980–2016



Note: Dashed line represents historical average. Shading denotes recession.
Source: Bureau of Economic Analysis; University of Michigan.

Figure 2-14

Household Debt Relative to Disposable Personal Income (DPI), 1995–2016



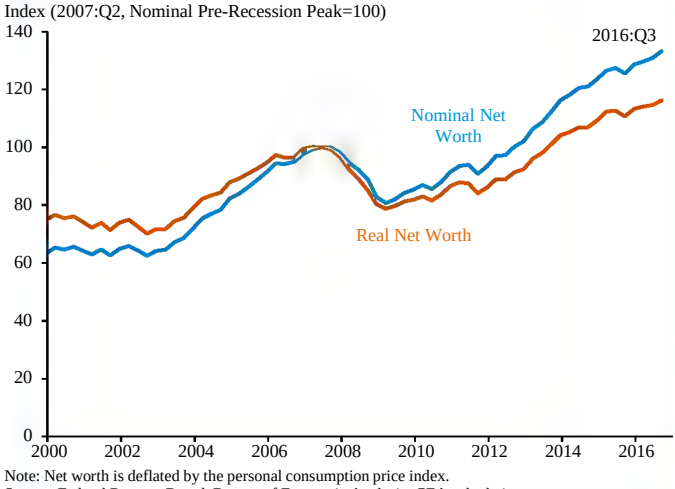
Note: Shading denotes recession.
Source: Federal Reserve Board; Bureau of Economic Analysis.

Box 2-6: Household Deleveraging and Consumption Growth

Household balance sheets have continued to recover from the damage wrought during the recession, helping to support the strong consumption growth seen in recent years. Real household net worth—the difference between the market value of household assets and the value of outstanding liabilities, adjusted for inflation using the price index for personal consumption expenditures—did not regain the pre-crisis high reached in 2007:Q1 until 2013:Q3. Growth has continued and, as of 2016:Q3, real household net worth is 16 percent above the pre-crisis high (Figure 2-x).

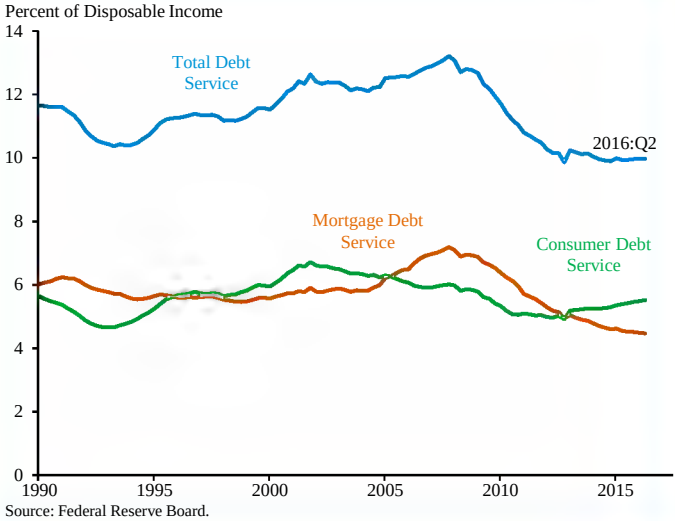
The improvement of household balance sheets reflects a number of positive factors. First, households have increased their saving, with the saving rate moving up to 5.9 percent post-recession compared with the 3.8 percent average from 2001:Q4 to 2007:Q4. Second, the strong stock market growth seen in 2012-14 and substantial (roughly 6 percent a year) increases in house prices during the past four years have increased the value of household assets. Third, mortgage debt—by far the largest component of household liabilities—has fallen substantially, especially relative to income gains since the crisis, far outstripping small increases in other categories of debt. Household debt as a share of disposable income is at 106 percent as of 2016:Q3, far below the 2007:Q4 peak of 135 percent.

Figure 2-x
Household Net Worth, 2000–2016



Note: Net worth is deflated by the personal consumption price index.
Source: Federal Reserve Board; Bureau of Economic Analysis; CEA calculations.

Figure 2-xi
Household Debt Service, 1990–2016



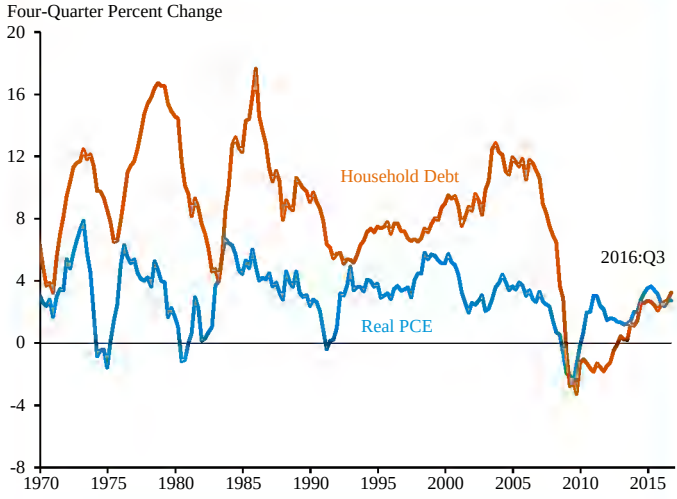
Source: Federal Reserve Board.

In addition to lower debt balances and strong asset returns, low interest rates have further supported household finances. Debt service costs as a fraction of disposable personal income, which reflects the current burden of carrying debt including interest and principal payments, fell from 13 percent in 2007 to only 10 percent in 2013. This leaves households with more cash to spend. As shown in Figure 2-xi, the debt service-to-income ratio has held steady at this new lower level since 2013, with mortgage expenses continuing to decline while servicing costs for consumer debt—which includes automobile, student, and credit card debt—having increased somewhat.

Strong household balance sheets, together with low debt servicing costs, help to support consumption growth. As shown in Figure 2-xii, though household debt has begun to grow once more it is still growing very slowly—on a four-quarter basis, growth is still lower than in any period between 1971 and 2007. These developments, along with strong growth in employment and wages, have allowed households to increase their consumption. In particular, spending on durable goods—which are more likely to be paid for with borrowing and thus sensitive to balance sheet and interest rate considerations—accounted for 26 percent of personal consumption growth from 2014 through 2016:Q3, despite making up only 11 percent of expenditures. A large portion of this growth in durable goods spending comes from sales of motor vehicles,

which fell sharply in the Great Recessions and were slow to recover until more recently.

Figure 2-xii
Household Debt and Real Consumer Spending Growth, 1970–2016



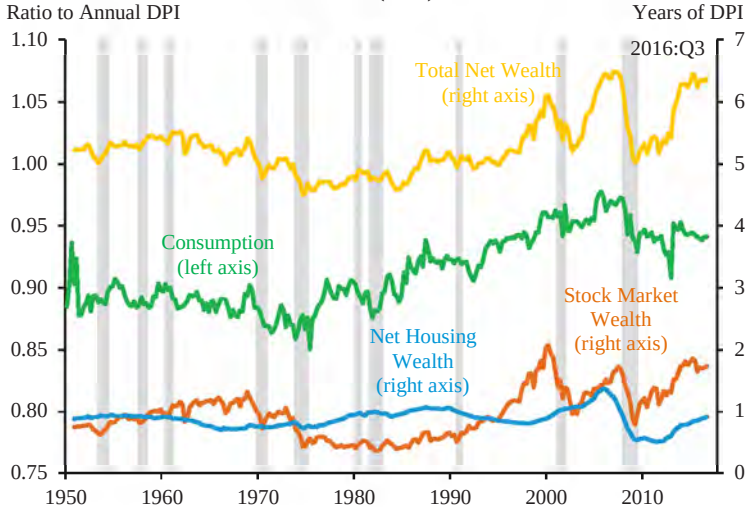
Source: Bureau of Economic Analysis; Federal Reserve Board.

Earlier gains in household net worth (that is, assets less debts, also referred to as household wealth), such as the moderate increases in equity wealth so far in 2016, also supported consumer-spending growth in 2016 (Figure 2-15). The wealth-to-income ratio remained elevated in 2016, following a marked increase during 2013. Changes in net worth have been spread unevenly across households, though, and these disparities may have implications for families and macroeconomic activity.

Housing Markets

The housing market recovery continued in the first quarter of 2016, but residential investment was a drag on economic growth in the second and third quarters. In 2016, sales of newly constructed single-family homes and single-family housing starts, bolstered by strong labor market conditions and low mortgage interest rates, averaged their highest annual level through the first 10 months of a year since 2007. However, growth in new construction slowed from its 2015 pace: total housing starts and permits zig-zagged around their 2015 level. Real residential investment decreased 1.7 percent

Figure 2-15
Consumption and Wealth Relative to Disposable Personal Income (DPI), 1950–2016



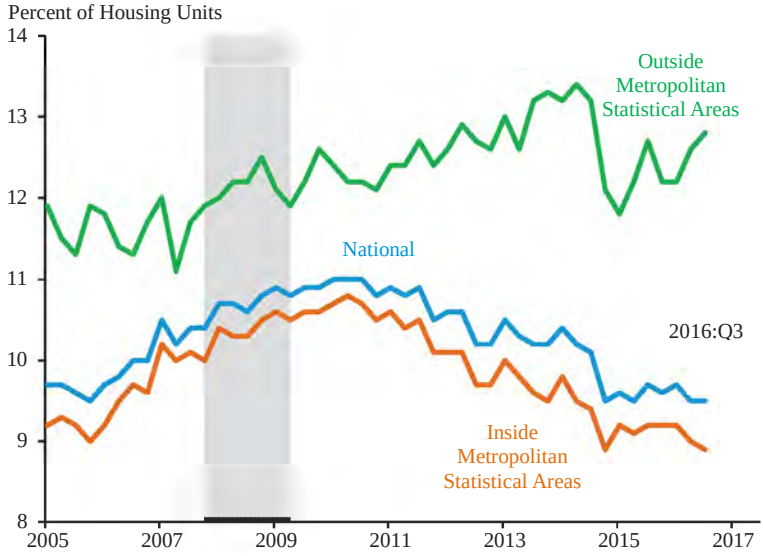
Note: Shading denotes recession.
Source: Bureau of Economic Analysis, National Income and Product Accounts; Federal Reserve Board, Financial Accounts of the United States; CEA calculations.

at an annual rate through the first three quarters of 2016, down from 13.1 percent positive growth in the four quarters of 2015.

While the housing market has continued its recovery since the recession, several structural challenges remain, including a constrained housing supply, low affordability in some areas of the country, and persistently muted household formation for 18-34 year olds. Housing supply is constrained: the inventory of homes available for sale is below its historical average and vacancy rates (for both renter and owner occupied) have fallen to levels that had prevailed before the boom, particularly in metropolitan areas, indicating that there is no longer excess supply (Figure 2-16). Sale volumes of the most affordable new single-family homes, particularly those less than $200 thousand, are lower than before the crisis. The share of young adults living with their parents remains above its long-run historical average, stifling household formation. These challenges may explain why housing starts still seem to be below their long-run steady state level.

House prices continued to rise in 2016, similar to the pace in 2015. National home prices increased between 5.5 and 6.1 percent (depending on the index) during the 12 months ended September 2016 compared with

Figure 2-16
Year-Round Vacant Housing Units, 2005–2016



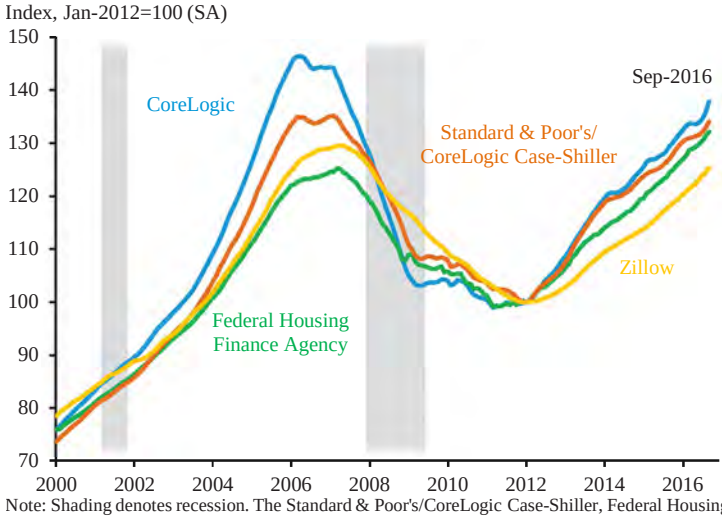
Note: Shading denotes recession. Covers housing units that are vacant all year.
Source: Census Bureau, Housing Vacancy Survey.

4.7-to-6.2 percent in the year earlier period.[11] While price increases are above estimates for long-run steady state house price increases, they are not as rapid as the 6-to-11-percent increase in 2013. Nominal house prices are between 25 and 39 percent above their recessionary trough and between 6 percent below and 6 percent above their pre-recession peak (Figure 2-17). However, in real terms (adjusting for inflation with the CPI), house prices remain roughly 17 percent below their pre-recession peak.

Continued house price increases have improved owners' equity relative to the debt they owe on their houses. Homeowners' equity as of 2016:Q3 equaled slightly more than half of the total value of household real estate (57 percent), 20 percentage points higher than the recessionary trough and near the historical average of roughly 60 percent. Rising home prices since 2012 also helped lift more than 9 million households out of a negative equity position from 2012:Q2 to 2016:Q2, reducing the overall share of single-family homeowners with an underwater mortgage (when mortgage debt exceeds the value of their house) to 12.1 percent in the second quarter, down from 14.4 percent a year earlier. In addition, the number of delinquent home mortgages (when the homeowner misses at least one monthly payment) has fallen to its lowest level since 2007, though the share of mortgages that are

[11] Seasonally-adjusted national home price indexes from Zillow, CoreLogic, FHFA Purchase-Only, and S&P CoreLogic Case-Shiller are used.

Figure 2-17
National House Price Indexes, 2000–2016



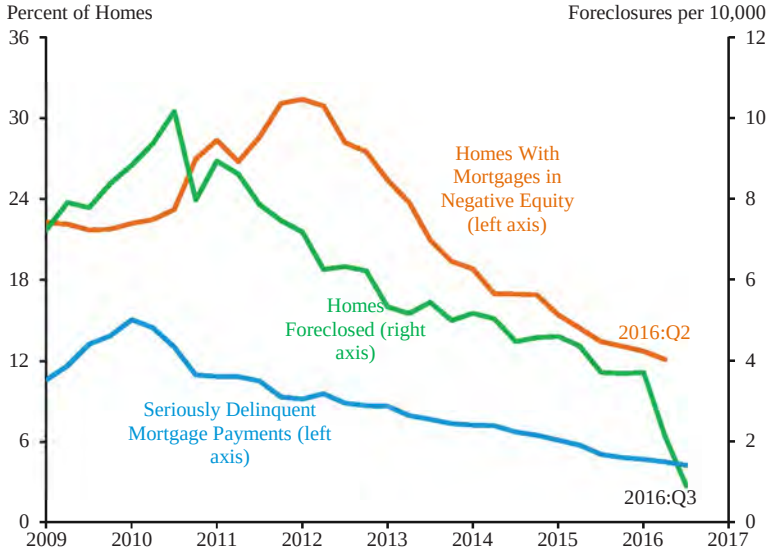
Note: Shading denotes recession. The Standard & Poor's/CoreLogic Case-Shiller, Federal Housing Finance Agency, and CoreLogic indexes all adjust for the quality of homes sold but only cover homes that are bought or sold, whereas Zillow reflects prices for all homes on the market. All indexes are seasonally adjusted.
Source: Zillow; CoreLogic; Federal Housing Finance Agency; Standard & Poor's.

seriously delinquent (payment more than 90 days overdue, with the bank considering the mortgages to be in danger of default) remains somewhat elevated (Figure 2-18). Falling delinquencies support overall economic growth because homeowners with underwater or delinquent mortgages are less likely to spend or relocate in search of better-paying jobs (Ferreira, Gyourko, and Tracy 2012).

Single-family homes were still more affordable in 2016 than the historical average, as rising incomes and low and steady mortgage rates partially offset the effect of rising house prices on the cost of homeownership (Figure 2-19). Nevertheless, affordability decreased somewhat over the past three years because median existing home prices grew roughly 4 percentage points faster than median family incomes on average each year.

The national homeownership rate was 63.5 percent in the third quarter of 2016, much lower than the historical average due to a variety of trends in the housing market. The decline has been concentrated among young households. The homeownership rate of those aged 18-34 was 35.2 percent in 2016:Q3, roughly 8-percentage points lower than its all-time high in 2004. The major reason for this decline is that young adults are waiting longer to get married or form households, and first-time homebuyers are older, on average, than they were in the 1980s. Second, credit availability remains

Figure 2-18
Delinquent and Underwater Mortgages and Foreclosures, 2009–2016



Source: Zillow Real Estate Market Reports; Mortgage Bankers Association.

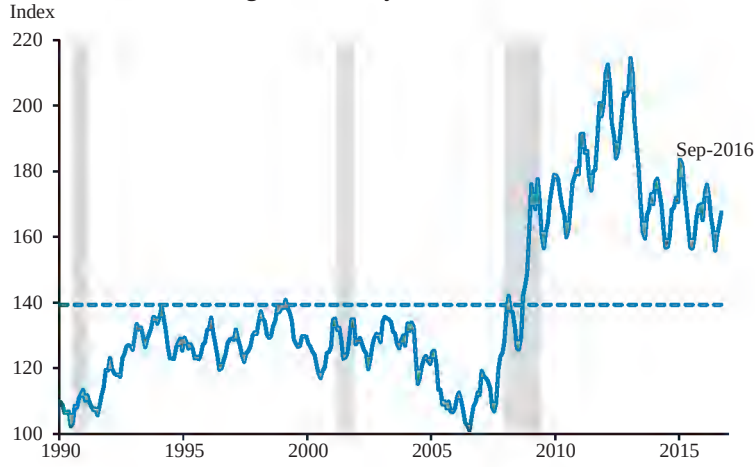
tight for borrowers with credit scores below 620. Third, it can be difficult for prospective buyers, especially those living in urban areas, to save for a down payment.

Overall household formation has showed some tentative signs of picking up in recent years, after having been weak since the recession. The number of households increased by 1.2 million in 2016 after rising 0.7 million in 2015. This uptick in household formation contributed to a 5.5 percent rise in overall housing starts during the first ten months 2016 relative to 2015 as a whole and a solid 9.2 percent rise in single-family housing starts during the first ten months of 2016 relative to 2015 as a whole (Figure 2-20). Nevertheless, starts remained well below the roughly 1.5 million rate that is consistent with long-term demographics and the replacement of the existing housing stock.[12] Further, because the rates of homebuilding have been below that pace since the recession, pent-up demand for housing may play a role in supporting further recovery in the housing market. However, an increase in housing demand, if not accompanied by an increase in housing supply, would not bring about a full recovery in the housing market. The accumulation of State and local barriers to housing development—including

[12] Demographics and historical trends would have predicted 1.2 to 1.4 million new households formed each year requiring housing (Joint Center for Housing Studies 2015). Together with the assumption that about 0.25 percent of the existing homes deteriorate and need to be replaced a given year, yields an underlying trend of roughly 1.5 million housing starts.

Figure 2-19

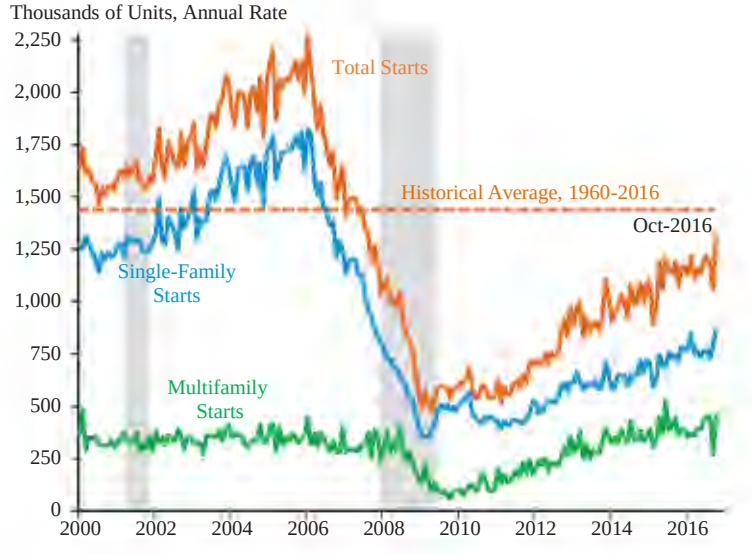
Housing Affordability Index, 1990–2016



Note: Index is 100 when the median income family can exactly qualify for a mortgage on a median-priced home. An index over 100 means that the median income family has more than enough income to qualify for a mortgage on a median-priced home. Dashed line represents average over 1990–2016. Shading denotes recession.
Source: National Association of Realtors.

Figure 2-20

Single-Family and Multifamily Housing Starts, 2000–2016



Note: Shading denotes recession.
Source: Census Bureau.

zoning, other land use regulations, and unnecessarily lengthy development approval processes—have reduced the ability of many housing markets to respond to growing demand (White House 2016). While land use regulations sometimes serve reasonable and legitimate purposes, they can also give extra-normal returns to entrenched interests at the expense of everyone else (see Box 2-6 of the 2016 *Report* for a more in-depth discussion of the constraints on housing supply).

Investment

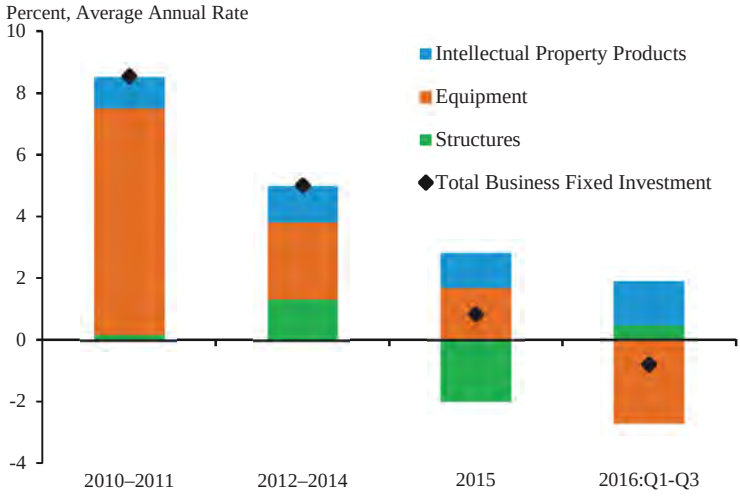
Business Fixed Investment

After being a bright spot early in the recovery, business investment growth has slowed since the end of 2014, and turned negative in 2015:Q4 and 2016:Q1. Real business fixed investment fell 1.4 percent during the four quarters ended in 2016:Q3, a reversal from the average increase of 5.0 percent at an annual rate during the twelve quarters of 2012-14, and much slower that the average of 8.5 percent annual rate increase during the eight quarters of 2010-11. Not all components of investment were weak in 2016. The rate of investment growth remained strong for intellectual property products, which grew 4.5 percent at an annual rate during the first three quarters of 2016, and has now been positive for 13 consecutive quarters. However, the strong gains in intellectual property products were more than offset by larger declines in equipment investment (Figure 2-21). While oil price declines can explain part of the investment decline in 2015, the slowdown in investment growth continued into 2016 and was not simply due to lower oil and gas structures investment, but was due to shrinking overall equipment investment as well. Recent CEA work has found that this broad-based investment slowdown is largely associated with the low rate of output growth both in the United States and globally (Box 2-7).

Slower investment growth is a concern because it limits the productive capacity of the economy. Net investment (gross investment less depreciation) is required to increase the capital stock. In 2009, net investment as a share of the capital stock fell to its lowest level in the post-World War II era and the nominal capital stock even declined. Although net investment has rebounded somewhat in the recovery, its level as a share of the capital stock remains well below the historical average and it declined slightly in 2015 (Figure 2-22).

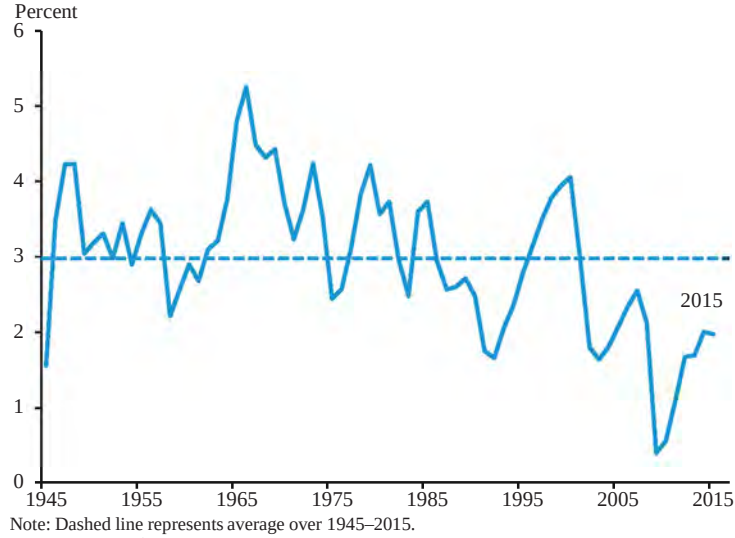
The slowdown in investment has also contributed to the slowdown in labor productivity growth. Investment growth contributes to labor productivity growth most directly through capital deepening—the increase in capital services per hour worked—that had added nearly 1 percentage point

Figure 2-21
Composition of Growth in Real Business Fixed Investment (BFI)



Note: Components may not sum to total due to rounding. Growth rate computed using Q4-to-Q4 changes
Source: Bureau of Economic Analysis; CEA calculations.

Figure 2-22
Net Investment as a Share of the Capital Stock, 1945–2015



Note: Dashed line represents average over 1945–2015.
Source: Bureau of Economic Analysis.

a year to labor productivity growth in the post-war period to 2010. But since 2010, capital deepening has subtracted from productivity growth and contributed slightly more to the slowdown from 1948-2010 to 2010-15 than did the slowdown in total factor productivity growth.

With the sharp fall in output in 2008-09, the amount of capital relative to output rose considerably (Figure 2-23). Even years into the recovery, businesses had access to more capital services than the level of output would typically have required. The excess of capital likely reduced new investment and helped lower capital services growth. Capital services relative to output have now fallen back to trend, a factor supporting future investment. This view is consistent with the usual pattern that historically weaker periods of investment growth are, on average, followed by stronger periods. This historical pattern argues for faster growth in investment spending during 2017 than in the recent past.

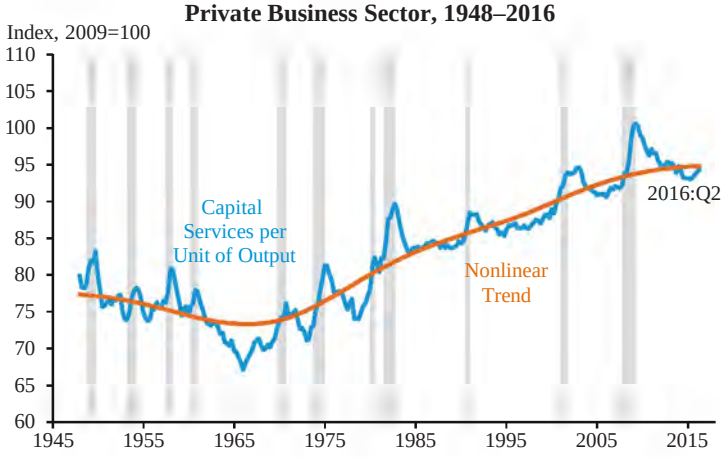
The Administration has pursued policies to support investment, including additional funding for public research and development and public infrastructure as well as the Trans-Pacific Partnership, all of which can stimulate private sector investment. In addition, the President has proposed business tax reform that would directly spur private investment (see Box 2-9 and Chapter 5 of the 2015 *Report* for a more in-depth discussion of the economic benefits of business tax reform (CEA 2015b)).

Inventory Investment

Inventory investment continued to weaken during the first half of 2016, a continuation of the pattern during the last three quarters of 2015. The inventory-to-sales ratio in manufacturing and trade had crept up over the past few years, and by 2016:Q1 had reached 1.41 months' supply, substantially above its post-2000 non-recessionary average of 1.32 months' supply (Figure 2-24).Given the higher-than-average ratio, it was not surprising that inventories fell relative to sales in the second and third quarters of 2016. As of September, the latest data available as this *Report* goes to press, the ratio was 1.38, still somewhat elevated relative to recent history.

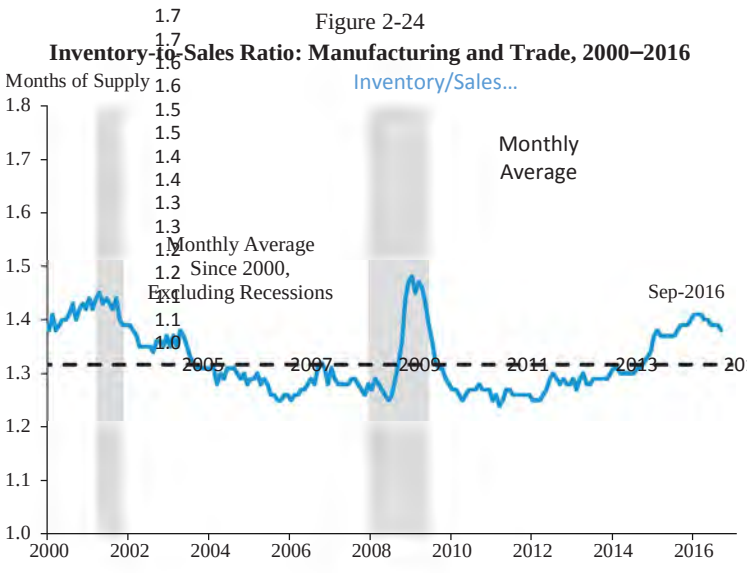
Real inventory investment—the change in the inventory stock—has subtracted from output growth thus far in 2016, especially in the second quarter. Although inventory investment is volatile, and can greatly affect quarterly GDP growth rates, its contribution to output growth generally averages close to zero over 4- or 8-quarter horizons outside of recessions and their immediate aftermath (Figure 2-25). After inventory-to-sales ratios had risen to relatively high levels in 2015:Q1, though, the change in inventory investment was negative for five consecutive quarters, a string of negative changes that is unusual in non-recessionary conditions. By the second

Figure 2-23
Capital Services per Unit of Real Output, Private Business Sector, 1948–2016



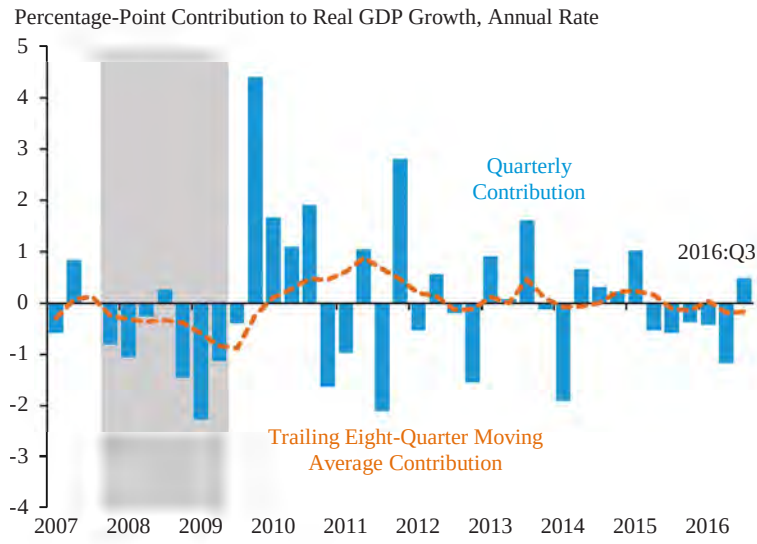
Note: Shading denotes recesion. Post-1964 data interpolated quarterly using Macroeconomic Advisers quarterly data. Pre-1965 data interpolated by moving average. Nonlinear trend is a bi-weight filter using a 60-quarter window. Shading denotes recession.
Source: Bureau of Labor Statistics, Labor Productivity and Costs; Macroeconomic Advisers; CEA calculations.

Figure 2-24
Inventory-to-Sales Ratio: Manufacturing and Trade, 2000–2016



Note: Manufacturing and trade inventories at book value. Shading denotes recession.

Figure 2-25
Contribution of Inventory Investment to Real GDP Growth, 2007–2016



Note: Shading denotes recession.
Source: Bureau of Economic Analysis, National Income and Product Accounts; CEA calculations.

quarter, the level of inventory investment itself was negative, and the third quarter's positive contribution of inventory investment to real GDP growth reflects the swing from negative inventory investment in 2016:Q2 to positive inventory investment in 2016:Q3.

Net Exports

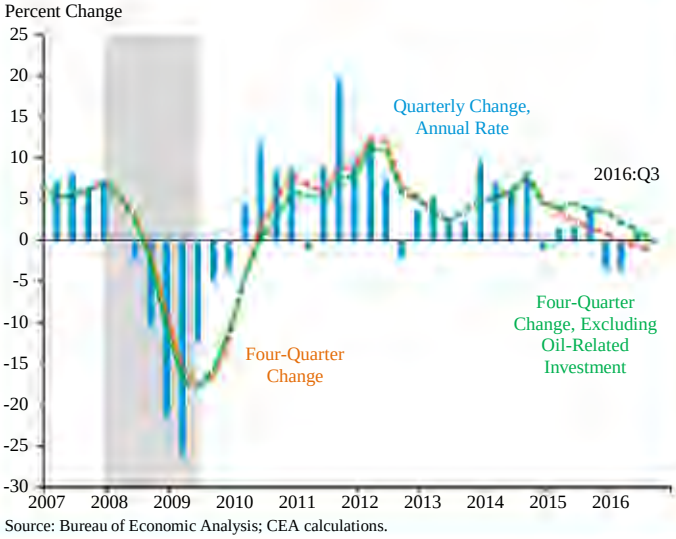
With weak demand in much of the world outside the United States and the stronger dollar that has come with it, U.S. nominal exports of goods and services rose only 0.8 percent over the four quarters ended 2016:Q3. Part of the reason for the weak nominal growth in the past four quarters is the 1.2 percent drop in export prices, as lower oil and commodity prices have meant lower prices for U.S. exports of agricultural goods or oil-related products and falling input costs have other prices. Driven by the strong growth in agricultural exports in the third quarter, real exports rose 2 percent during the four quarters ended 2016:Q3, shown in Figure 2-26. As the Figure shows, real exports tend to trace trade-weighted global growth rates[13], and as global

[13] Trade-weighted global growth is calculated as a weighted average of real GDP growth for 25 foreign economies and the Euro area, using those economies' share of U.S. goods exports as weights.

Box 2-7: Explanations for the Recent Performance of Business Fixed Investment

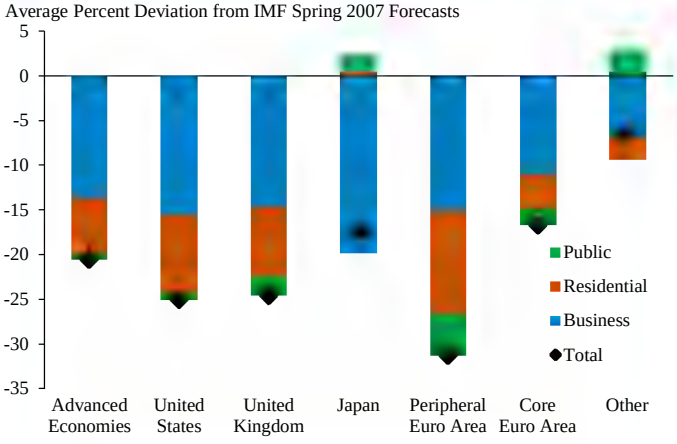
Business fixed investment comprises business spending on structures and equipment, as well as expenditures on intellectual property products such as software and research and development (R&D). While it constitutes only 12 percent of GDP, business fixed investment affects short-run growth disproportionately, as it accounts for about 20 percent of the quarterly volatility in real GDP growth. Moreover, business fixed investment is crucial to long-run growth because it supports future output (and income) and thereby consumption and is a major contributor to productivity growth. Business fixed investment has weakened since 2014:Q4; for the first time since it began recovering after the recession, its four-quarter growth rate was negative in 2016:Q1 (Figure 2-xiii). Although oil-related investment has dragged on investment growth due to low oil prices, non-oil related investment growth has also slowed over the period. Finding the sources of this broad-based slowdown in investment spending is an ongoing discussion and empirical effort among economists. CEA has found that slow U.S. and global growth provides a partial quantitative explanation for the recent slowdown, while CEA's analysis indicates that other factors such as business confidence, policy uncertainty, or financial conditions do not seem to explain the recent

Figure 2-xiii
Real Business Fixed Investment, 2007–2016



Source: Bureau of Economic Analysis; CEA calculations.

Figure 2-xiv
Decomposition of the Investment Slump, 2008–2014
Average Percent Deviation from IMF Spring 2007 Forecasts



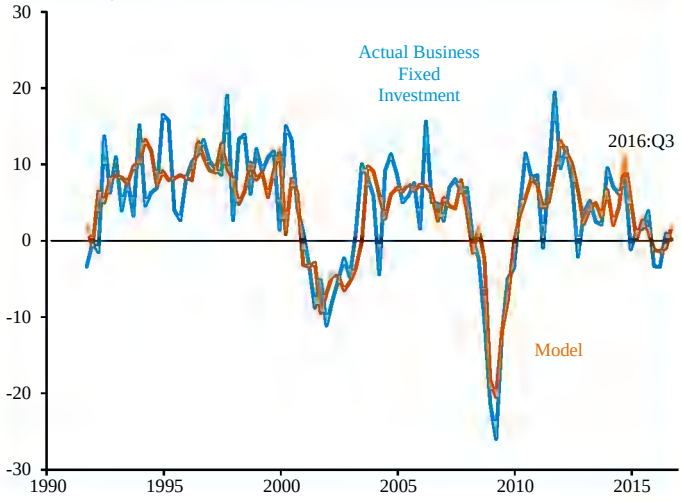
Note: Peripheral Euro Area refers to economies (Greece, Ireland, Italy, Portugal, Spain) with high borrowing spreads during the 2010–2011 sovereign debt crisis.
Source: Consensus Economics; IMF, Fiscal Monitor database; national authorities; IMF staff estimates.

data. While this implies that headwinds to investment are coming from the broader economy, it also suggests that investment spending should rebound if and when consensus forecasts for stronger global growth are realized.

The slowdown in investment in the United States is not an isolated trend; in recent years, investment spending in advanced economies has fallen short of forecasts made by the IMF in the spring of 2007 (Figure 2-xiv). Emerging market economies, which have been accumulating capital at higher rates than advanced economies, have also seen a slowdown. The global nature of the investment slowdown sheds doubt on the theory that any particular factor specific to the United States, such as government policy, is behind the current U.S. investment slowdown.

A standard model that economists employ to explain investment theoretically and empirically is called the "accelerator model." This model assumes that businesses invest if they expect rising demand growth for their products, so rising GDP growth rates will lead to higher investment growth. CEA research has found that this accelerator model explains much of the recent fluctuation in investment, as shown in Figure

Figure 2-xv
Business Fixed Investment - Actual vs. Accelerator Model, 1991–2016
Percent Change, Annual Rate



Source: Bureau of Economic Analysis, CEA calculations

2-xv.[1] The uptick in output growth after the crisis spurred faster investment growth in 2011 but the slowdown in growth in 2015-16 contributed to a slowdown in investment growth more recently, though investment growth is still somewhat weaker than this model would predict over this past year. Importantly, the model shows that changes in global growth—not just domestic growth—affect business investment, consistent with findings from the IMF and the Organisation for Economic Cooperation and Development (OECD) (IMF 2015a; OECD 2015).

Several factors that have historically mattered for investment growth have little explanatory power in the recent slowdown. These include two main financial stress measures, the credit spread (the gap between treasury yields and corporate bond yields that is sometimes seen as a measure of concerns for financial risk in the economy) and an index of tightness of loan conditions. Both of these increased recently, but not enough to have any explanatory power in the investment slowdown. Therefore, constraints on credit or in the financial system cannot explain on their own the slowdown in business investment over the last year and

[1] The standard "accelerator" model assumes that investment growth is a function of the change in the growth of real GDP because firms target a level of the capital stock that moves with the overall level of GDP. The accelerator model can be estimated using first or second differences of the relevant series. CEA ran both specifications – Figure 2-xv shows the results using the model where changes in investment are driven by lags of itself as well as the second difference of US and a foreign trade-weighted GDP aggregate. As Figure 2-xv shows, this specification closely matches investment growth.

a half, consistent with the observation that, even as the financial sector has healed, business investment growth has actually slowed further.

Another possibility is that declining profits have held back investments in the last two years. Real corporate profits rebounded after the recession but have been declining since 2014, leaving fewer funds for internal funding of investment projects. But this theory also does not match the data. Firms still have a high level of profits relative to history, and have been taking the profits they do have and increasing payouts to shareholders instead of investing in structures or equipment. This suggests firms could invest if they wanted to, but do not see adequately attractive uses of investment funds.

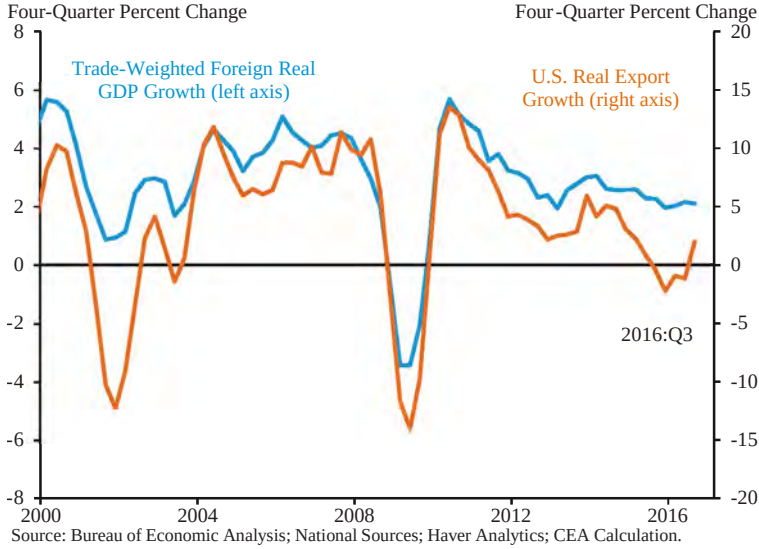
While evidence shows that weak global growth explains weak business investment growth, this does not suggest that it is the only explanation. Investment, like any other macroeconomic variable, is affected by both short- and long-run trends. There is evidence to suggest that the recent slowdown is also connected to a longer-run downward trend in investment as a share of GDP over the last few decades. Part of this decline can be attributed to secular shifts in the U.S. economy. U.S. output is increasingly produced by services industries that require less capital. For example, from 2010 to 2015, average investment-to-output ratio for services industries was 15.6 percent, while it was 21.9 percent for all non-service industries.

The accelerator model predicts a rebound in investment in the future. A key feature of the model is that investment depends on changes in GDP growth (in other words, the acceleration of GDP). The deceleration in GDP, both in the United States and abroad, has already had its negative impact on investment growth. Moving forward, more normal investment growth should occur if—as expected—world output growth stabilizes. Further, a rebound in global growth should also contribute to a rebound in overall U.S. GDP growth.

growth seems to be stabilizing, real export growth rates have begun to rise as well.

At the same time, real U.S. imports increased just 0.6 percent in the four quarters ended 2016:Q3, slower than did exports. Taken together, Figure 2-27 shows net exports contributed 0.4 percentage point to real GDP growth during the first three quarters of 2016, after subtracting 0.7 percentage point from overall growth during the four quarters of 2015.

Figure 2-26
Foreign Real GDP and U.S. Real Export Growth



Source: Bureau of Economic Analysis; National Sources; Haver Analytics; CEA Calculation.

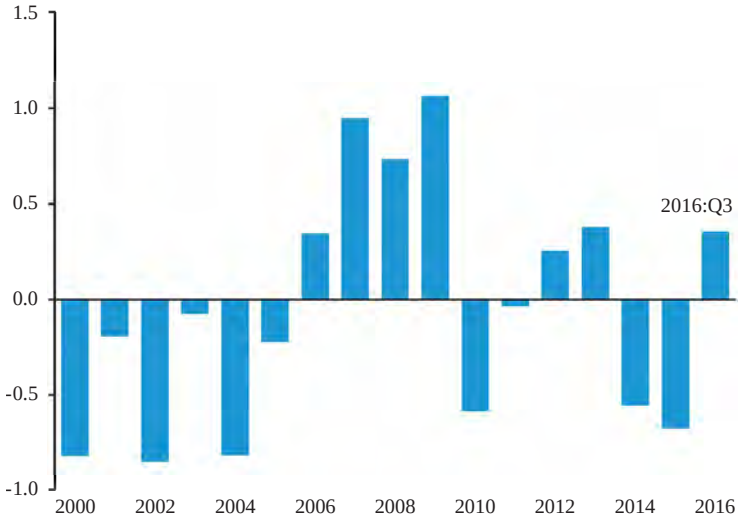
Productivity

Labor productivity, defined as nonfarm output per hour worked, has grown slower in the past decade and in particular over the past few years. Productivity growth slowed first around 2005 and then even more after 2011, averaging just 0.5 percent over the five years ending 2015:Q4—the slowest five years during an expansion in the postwar data and well below its 2.0-percent average since 1953 (Figure 2-28). This low productivity growth reflects rapid growth in employment while GDP has grown more slowly. Over longer periods of time, growth in real output and real wages depend on rising productivity, so this slowdown is a cause for concern.

Similar to trends in business fixed investment, the slowdown in productivity growth is shared across the advanced economies: 34 of the 35 OECD member countries saw slowdowns labor productivity per hour worked from 2005 to 2015 relative to the prior 10-year period.[14] In fact, despite its own slowdown, the United States has had higher productivity growth than any other G-7 economy over the past 10 years (Figure 2-xvi). The sources of the productivity slowdown are shared across advanced economies to some extent, so the approaches to address these problems are

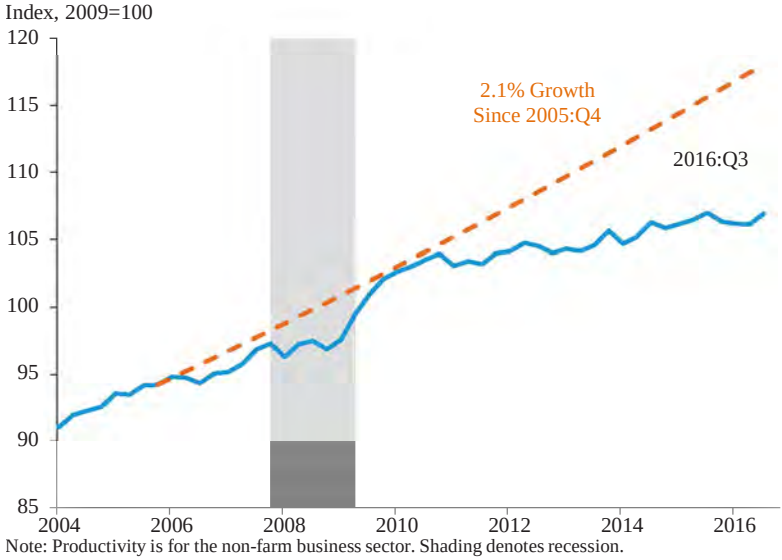
[14] The calculation uses data from The Conference Board: Labor productivity per hour worked in 2015 US$ (converted to 2015 price level with updated 2011 PPPs).

Figure 2-27
Contribution of Net Exports to U.S. Real GDP Growth, 2000–2016
Percentage Points, Annual Rate



Note: Contributions are computed using Q4-to-Q4 changes.
Source: Bureau of Economic Analysis.

Figure 2-28
Nonfarm Business Productivity, 2004-2016



Note: Productivity is for the non-farm business sector. Shading denotes recession.
Source: Bureau of Labor Statistics.

somewhat generalizable (Box 2-8), but the U.S. productivity slowdown has several of its own specific causes.

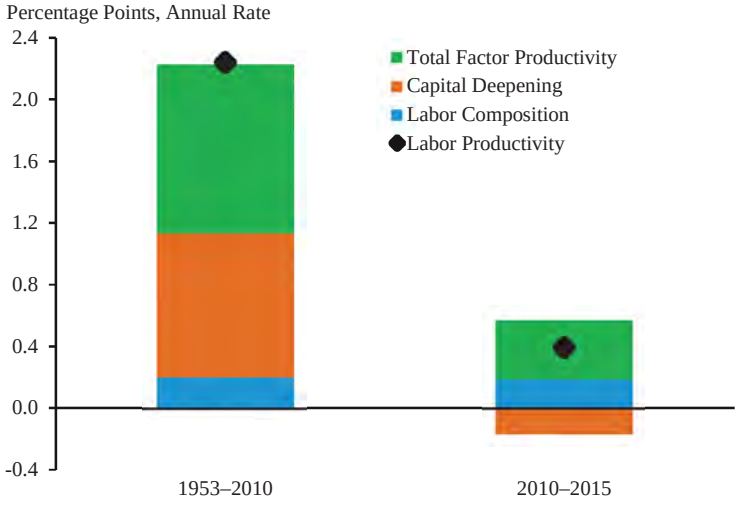
A useful way to analyze labor productivity is to decompose its growth into three factors: increased capital services per hour worked (capital deepening), increased skills per worker (labor composition), and increased technology or efficiency (technically termed "total factor productivity" and measured as a residual). While the contribution of all three decreased in the post-recessionary period compared with their long-run averages, the slowdown in capital deepening has been the largest factor subtracting from productivity growth, accounting for more than half the decline in total productivity growth, although the slowdown in total factor productivity (TFP) was substantial as well (Figure 2-29).

In the period from 1953 to 2010, about 0.92 percentage points (41 percent) of productivity growth was attributable to additional capital services per worker. Even as the recovery was underway during 2010 to 2015, the capital-deepening contribution to labor productivity growth was actually negative; in 2014 and 2015, a worker had less capital services at his or her disposal than five years earlier—the first time this has occurred during any five-year period since the end of World War II (Figure 2-30). These data suggest that net investment (that is, gross investment less depreciation) has not sufficed to grow capital services in line with the increase in hours worked. Indeed, business fixed investment growth has fallen short of IMF forecasts and been weak since 2014 (IMF 2014; IMF 2015a).

Another possible explanation is that we are not measuring productivity correctly in the information-driven economy. Measurement error, however, has probably always been present in the official productivity data and is therefore unlikely to explain much of the recent, productivity slowdown. CEA analysis and recent research suggests that mismeasurement has not grown in such a way to explain such a large slowdown in productivity growth from a 2.1-percent historical average to 0.0 percent during the four quarters ended 2016:Q3 (Box 2-5 in CEA 2016a). Some reasons for skepticism include: (i) productivity growth was high from 1995 to 2005 when many of the potentially underestimated information technology innovations were introduced; (ii) the slowdown in productivity has affected well-measured sectors of the economy too; and (iii) many recent innovations boost consumer surplus and the value of leisure, which GDP was not designed to measure.

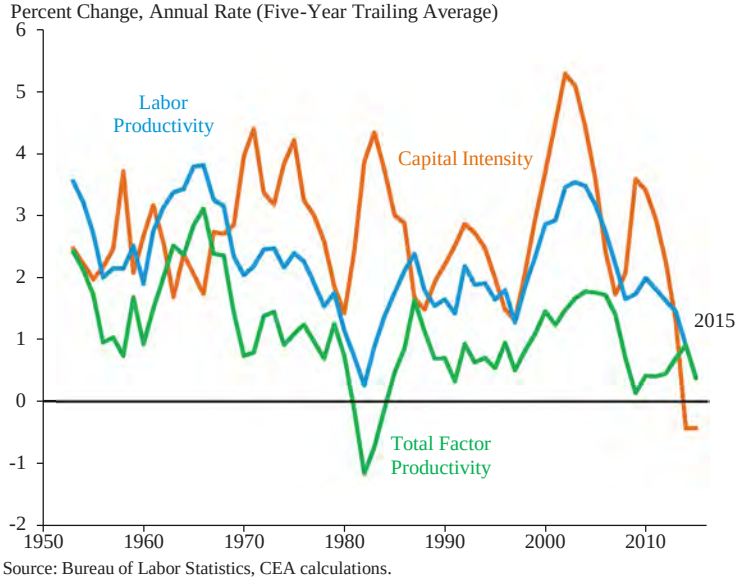
Changes in industrial composition can explain some of the decrease. Since 2011, output and employment growth has been higher in lower output-per-hour sectors, such as business services, construction, and hospitality, holding back productivity growth overall. Conversely, as commodity

Figure 2-29
Contributions to Growth of Labor Productivity, 1953–2015



Note: Productivity is measured for the private non-farm business sector.
Source: Bureau of Labor Statistics; CEA calculations.

Figure 2-30
Labor Productivity and Major Components, 1953–2015



Source: Bureau of Labor Statistics, CEA calculations.

prices weakened and the global economy slowed during 2015 and 2016, both the energy-producing sector and manufacturing have struggled. A shrinking role for these capital- and technology-intensive sectors reduces output per hour.

In the labor market, there is some evidence that the improving economy is drawing in workers who have at least temporarily lower productivity, which also reduces measured productivity growth. Newly employed workers tend to receive lower wages, presumably because they are at least temporarily less productive than their more experienced co-workers. Partly for these reasons, it is not unusual for measured productivity growth to be higher early in a business cycle recovery and slower as a business-cycle expansion matures as workers are added back onto payrolls, though this is actually an overall positive development for the economy as long as it moves the economy towards full employment. Since 2011, newly employed workers have made up a larger-than-normal share of the workforce as employment growth has boomed. This has suppressed wage growth by 0.5 to 1.0 percentage point over this period. These newer hires may have lower skills or productivity than otherwise similar workers, or their skills may have eroded during their extended time out of work. Adding relatively more of these below-median-wage workers may have temporarily depressed productivity growth.

Longer-standing declines in the fluidity and dynamism of the economy may also be contributing to slower productivity growth. The entry of new firms has been slowing for decades and, to the extent that these firms drive both investment and productivity growth, their decline is important. A pessimistic view put forward by economist Robert Gordon is that the world economy may have simply run through the best productivity-enhancing innovations such as the steam engine, the telephone, and indoor plumbing while more recent innovations may not have the same impact on output (Gordon 2012). This pessimistic view of our future is not universally held. The world has more educated and connected people than at any time in history. Investment in intellectual property products has been strong throughout the recovery. Spending on the research and development component of investment (R&D) in particular has risen to its highest share of GDP on record, suggesting good prospects for continued innovation remain.

Of the possible explanations, it appears that more cyclical or short-term explanations explain a large portion of the slowdown. In particular, to the degree that the productivity slowdown is caused by an investment bust, that may actually be encouraging for the future outlook. It means we are not out of ideas or permanently mired in secular stagnation, but instead just need to invest more. Not only do we have policy tools to help push in that direction, but to some degree such investment busts have historically

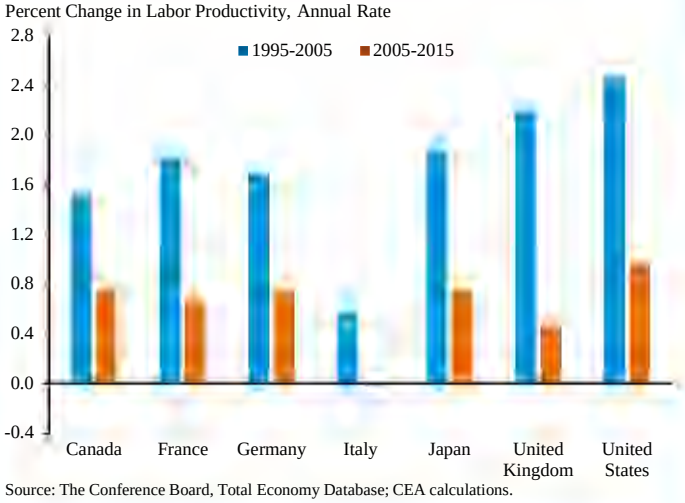
Box 2-8: Productivity Among the Advanced Economies—Explanations and Prospects

The slow productivity growth over the last decade in the United States is hardly an exception within the advanced economies. While there is still substantial heterogeneity across the advanced economies in terms of their cyclical position, there is commonality in terms of their experience with productivity growth. Average annual productivity growth in the advanced economies slowed to 1 percent in the period from 2005 to 2015, down from 2 percent in the previous decade—with productivity slowing in 34 of the 35 OECD member countries, including all of the G-7 economies, with the United States having the fastest productivity growth in the G-7 (Figure 2-xvi).

An economy takes various inputs, such as labor and capital, and produces goods and services. Low labor productivity growth means that labor inputs are growing relatively quickly compared with output, such that growth in output per hour worked is low. This may be due to less capital for each worker or because technology or management are not using these inputs efficiently.

It is unlikely to be a mere coincidence that a substantial shortfall in aggregate demand and a large slowdown in productivity growth have occurred simultaneously. In fact, the causal relationship between the two phenomena likely runs both ways. In the period from 2008 to 2014,

Figure 2-xvi
Labor Productivity Growth Slowdown in the G-7



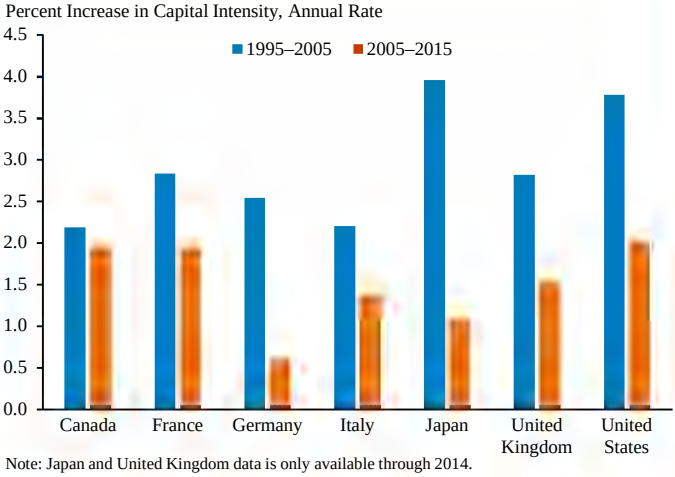
Source: The Conference Board, Total Economy Database; CEA calculations.

inadequate demand has contributed to a large shortfall of investment in both advanced and emerging markets. Moreover, CEA has found that the U.S. investment slowdown in the past 18 months can, in part, be quantitatively explained by slow global growth (Box 2-7).

In the United States, the largest contributor to the decline in labor productivity in the past five years is a reduction in capital deepening. This was not a unique experience, as all of the G-7 countries except Canada saw appreciable slowing in their rates of capital deepening between 1995-2005 and 2005-15 (Figure 2-xvii). As in the United States, the slowdown in capital deepening was even than the slowdown in total factor productivity (TFP) in Germany, Japan, and Italy. In France and the United Kingdom, however, relatively larger slowdowns in TFP growth account for the larger share of the decline in labor productivity (Figure 2-xviii).

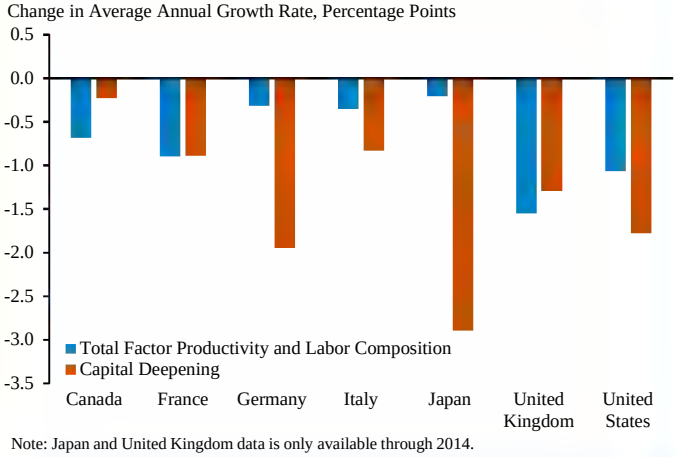
On the supply side, slowing total factor productivity growth has also played a role in all of the G-7 economies. There is some evidence that the slowing began before the crisis, around 2004, as the impulse from the information technology revolution either did not endure or was not well measured.

Figure 2-xvii
Capital Deepening in the G-7



Note: Japan and United Kingdom data is only available through 2014.
Source: OECD.Stat; CEA Calculations.

Figure 2-xviii
Change in Growth in Components of Productivity in the G-7, 1995–2005 to 2005–2015



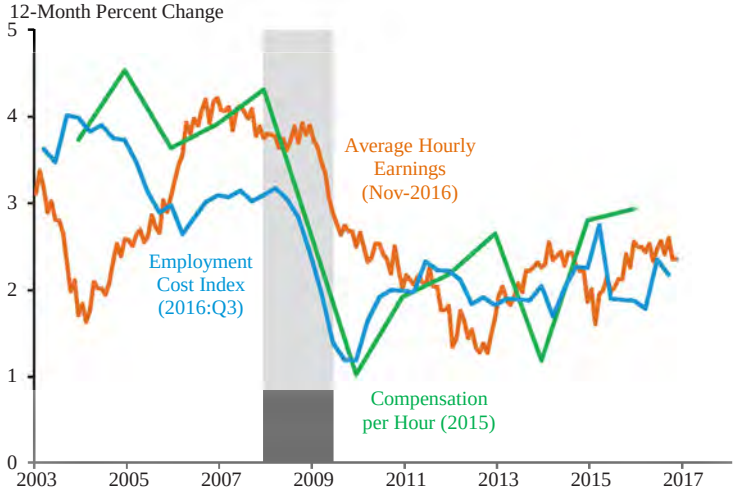
Note: Japan and United Kingdom data is only available through 2014.

been self-correcting as investment tends to be negatively serially correlated, with busts followed by booms and vice versa. Other factors holding down productivity growth—particularly shifting industry composition and new-worker entry—should fade. As the labor market normalizes over the long term, the economy will no longer be adding a disproportionate number of new workers.

Looking forward, a number of the President's proposed policies would contribute to increasing productivity growth. Infrastructure spending would lift public investment, raising effective capital per worker; investing in job training and greater access to higher education would raise labor quality; reforming innovation policy, patent reforms, expanding R&D tax credits, and supporting public R&D spending would all increase total factor productivity. Broader policies would aid as well: the Trans-Pacific Partnership (TPP) trade agreement would help better firms grow and hire more workers, increasing productivity within sectors; immigration reform would increase high-skilled immigration and improve job matching of workers and increase certainty for undocumented workers already here; supportive entrepreneurship policies would help both investment and firm dynamism; business tax reform would encourage domestic investment and innovation; and better competition policy would steer firms away from rent-seeking toward

Figure 2-31

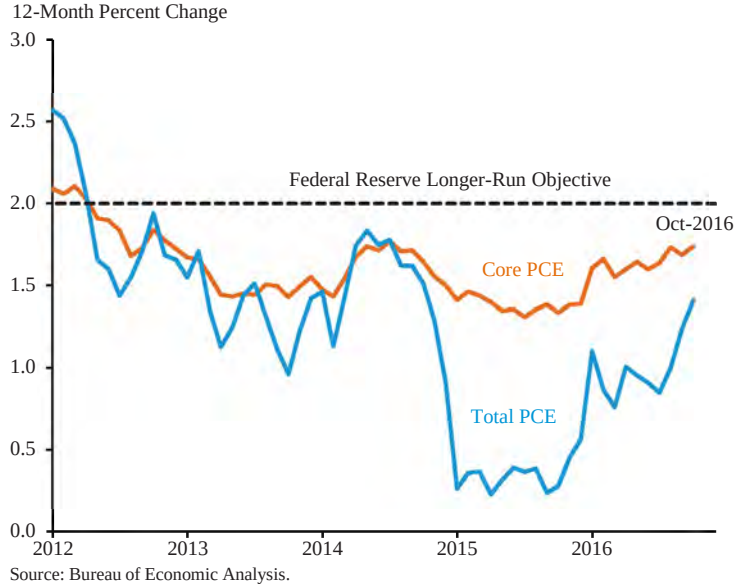
Nominal Wage Inflation Over Past Year, 2003–2016



Note: Compensation per hour refers to the productivity and cost measure for nonfarm business. The Employment Cost Index ialso refers to the nonfarm sector, but uses a different survey. Aver-age hourly earnings refers to production & nonsupervisory workers. Shading denotes recession.
Source: Bureau of Labor Statistics; Department of Labor; Haver Analytics.

Figure 2-32

Consumer Price Inflation, 2012–2016



Source: Bureau of Economic Analysis.

productive innovation. There is no silver bullet for improving productivity growth, but sound policy across a range of initiatives could support it, raising real wages and living standards in the process.

Wage and Price Inflation

Nominal wage inflation has trended up over the course of the recovery as the labor market has continued to strengthen amid robust job growth. Average nominal hourly earnings for private sector production and nonsupervisory employees increased 2.4 percent during the 12–month period ended November 2016, up from 2.3 percent during the year-earlier period. Nominal hourly compensation for private-sector workers, as measured by the employment cost index, increased 2.2 percent during the four quarters through 2016:Q3, up from 1.9 percent in the four quarters of 2015. Alternatively, the more-volatile compensation per hour measure for the non-farm business sector, as measured by the labor productivity and cost dataset, increased 2.2 percent during the four quarters through 2016:Q3, below its 3.1-percent rise during the four quarters of 2015. Taken together, as shown in Figure 2-31, nominal wage inflation has increased with the strong recovery in the labor market. However, the pace remains below the pre-crisis pace.

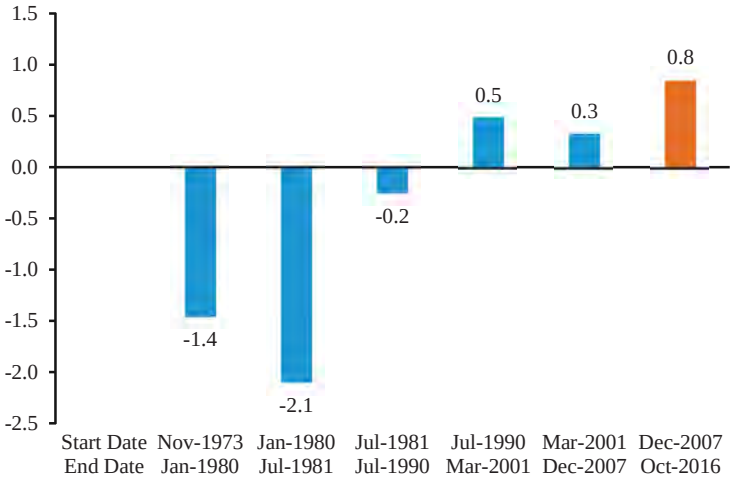
Consumer prices, as measured by the price index for personal consumption expenditures (PCE) and shown in Figure 2-32, increased roughly 1.4 percent over the 12 months ended in October 2016. The growth rate was held down by continued declines in energy prices, leaving overall inflation well below the Federal Reserve's longer-run objective of 2 percent. Core inflation—which excludes energy and food prices and tends to be a better predictor of future inflation than overall inflation—was also less than the 2-percent target, ranging between 1.6 and 1.7 percent thus far in 2016.[15] Lower imported goods prices, as well as the pass through of lower energy costs to non-energy goods, likely weighed on core inflation this year. The speed and degree to which these factors wane are two keys to the inflationary pressures in the economy this year. While inflation has picked up in recent months, nominal earnings have also continued to grow considerably

[15] The Federal Reserve defines its inflation objective in terms of the PCE price index. The consumer price index (CPI) is an alternate measure of prices paid by consumers and is used to index some government transfers, such as Social Security benefits. Largely because of a different method of aggregating the individual components, PCE inflation has averaged about 0.3-percentage point a year less than the CPI inflation since 1979. Recently, though, the gap between core price inflation has been larger across the two indices. During the 12 months ended in October 2016, for example, core CPI prices increased 2.2 percent, more than the 1.7-percent increase in core PCE prices.

Figure 2-33

Real Hourly Wage Growth Over Business Cycles (Cycle Peak to Cycle Peak), 1973–2016

Percent Change, Annual Rate

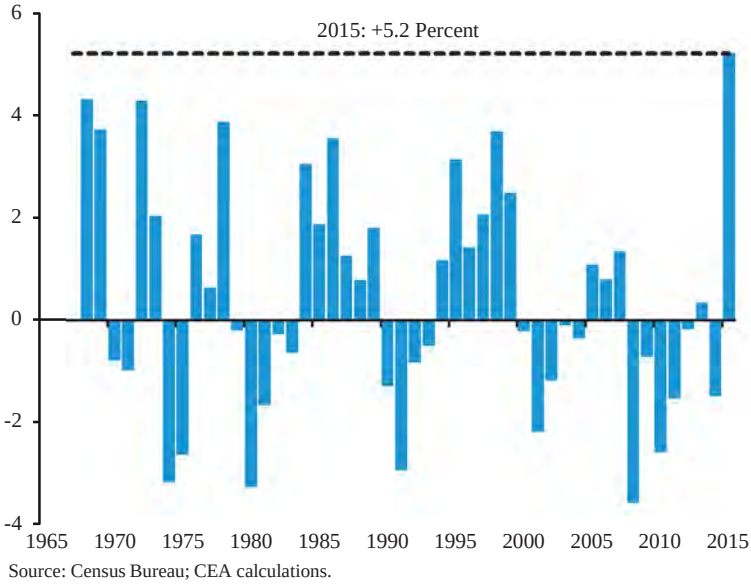


Note: Wages for private production and nonsupervisory workers. Nominal wages are deflated using the CPI for urban wage earners and clerical workers (CPI-W).
Source: National Bureau of Economic Research; Bureau of Labor Statistics; CEA calculations.

Figure 2-34

Change in Real Median Household Income, 1968–2015

Percent Change from Prior Year



Source: Census Bureau; CEA calculations.

Figure 2-35

Growth in Real Household Income by Percentile, 2014–2015

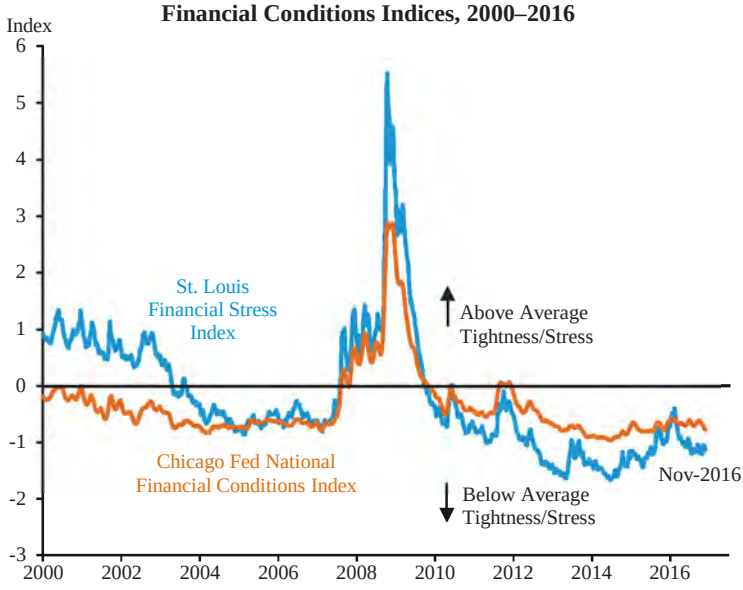
Source: Census Bureau; CEA calculations.

faster than inflation, translating into sustained real wage gains for American workers.

Real average hourly earnings of production and nonsupervisory workers have grown at a relatively high rate in 2016. As of October, real wages of production and nonsupervisory workers have grown at an annual rate of 0.8 percent since the start of the current business cycle in December 2007, which is the fastest real wage growth over a business cycle since the early 1970s (Figure 2-33). From October 2012 to October 2016, the total growth of real wages of private production and nonsupervisory workers was 6.1 percent, exceeding the 2.1-percent total growth from the business cycle peak in 1980 to the business cycle peak in 2007.

The combination of strong employment gains and real wage gains have contributed to rising real household income. Real median household income rose 5.2 percent, to $56,516 in 2015. This was the largest percent increase since records began in 1967. The income gains were broad based: for the first time since 2006, all income percentiles reported by the U.S. Census Bureau experienced gains (Figure 2-34). The largest gains were among households at the bottom of the income distribution; real income growth was the fastest on record for the 10th, 20th, 40th, 50th, and 60th percentiles (Figure 2-35). In addition, all racial and ethnic groups saw

Figure 2-36
Financial Conditions Indices, 2000–2016



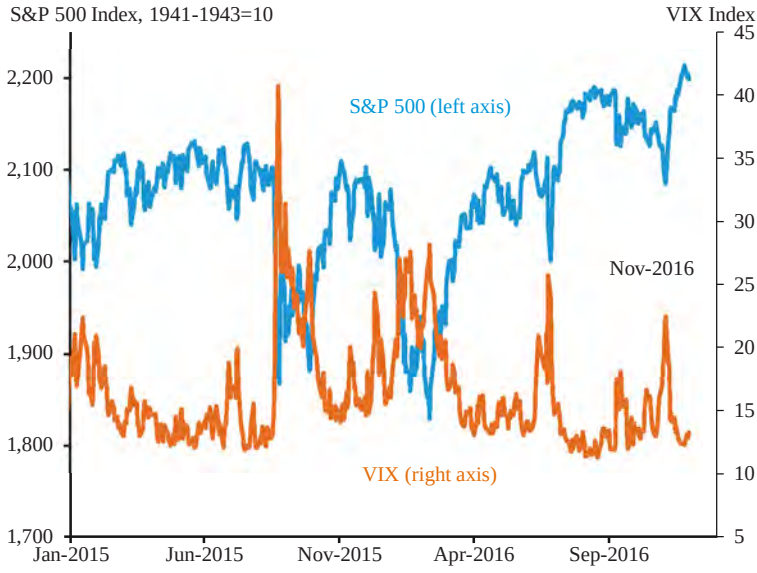
Source: Federal Reserve Bank of St. Louis; Federal Reserve Bank of Chicago.

income gains—6.1 percent for Hispanic households, 4.1 percent for African-American households, 3.7 percent for Asian households, and 4.4 percent for non-Hispanic White households.

Financial Markets

U.S. financial markets have been robust so far in 2016, with equity indexes higher, government bond yields slightly higher, credit spreads lower, and oil prices rallying from lows that were touched in January. Equity markets had been broadly down in late 2015. The level of the S&P 500 Index as of November 30 is up 3.2 percent relative to the high reached in mid-2015. Asset prices in 2016 tended to be broadly affected by central bank policy decisions and investor perceptions of domestic and global growth prospects. Financial markets were volatile and equity markets were down early in the year, but have since recovered. In general, investor sentiment has been cautiously optimistic and, as shown in Figure 2-36, financial conditions have been relatively loose. Both rising asset prices and eased financial conditions should continue to support the economic recovery.

Figure 2-37
S&P 500 and VIX, 2015–2016



Source: Wall Street Journal.

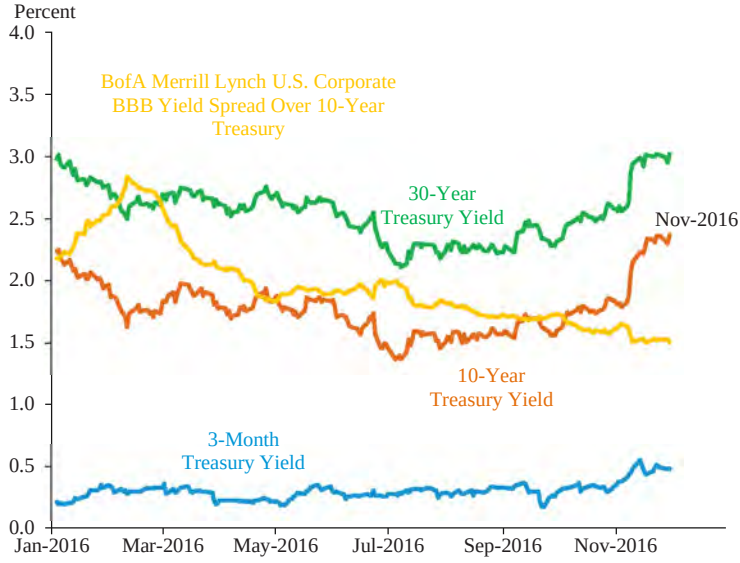
Equity Markets

The S&P 500 is up 7.6 percent in 2016 as of November 30. The first two months of the year saw steep declines, reflecting investor concern about the health of the global economy. During those episodes of market declines, the Chicago Board of Options Exchange Market Volatility Index (VIX), which reflects investor expectations of future volatility for the S&P 500, spiked to almost 30 in early January and again in early February (VIX levels above 30 are generally considered high). Thereafter, equity markets recovered broadly and investor volatility expectations were generally much lower for the rest of the year.

The United Kingdom's decision to exit the European Union (popularly termed "Brexit") was followed by falling equity prices in markets around the globe, but the spike in volatility was temporary and major U.S. equity indices quickly recovered. The S&P 500 reached a record high in August, before easing back a bit in September and October. The index rose sharply in November, rising 3.4 percent and hitting a new all-time high on November 25. With the exception of early November, the VIX has closed below 20 since shortly after Brexit, as shown in Figure 2-37. As of November 30, 2016, the S&P 500 was 40 percent above its pre-recession peak in 2007.

Figure 2-38

Nominal Long- and Short-Term Interest Rates, 2016



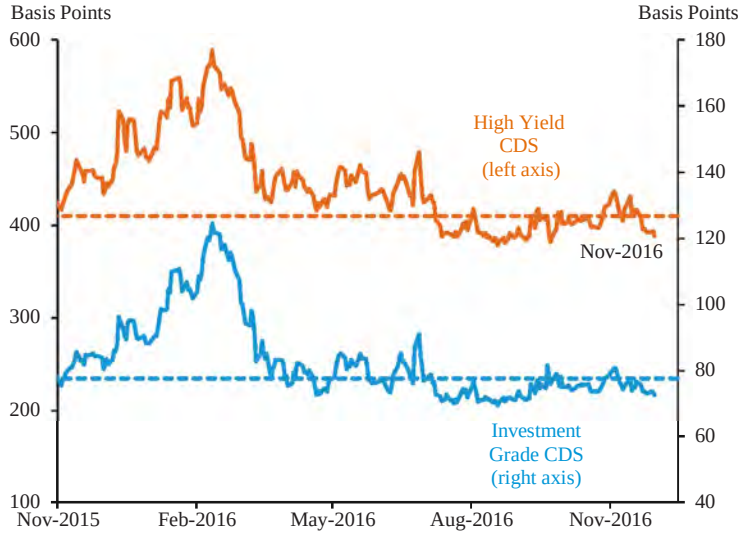
Source: Federal Reserve; Bank of America Merrill Lynch.

Interest Rates and Credit Spreads

During the first half of the year, yields on government and corporate debt generally moved lower, continuing the downward trend of the past few years. However, Treasury yields rose in the second half of the year and spiked upward in November, with the 10-year yield ending the month above its end-of-2015 level. Levels of default risk, as measured by credit default swap (CDS) spreads, spiked in tandem with the equity and oil market volatility near the start of the year but, consistent with equity market volatility, have returned to relatively low levels since. At the same time, consensus forecasts of long-run U.S. interest rates have fallen over 2016. The market-implied expectation for the 10-year Treasury yield 10 years from now fell in the first half of the year but spiked upward in November and, as of November 30, is at its end-of-2015 level.

Long-term government interest rates, or yields on 10-year and 30-year U.S. Treasury notes, declined more than did yields on shorter-term debt during the first half of 2016. The 10-year U.S. Treasury yield fell below 2 percent at the beginning of the year and reached its lowest level on record (1.37 percent) on July 5, but recovered steadily throughout the third quarter and reached 1.84 percent at the end of October (Figure 2-38). In November, the 10-year yield jumped up 53 basis points (bps) to 2.37 percent, a large move shared by the 30-year Treasury yield as well as the government bond

Figure 2-39
CDS Spreads for North American Corporate Debt, 2015–2016

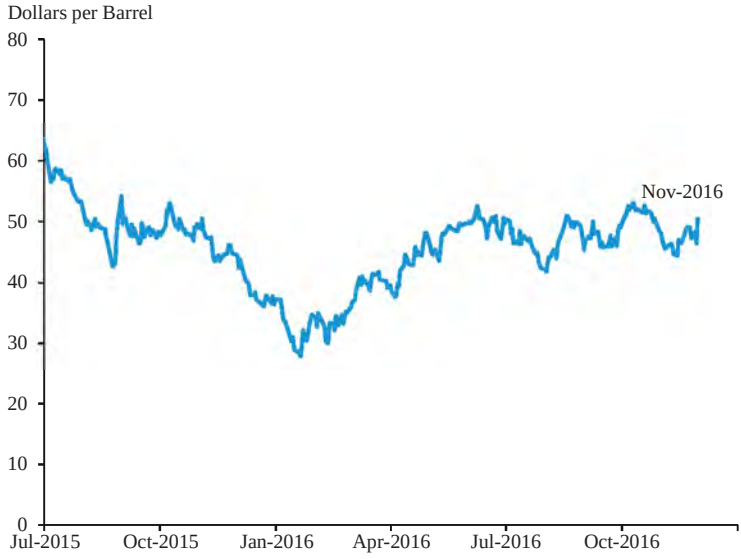


Note: Dotted lines indicate average spreads 2015-2016 year to date.
Source: Markit; Bloomberg.

yields of other advanced economies. Despite the recent upward movements, Treasury yields are still low relative to their long-term averages. Unusually low interest rates are not unique to the United States, as relatively low interest rates were common among G7 economies in 2016.

Average borrowing costs for BBB-rated companies decreased more than 10-year U.S. Treasury yields did in 2016, with the BBB spread over 10-year U.S. Treasuries declining from 2.18 percentage points at the end of 2015 to 1.51 percentage points at the end of November. The BBB spread had widened in late 2015 and peaked at 2.84 percentage points in February before steadily narrowing to 1.61 percentage points by the end of October. In November, the spread decreased another 10 basis points, though both the 10-year Treasury yield and the average BBB yield to maturity rose. As of November 30, the BBB spread is slightly below its average post-recession level of 1.70 percentage points. Narrowing corporate credit spreads relative to Treasury notes mean the market is requiring less compensation for the credit risk of corporate debt. This is consistent with the downward movement of credit default swap (CDS) spreads for corporate debt over the year (Figure 2-39). Because CDS spreads are the cost of insurance against the default of a borrower, falling CDS spreads mean that the market perceives debt defaults as less probable now than at the start of the year. Corporate bond issuance has been proceeding at a robust pace; over the first 10 months

Figure 2-40
Brent Crude Oil Prices, 2015–2016



Source: Bloomberg.

of 2016, corporate bond issuers have issued 1.4 trillion dollars of debt, on par with the pace in 2015.[16] This high rate of debt issuance, however, does not appear to reflect rising business fixed investment (Box 2-7).

North American high-yield CDS spreads increased roughly 80bps in early February due in part to the increasing credit risk of energy producers, some of which defaulted after the price of oil plummeted after the start of the year. As oil prices recovered, industry-average CDS spreads fell, reflecting the improved health of energy firms as well as improved investor sentiment. As of November 30, high-yield and investment grade CDS spreads are below their average 2015-16 levels.

Market estimates for long-term U.S. Treasury rates decreased in the first half of the year along with the current (spot) Treasury rates, signaling that markets may believe that interest rates will remain low over the long-term as well. The 10-year U.S. Treasury rate, 10 years forward, which is a function of the 20-year U.S. Treasury rate and the 10-year U.S. Treasury rate, was 3.6 percent as of November 30, same as the level at the end of 2015, but slightly lower than the 3.7-percent rate projected for 2026 by a consensus of professional forecasters. This forward interest rate may be interpreted

[16] This measure was provided by SIFMA and includes all non-convertible corporate debt, MTNs, and Yankee bonds, but excludes all issues with maturities of one or less and certificates of deposits.

as a market forecast of the 10-year interest rate a decade from today but may diverge from it due to liquidity and maturity risk premia. Some of the gap between the market-implied rate and the consensus forecast may be explained by a lower term premium, global flight-to-safety flows, or divergent expectations about long-term productivity and output growth. Forward rates incorporate risk premia, can be highly volatile, and their movements may reflect transitory developments as opposed to structural changes; as such, they may be poor predictors of future rates. For a more in-depth analysis into the 10-year U.S. Treasury rate, 10 years forward, and the overall shift to lower long-term rates, see the Council of Economic Advisers (2015d) report, "Long-Term Interest Rates: A Survey."

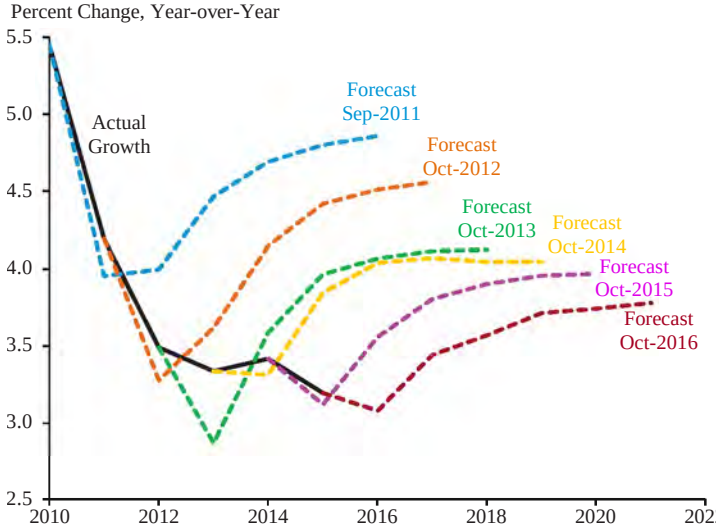
Energy Prices

Weakness in oil prices contributed to equity and credit market volatility in the first two months of the year. Brent crude oil closing prices fell to less than $30 a barrel in late January and touched $30 a barrel again in early February on data suggesting slower Chinese growth would depress oil demand, dollar appreciation would restrain price increases, and that excess supply would persist. Oil prices have rallied since then and have mostly hovered between $40 and $50 a barrel since April (Figure 2-40), exceeding $50 in the beginning of November as OPEC members agreed to an output agreement capping production at 32.5 million barrels per day, 3 percent below the 33.64 million barrels per day reported by OPEC members in October.

The Global Macroeconomic Situation

The growth of the global economy in 2016 is expected to be the same as in 2015, but was below the year-earlier expectations of a rebound. Relatively lower growth is both a long-term phenomenon, with advanced economies repeatedly underperforming over the past six years, and the manifestation of short-term developments arising in part from uncertainty in European markets following the Brexit vote as well as recessions and continued risks in selected emerging markets. Downward revisions to growth forecasts occurred amid an environment of weak global demand and investment and disappointing global productivity growth. Compared with forecasts in October 2015, IMF forecasts for four-quarter growth in the October 2016 *World Economic Outlook* reflected downward revisions across both advanced and emerging markets, resulting in a downward revision in the global four-quarter growth forecast for 2016 from 3.6 percent to 3.1 percent (IMF 2015b; IMF 2016b).

Figure 2-41
IMF World Real GDP Growth Forecast, 2010–2021

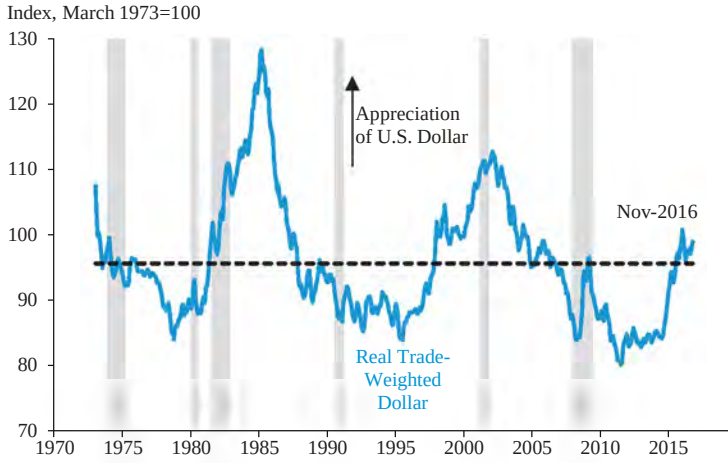


Note: The figure uses year-over-year growth. Q4-over-Q4 forecacasts are not available over extended horizons.
Source: International Monetary Fund (IMF) World Economic Outlook.

Some developments, especially as they relate to advanced economies, were unexpected, but the slow growth seen throughout 2016 was an extension of developments seen in 2015, namely the stabilizing but persistently slowing growth in China, the persistence of low prices for some commodities, and slower working-age population growth in many countries. Despite coming in below expectations, the pace of growth has broadly stabilized with growth projected for the four quarters of 2016 matching the pace over the four quarters of 2015. The weak global growth, particularly among U.S. trading partners, continued to be a headwind to U.S. economic growth in 2016, but the prospect that global growth has stabilized and may pick up could be a promising sign for U.S. growth.

The IMF's projected global growth rate of 3.1 percent during the four quarters of 2016 is well below both the pace earlier in the recovery and pre-crisis (between 4 and 5 percent). This longer-term slowdown was not anticipated in earlier forecasts. Figure 2-41 shows the IMF's forecast for global growth at different times. The solid line represents the actual growth outcomes while the dotted lines show the forecast. At first, as growth slowed, the IMF—along with most other forecasters—expected a near-term pickup in growth to over 4 percent. Since then, medium-term global growth has

Figure 2-42
Real Broad Trade-Weighted Dollar, 1973–2016



Note: This index is a weighted average of the foreign exchange values of the U.S. dollar against major U.S. trading partners. The dotted line represents the 1973-2016 average. Shading denotes recession.
Source: Federal Reserve Board.

consistently fallen short of expectations, as the long-term growth forecasts have flattened and medium-term risks have deepened.

As discussed above, the slowdown in global growth has been a headwind for the U.S. economy, dragging on real export growth. As global growth and the appreciation of the dollar have stabilized, however, real exports have grown 2 percent in the four quarters ended in 2016:Q3. Still, global growth is below expectations and there appears to be room for more growth in many countries. That is why it is critical for economies around the world to coordinate efforts focused on promoting growth, undertaking the necessary steps to expand demand, increase investment, encourage trade, and manage economic and financial developments as appropriate in different contexts.

Global Headwinds and Trade

Starting in July 2014, the dollar entered a period of sustained real appreciation, increasing by 17 percent through December 2015, according to the Federal Reserve's broad real dollar index. Such a major wave of dollar appreciation has occurred only twice before since the dollar began to float freely in 1973 following the collapse of the Bretton Woods fixed exchange rate system. In 2016, the dollar was largely stable for most of the year but appreciated 2.3 percent on a trade-weighted basis in November (Figure 2-42). The limited appreciation of the trade-weighted exchange rate so far in 2016 obscures some larger bilateral moves in the dollar, with appreciation

against the Mexican peso, the Chinese renminbi (RMB) and the British pound partially offset by depreciation with respect to the Canadian dollar and the Japanese yen.

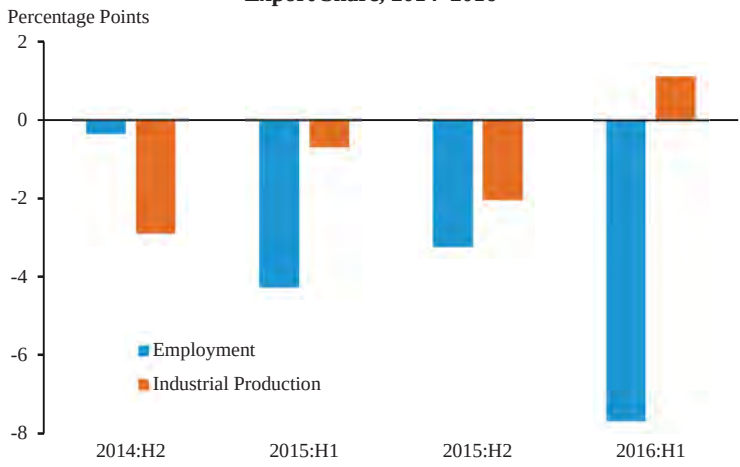
While well above the level that prevailed in the years immediately following the financial crisis, the recent appreciation leaves the dollar close to its 40-year historical average on a real, price-adjusted basis. Among the drivers of the recent dollar appreciation is the strong performance of the U.S. economy against a backdrop of relatively weak growth in the rest of the world. U.S. Federal Reserve policy is at a different juncture than monetary policy in other major economies. The Federal Reserve increased interest rates for the first time since the 2008 financial crisis at its December 2015 meeting. In the first half of 2016, however, both the pace of U.S. growth and of monetary tightening by the Federal Reserve fell behind expectations. FOMC participants consistently marked down both their interest rate and U.S. growth forecasts throughout 2016, while several other advanced economies chose to keep their policy rates unchanged. Although markets expect the Federal Reserve to reduce monetary policy accommodation over the coming year, the European Central Bank (ECB) and the Bank of Japan (BOJ) are in the midst of maintaining or expanding monetary stimulus with the aim of raising inflation from low levels toward their respective 2-percent targets.

The manufacturing sector, in particular, struggles when foreign demand for U.S. exports is low because it is a more export-oriented part of the economy. While manufacturing makes up roughly 12 percent of U.S. value added, it constitutes about one-half of U.S. exports. Within manufacturing, the more export-oriented sectors have struggled most. In the first half of the year, export-intensive manufacturing sectors lagged in terms of both output and employment growth (Figure 2-43).[17]

Weak global demand and subdued investment growth have driven a slowdown in global trade. The IMF notes that the rate of growth in the volume of world trade in goods and services has fallen to less than half its average rate of growth over the preceding three decades. Both the IMF and the OECD note that growth in real world trade has just barely kept up with growth in real global GDP since 2011, whereas it grew on average twice as fast as real global GDP during the two decades before the crisis. Various analysts attribute the slowdown to weak global growth, especially in investment, a decline in the growth of trade in both capital and intermediate goods through the "global value chain," rebalancing in China, the shift across

[17] The CEA defines export share as being the sum of direct export sales and "indirect" export sales, which are the input-cost weighted export sales of downstream users, using the Leontief inverse method in Johnson and Noguera (2012).

Figure 2-43
Employment and Industrial Production Relative to Trend Given High Export Share, 2014–2016



Note: These values represent the average difference between the annualized monthly growth rate for June 2014-June 2016 and the annualized monthly growth rate for 2010-2014:H1, for U.S. manufacturing industries associated with a 15 percent higher total (direct + indirect) export share.
Source: Bureau of Labor Statistics; Federal Reserve; CEA calculations.

many economies toward services, and rising protectionist sentiment. The slowdown in trade may both be associated with, and contribute to, slower future economic growth. This is because both the slowdown in capital deepening through investment, which is more import-intensive than other contributors to aggregate demand, and the end to the rapid expansion of global value-chain activity, partly attributed to China's re-balancing toward consumption and services, may reduce productivity growth.

Developments in 2016

Economic growth in 2016 continued to be subdued in a number of advanced economies, but improved in emerging market and developing economies in aggregate. Though total growth for emerging markets and developing economies as a group continued to improve, it underperformed forecasts made in fall 2015 and was weighed down by continuing contraction and slowing growth in emerging European economies, Latin America and the Caribbean, and Sub-Saharan Africa. Emerging markets had been expected to grow 4.8 percent over the four quarters of 2016, but now look set to grow only 4.3 percent (IMF 2015b; IMF 2016b).

United Kingdom

It has been a turbulent year for the United Kingdom since the June referendum in which voters called for the county to leave the European Union. It remains too early to tell what the economic impact of a 'Brexit' will be for the United Kingdom and the world, as expectations for future growth evolve with the release of new data. The Bank of England originally marked down its forecast for UK growth for 2016 through 2018 in its third quarter inflation report after the referendum; in its fourth quarter inflation report, the bank revised its forecast upward for 2016 and 2017 reflecting positive GDP data in 2016:Q3, but further lowered its forecast for 2018. The central bank acted strongly to support the UK economy at its August policy meeting, lowering its key policy rate and signaling that it stood ready to provide more accommodation if needed. However, the depreciation of the pound since the referendum—it fell as much as 16 percent on a trade-weighted basis, reaching its lowest level since 2010—has sparked inflationary pressures. Citing these developments at its November meeting the bank's policy committee shifted its guidance from an easing to a neutral outlook for monetary policy.

Global equity markets initially plunged after the Brexit vote, though generally rebounded later and recovered their losses. The FTSE 250 Index—made up of the stocks of the largest 250 companies on the London Stock Exchange that are not in the top 100 stocks by market capitalization—dropped 7.5 percent in the immediate aftermath of the vote, but has since recovered these loses. Despite these developments, the real economy has proved to be remarkably resilient in the months after the vote: real GDP growth for 2016:Q3 surprised on the upside, growing at a 2-percent annual rate, similar to the pace over the preceding four quarters and meeting forecasts issued prior to the vote; the harmonized unemployment rate held steady at 4.8 percent through the end of August 2016; consumer confidence was above its long-term average; and purchasing manager surveys of manufacturing and services activity continued to indicate expansion. Growth in industrial production, however, missed expectations, and some economists assert that the negative implications of Brexit have yet to materialize given the estimated two-year exit process once formal negotiations with the European Union begin. Of particular concern is the risk to the UK's financial sector if UK-based firms lose "passporting" rights to operate on an equal footing in the EU single market. In many ways, Brexit's impact is yet to be seen as the true terms of exit are yet to be understood, and the uncertainty involved could weigh on the economy over time.

Euro area

Recovery from the financial and sovereign debt crises in the euro area remains uneven, with new uncertainties creating downward pressure on growth. Unemployment only recently edged down to 9.8 from over 10 percent, and the euro area's real GDP-per-capita has only just recovered its pre-crisis peak in 2016:Q3. The IMF expects the euro area economy as a whole to grow 1.6 percent over the four quarters of 2016, more slowly than its 2-percent growth rate in 2015, reflecting some weakness in domestic demand in the first half of 2016. The unemployment rate in the nations hardest hit by the sovereign debt crisis remains elevated, as high as 20 percent. This persistently slow economic growth and labor market slack, coupled with very low inflation (averaging 0.2 in 2016 for the euro area as a whole, and deflation in Ireland, Italy, and Spain) highlight the need for more supportive policy in Europe, including expansionary fiscal policy. Meanwhile, the euro area's current account surplus has widened since 2012, driven by Germany's growing current account surplus.

Although euro area banks are more resilient to market stress than before the financial crisis, weak profits and concerns about sufficiency of financial capital leaves euro-area banks and the financial sector vulnerable, potentially acting as a drag on growth. Burdened by high levels of legacy non-performing loans, Portuguese and Italian banks in particular are struggling to recapitalize and achieve a sustainable business model. Additionally, declines in investor confidence may signal questions about the capacity of both countries to support its banks, if necessary, given weak growth and high sovereign indebtedness. Similar vulnerabilities are also weighing on some large institutions such that the Euro Stoxx Bank Index—an aggregate of European bank equity prices—has fallen 17.8 percent since the beginning of the year. Slow growth, low interest rates, and what some observers call oversaturation of lenders in some credit markets have compressed profit opportunities.

Japan

Japan has continued to face economic challenges in 2016. Prime Minister Shinzo Abe is promoting a package of structural reforms aimed at jumpstarting growth in the Japanese economy, in addition to campaigning for monetary stimulus and advocating for "flexible" fiscal policy, renewing his signature "Abenomics." After dipping in and out of recession since its 1992 financial crisis, economic growth in 2016 continues to be sluggish, growing 0.8 percent over the four quarters ended in 2016:Q3. Slow growth is due in large part to Japan's declining working-age population. When looking at real GDP per working-age population rather than real GDP,

for example, Japan has grown almost as robustly as the United States over the past 25 years. For this reason, promoting fertility while encouraging women's continued engagement in the labor force is a pillar of the second phase of Abenomics.

Deflationary pressures continue to plague Japan despite expansive monetary policy. In 2016, the Bank of Japan began an experiment using negative interest rates to complement its quantitative easing program. The objective is to put downward pressure on short-term interest rates and raise inflation by reinforcing its commitment to its inflation target and trying to encourage spending over saving. Partly as a result of these policies, the yield curve flattened, with even the 10-year benchmark yield falling below zero. More recently, the bank has announced continued asset purchases and introduced a policy of yield curve control, which sets up an interest rate target of around 0 percent on 10-year Japanese government bonds. The IMF Global Financial Stability report cautions on the increased reliance of Japanese banks on wholesale dollar funding to finance foreign asset purchases, which could make banks more sensitive to disruptions in dollar funding markets.

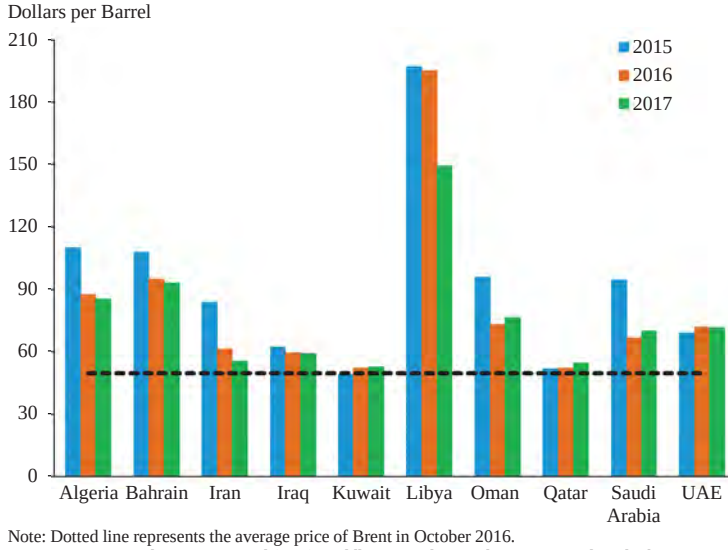
Emerging Markets

The situation in some emerging markets has improved relative to 2015, but growth in 2016 is still underperforming expectations compared with forecasts made in 2015, while there continues to be uncertainty surrounding major commodity exporters and China. Emerging markets are expected to account for 54 percent of world growth in 2016, compared with 53 percent in 2015, and 60 percent between 2010 and 2014. As a group, their 2016 growth is expected to come in below the 2015 forecast. The IMF estimates that growth will pick up in 2017, as growth in several oil-producing emerging markets, such as Brazil, and Russia (which are expected to recover from recession) compensates for the steady slowdown in China (IMF 2016b).

Oil-Exporting Emerging Markets. The substantial decline in oil prices from mid-2014 through 2016 has put considerable pressure on the economies of many oil exporters, especially those with undiversified economies. Oil sales remain the primary source of government revenues in several oil-exporting countries, so the drop in oil prices from over $100 a barrel in 2014 to between $25-$55 a barrel in 2016 has put tremendous pressure on government budgets. As figure 2-44 demonstrates, the oil price that guarantees a neutral fiscal balance is well above the current price of Brent in many oil-exporting countries.

Beyond the fiscal concerns, in countries where the price of extracting oil is relatively high, the strain of lower prices for oil and other commodities

Figure 2-44
Fiscal Breakeven Oil Prices by Country, 2015–2017



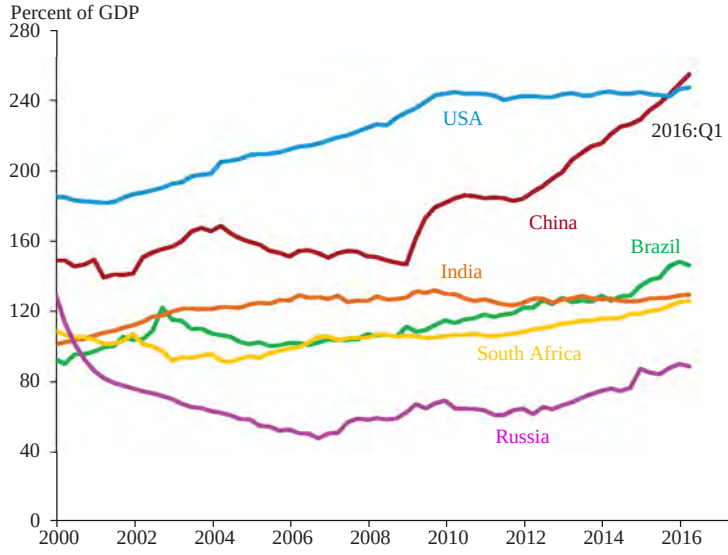
Note: Dotted line represents the average price of Brent in October 2016.
Source: International Monetary Fund (IMF) Middle East and Central Asia Regional Outlook.

has generated recessions. For example, Brazil's economy continued to contract (partially due to oil prices) and Venezuela's economy collapsed. Unemployment in Brazil in October 2016 was at its highest level since mid-2004, though this may be due to a recent change in its computation. Recent improvements—such as real GDP contracting less than expected in the third quarter, housing prices beginning to stabilize, and the appreciation of the Brazilian real reflecting strengthening financial market sentiment—suggest Brazil's economy may be beginning to recover and see positive growth in 2017. The combination of the commodities price bust, economic sanctions following its annexation of Crimea in 2014, and reduced firm access to international capital markets have caused Russia to enter a recession since late 2014 from which the IMF expects Russia will exit in 2017 (IMF 2016b).

Other Major Emerging Markets. Among other major emerging market economies, growth has been mixed in 2016. India remains one of the fastest-growing countries in the world, with real GDP expanding at 7.3 percent in the four quarters through 2016:Q3. However, countries that typically export to China and the advanced economies have suffered due to the slowdown in those important markets.

Economic growth in China has been on a downward trend since a brief rebound after the global financial crisis. China has been attempting to rebalance from an investment- and export-driven economy to an economy

Figure 2-45
Credit to Nonfinancial Sector (Public and Private), 2000–2016



Source: Bank for International Settlements.

driven more by private consumption. However, more recently, China may be postponing its longer-term goal of rebalancing in order to stabilize growth in the near term after growth fell from 7.2 percent in the four quarters ended in 2014:Q4 to 6.7 percent in the four quarters ended in 2016:Q3. In 2016, credit growth has been rapid, increasing financial risks, with credit to the non-financial sector as a percent of GDP now exceeding that of major emerging market economies (see Figure 2-45), real estate prices hitting record highs, and distressed bank assets rising.

Against this backdrop, the Chinese renminbi (RMB) has been gradually depreciating since mid-2015 against both the dollar and a weighted basket of currencies. Net capital outflows, which had stabilized in the spring and early summer, edged up again in the third quarter and uncertainty about the course of policy in the near term may be putting downward pressure against the RMB. China's current account surplus is well below its recent peak, but has been considerably above levels the IMF assesses to be appropriate, and it still constitutes a substantial portion of the world's current account surpluses. As China's economy grew to 15 percent of global GDP in 2015, targeted industrial policies have made it the world's largest manufacturer and the dominant producer of some key goods in the global marketplace, as well as a major source of demand for an array of goods, magnifying the effects of changes in its domestic economy on global prices and growth. Delays in

adjusting to changing dynamics in the world economy have led to excess capacity in some industries where China is a dominant player. Adjusting to these factors poses additional challenges for policymakers.

Economic growth in India continues at a solid pace of a projected 7.4 percent over the 4 quarters of 2016 (IMF 2016b). Private consumption has been a major driver in economic growth, contributing 4.3 percentage points to its 7.3 percent real GDP growth rate in the four quarters through 2016:Q3. Lower inflation and fiscal consolidation over the past year has created additional policy space for India to stimulate growth should a crisis occur. Macroeconomic risks revolve around inflationary pressure stemming from increasing commodity prices, which could weigh on the current account and fiscal deficit (OECD 2016). Inefficiencies remain in the public sector, with India's poor still lacking health care coverage, educational attainment, and access to financial services (IMF 2016a). Further, inequality in India remains high.

The Outlook

GDP Growth over the Next Three Years

After growing roughly 2.6 percent on average during the four quarters of 2013 and 2014, real GDP growth averaged 1.9 percent during the four quarters of 2015 and 1.8 percent at an annual rate during the first three quarters of 2016. The Administration forecast (finalized on November 9, 2016) projects an acceleration to 2.4-percent growth during the four quarters of 2017. The Administration forecast is the same as the CBO's August 2016 forecast and slightly above the Blue-Chip November consensus forecast of 2.2 percent. All forecasts implicitly or explicitly make assumptions about the future course of economic policy. The Administration's forecast is based on a baseline that assumes enactment of the President's policies, most of which were spelled out in the budget released in February 2016. In contrast, the CBO forecast assumes that current laws are unchanged while the Blue Chip implicitly reflects the expectations that private forecasters have about what policies will actually be enacted in the future.

The Administration's forecast expects that forces that influence investment and government spending point to faster growth in 2017 than in the recent past, while consumer spending will moderate somewhat and international forces will likely be a drag on growth. With a strengthening State and local sector, State and local fiscal actions will likely be somewhat expansionary in 2017.

Meanwhile, core inflation (excluding food and energy) is at 1.7 percent during the 12 months through October and remains below the Federal Reserve target of 2 percent for the PCE price index (the version of the consumer price index in the National Income and Product Accounts), partly due to declining import prices, and below-average capacity utilization. And so, though the unemployment rate is now close to the rate consistent with stable inflation, inflation is likely to remain low and unlikely to impose constraints, at least during the next four quarters. For consumers, continued growth in nominal and real wage gains in 2016—together with strong employment growth—will probably continue to boost spending in 2017. These income gains—following a multiyear period of successful deleveraging—leave consumers in an improved financial position (Box 2-6). Business investment also shows brighter prospects for growth in 2017 than in earlier years as the overhang of excess capital that suppressed investment earlier in this expansion has been reduced. As the economy continues to grow, businesses will need new facilities, equipment, and intellectual property to meet growing demand, and the expected pickup in output growth should support an uptick in investment as well (Box 2-7), though global headwinds will continue to be a concern for this sector.

Although most domestic signals are positive, the United States faces some headwinds from abroad. The available late-2016 indicators suggest that the economies of China, India, Mexico, and our euro-area trading partners are growing more slowly than in 2015, while Canada's growth is accelerating. The trade-weighted average of foreign GDP growth in the four quarters ended in 2016:Q3 has been 2.1 percent, down from the 2.3 percent average growth rate during the preceding four quarters. On the more positive side, forecasts are for a small pickup in global growth in 2017. Overall weak growth abroad not only reduces our exports and slows domestic investment, but also raises risks of adverse financial and other spillovers to the U.S. economy.

The unemployment rate in November 2016 at 4.6 percent differed little from the projected long run unemployment rate that is consistent with stable inflation in the long run, though some broader measures of labor market slack remain somewhat elevated. These facets of the labor market along with the fact that the capacity utilization rate in manufacturing, which was 74.9 percent in October, is below its long-run average (80 percent), suggest that the economy still has a bit of room to grow faster than its potential rate.

The Administration's economic forecast is presented in Table 2-1. When the Administration forecast was finalized in November 2016, real GDP growth during the four quarters of 2016 was projected at 1.9 percent. Real GDP is projected to grow 2.4, 2.3, and 2.2 percent during the four

Table 2-1

Administration Economic Forecast, 2015–2027

	Nominal GDP	Real GDP (Chain-Type)	GDP Price Index (Chain-Type)	Consumer Price Index (CPI-U)	Unemployment Rate (Percent)	Interest Rate, 91-Day Treasury Bills (Percent)	Interest Rate, 10-Year Treasury Notes (Percent)
	Percent Change, Q4-to-Q4				Level, Calendar Year		
2015 (Actual)	3.0	1.9	1.1	0.4	5.3	0.1	2.1
2016	3.4	1.9	1.5	1.5	4.9	0.3	1.8
2017	4.3	2.4	1.8	2.3	4.7	0.6	2.1
2018	4.3	2.3	1.9	2.3	4.7	1.2	2.7
2019	4.2	2.2	2.0	2.3	4.7	1.8	3.1
2020	4.2	2.2	2.0	2.3	4.8	2.3	3.4
2021	4.2	2.2	2.0	2.3	4.8	2.6	3.5
2022	4.2	2.2	2.0	2.3	4.8	2.7	3.6
2023	4.2	2.2	2.0	2.3	4.8	2.8	3.7
2024	4.2	2.2	2.0	2.3	4.8	2.8	3.7
2025	4.3	2.2	2.0	2.3	4.8	2.8	3.7
2026	4.3	2.2	2.0	2.3	4.8	2.8	3.7
2027	4.3	2.2	2.0	2.3	4.8	2.8	3.7

Note: Forecast was based on data available as of November 9, 2016. The interest rate on 91-day T-bills is measured on a secondary-market discount basis.
Source: Forecast was done jointly with the Council of Economic Advisers, the Department of the Treasury, and the Office of Management and Budget.

quarters of 2017, 2018, and 2019, respectively. The growth rates slightly exceed the Administration's estimated rate of potential real GDP growth over the long run of 2.2 percent a year based on the view that some limited slack remains in the economy. As a consequence of growth being slightly above the long-run trend over the next two years, the unemployment rate is likely to temporarily fall from its 4.9 percent rate in 2016:Q3 to 4.6 percent in 2017:Q4. The unemployment rate is expected to return to the administration's estimate of 4.8 percent for the rate of unemployment consistent with stable inflation in 2019:Q4. The price index for GDP, which increased just 1.3 percent during the four quarters through 2016:Q3, is expected to slowly creep up, reaching 2.0 percent in 2019, a rate that is roughly consistent with the Federal Reserve's 2-percent target for the PCE price index.

Nominal interest rates are currently low because of forces that have led to a reduction in expected long-run interest rates and wounds that have not fully healed from the last recession, while monetary policy has

kept rates low across a wide range of debt securities with long maturities. Consistent with the Federal Reserve's forward policy guidance at the time of the forecast, long-term interest rates are projected to rise. Eventually, real interest rates (that is, nominal rates less the projected rate of inflation) are predicted to move toward, but still remain well below, their historical average. These interest-rate paths are close to those projected by the consensus of professional economic forecasters. During the past several years, consensus forecasts for long-term interest rates and long-term economic growth have fallen, reflecting changes in views on productivity, demographics, the term premium, and global saving and investment behavior.

GDP Growth over the Long Term

As discussed earlier, the long-run growth rate of the economy is determined by the growth of its supply-side components, including those governed by demographics and technological change. The growth rate that characterizes the long-run trend in real U.S. GDP—or potential GDP—plays an important role in guiding the Administration's long-run forecast. After a brief period of above-trend growth in 2017 and 2018, real output growth shifts down to its long-term trend rate of 2.2 percent a year. These growth rates are slower than historical averages mostly because of the aging of the baby-boom generation into the retirement years and because of slower growth of the working-age population (Box 2-5).

The long-run potential GDP growth rate is 0.5-percentage point higher than the growth rate that would be expected if current law is unchanged. Specifically, the forecast assumes the President's policies, including substantial investments in transportation infrastructure, business tax reform, universal preschool (and other policies to boost female labor force participation), free community college, reforms to the immigration system, policies to expand cross-border trade, and approximately $2 trillion in deficit reduction (Box 2-9). A different set of policy assumptions would lead to different assumptions for potential GDP growth.

The potential real GDP projections are based on the assumption that the President's full set of policy proposals, which would boost long-run output, are enacted (Box 2-9).

Table 2-2 shows the Administration's forecast for the contribution of each supply-side factor to the growth in potential real GDP: the working-age population; the rate of labor force participation; the employed share of the labor force; the length of the workweek; labor productivity; and the difference between productivity growth for the economy as a whole and the

Box 2-9: Policy Proposals to Raise Output over the Next-Ten Years

The Administration has a wide-ranging and robust economic agenda that, if enacted, would expand the labor force and boost productivity. In line with long-standing precedent, the Administration's economic forecast incorporates the impact of the President's policy proposals. CEA estimates that, in total, these proposals would add over 5 percent to the level of output in 2027. As a result of including policy assumptions, the Administration's forecast for the level of output in 2027 is about 2 percent higher than the forecasts from both the Congressional Budget Office and the Blue Chip consensus panel, as well as about 4 percent higher than the median forecast from the Federal Open Market Committee.

Immigration reform. The policy proposal with the largest effect on output is immigration reform, as embodied in the bipartisan Border Security, Economic Opportunity, and Immigration Modernization Act that passed the U.S. Senate in June 2013. CBO (2013a) estimated that this legislation, if enacted, would raise the level of real GDP by 3.3 percent after 10 years. Immigration reform would benefit the economy by counteracting the effects of an aging native-born population, attracting highly skilled immigrants that engage in innovative or entrepreneurial activities, and enabling better job-matching for currently undocumented workers who are offered a path to citizenship. Much of the overall effect is due to an expanded workforce. However, 0.7 percentage point of the total effect from immigration reform is due to increased total factor productivity, and this is reflected in the Administration's economic forecast.

Policies to expand cross-border trade and investment. The other set of policies with a large effect on output are a number of international agreements that would boost cross-border trade and investment, including the Trans-Pacific Partnership (TPP), the Transatlantic Trade and Investment Partnership (TTIP), an expansion of the Information Technology Agreement (ITA), and a Trade in Services Agreement (TISA). A new study supported by the Peterson Institute for International Economics (Petri and Plummer 2016) finds that TPP could raise U.S. real income by 0.5 percent in 2030. The European Commission (2013) estimates a roughly similar effect of TTIP on the U.S. economy, an increase of 0.4 percent in GDP in 2027. In addition, if TPP does not pass, the United States would also face trade diversion and enjoy less market access compared with other countries such as China. The Regional Comprehensive Economic Partnership, a trade agreement that involves China, Japan, and other fast-growing Asian economies, will provide its member countries with improved market access, putting U.S. exporters at a disadvantage (CEA 2016c).

Investments in surface transportation infrastructure. The Administration recognizes that investments in infrastructure support economic growth by creating jobs, and boosting productivity, and strengthening the manufacturing sector. In December 2015, the bipartisan Fixing America's Surface Transportation Act (H.R. 22), which authorizes $226.3 billion in budget authority for Federal-aid highway programs over five years, was enacted into law. This funding is an important down payment, but the country must further transform our transportation system to achieve a cleaner, safer transportation future. The President's FY 2017 budget calls for $32 billion a year over 10 years to support innovative programs that make our communities more livable and sustainable. The IMF (2014) estimates that, given the current underutilization of resources in many advanced economies, a 1-percent-of-GDP permanent increase in public infrastructure investment could help increase output by as much as 2.5 percent after 10 years.

Policies to boost labor force participation. The Administration has pursued policies that enable all workers to participate in the labor force to their full potential by making it easier for workers to balance career and family responsibilities. The Administration's FY 2017 budget calls to triple the maximum child care tax credit to $3,000 for children younger than 5, while enabling more middle-class families to receive the maximum credit. In addition, every year since 2013, the President has proposed a Federal-State partnership that would provide all 4-year olds from low- and moderate-income families with access to high-quality preschool. Finally, the budget calls to provide technical assistance to help states implement and develop paid parental leave programs. These policies would increase labor force participation and the level of output.

Policies to make college affordable. The Administration is committed to making college affordable. The budget includes $61 billion over 10 years to make the first two years of community college tuition free for responsible students through a Federal-State cost sharing partnership. This plan would increase America's human capital and productivity by enabling 2 million people who would not have enrolled in college to earn an associate's degree.

Business tax reform. President Obama's framework for business tax reform issued in 2012 sets out a series of changes that would strengthen the economy in three main ways. First, by lowering average tax rates, the President's plan would boost investment in the United States. Second, by moving to a more neutral tax system, the proposals would result in a more efficient allocation of capital. And third, to the degree the new system better addresses externalities, for example with a more generous research and development credit, it would also increase

total factor productivity and therefore growth. (See Chapter 5 of the 2015 Report for a discussion of the economic benefits of business tax reform.)

Deficit reduction. CBO's (2013b) analysis of the macroeconomic effects of alternative budgetary paths estimates that a hypothetical $2 trillion in primary deficit reduction over 10 years raises the long-term level of real GDP by 0.5 percent. This effect arises because lower Federal deficits translate into higher national saving, lower interest rates and, in turn, greater private investment. The Administration's FY 2017 budget proposal includes $2.9 trillion in primary deficit reduction relative to the Administration's plausible baseline. Results of CBO's methodology would raise the level of output in 2027 by 0.6 percent.

Other Policies. Numerous other policies—ranging from policies to increase competition to increasing innovation or spurring green energy development might also raise growth over time, but are not explicitly modeled in the budget forecast.

(Note, to be consistent with previous Administration forecasts the portion of growth due to the workforce effects of immigration reform are not incorporated in the forecast or the underlying detail, for example in Table 2.1. Excluding this component, the policies add 3 percent to the level of output in 2027.)

nonfarm business sector. The two columns of Table 2-2 show the average annual growth rate for each factor during a long period of history and over the forecast horizon. The first column shows the long-run average growth rates between the business-cycle peak of 1953 and the latest quarter available when the forecast was finalized (2016:Q3). Many of these variables show substantial fluctuations within business cycles, so that long-period growth rates must be examined to uncover underlying trends. The second column shows average projected growth rates between 2016:Q3 and 2027:Q4; that is, the entire 11¼-year interval covered by the Administration forecast.

The population is projected to grow 1.0 percent a year, on average, over the projection period (line 1, column 2), following the latest projection from the Social Security Administration. Over this same period, the labor force participation rate is projected to decline 0.4 percent a year (line 2, column 2). This projected decline in the labor force participation rate primarily reflects a negative demographic trend deriving from the aging of the baby-boom generation into retirement. During the next couple of years, however, rising labor demand due to the continuing business-cycle recovery is expected to offset some of this downward trend.

The employed share of the labor force—which is equal to one minus the unemployment rate—is expected to remain roughly constant during the

Table 2-2

Supply-Side Components of Actual and Potential Real Output Growth, 1953–2027

	Component	Growth rate[a]	
		History	Forecast
		1953:Q2 to 2016:Q3[b]	2016:Q3 to 2027:Q4
1	Civilian noninstitutional population aged 16+	1.4	1.0
2	Labor force participation rate	0.1	-0.4
3	Employed share of the labor force	-0.0	0.0
4	Ratio of nonfarm business employment to household employment	-0.0	0.0
5	Average weekly hours (nonfarm business)	-0.2	0.0
6	Output per hour (productivity, nonfarm business)[c]	2.0	1.9
7	Ratio of real GDO to nonfarm business output[c]	-0.2	-0.3
8	Sum: Actual real GDO[c]	3.0	2.2
	Memo:		
9	Potential real GDO[d]	3.1	2.2
10	Output per worker differential: GDO vs nonfarm[e]	-0.2	-0.3

[a] All contributions are in percentage points at an annual rate, forecast finalized November 2016. Total may not add up due to rounding.

[b] 1953:Q2 was a business-cycle peak. 2016:Q3 is the latest quarter with available data.

[c] Real GDO and real nonfarm business output are measured as the average of income- and product-side measures.

[d] Computed as (line 8) - 2 * (line 3).

[e] Real output per household-survey worker less nonfarm business output per nonfarm business worker. This can be shown to equal (line 7) - (line 4).

Note: GDO is the average of GDP and GDI. Population, labor force, and household employment have been adjusted for discontinuities in the population series. Nonfarm business employment, and the workweek, come from the Labor Productivity and Costs database maintained by the Bureau of Labor Statistics.

Source: Bureau of Labor Statistics, Current Population Survey, Labor Productivity and Costs; Bureau of Economic Analysis, National Income and Product Accounts; Department of the Treasury; Office of Management and Budget; CEA calculations.

next 11 years because as the 2016:Q3 unemployment rate (4.9 percent) is only slightly higher than the 4.8 percent rate at which the rate of unemployment eventually stabilizes. The workweek is projected to be roughly flat during the forecast period, an improvement relative to its long-term historical trend growth of a 0.2-percent-a-year decline. The workweek is expected to stabilize because some of the demographic forces pushing it down are largely exhausted, and because a longer workweek is projected to compensate for the anticipated decline in the labor force participation rate in what will eventually become an economy with a tight labor supply.

Labor productivity is projected to increase 1.9 percent a year over the entire forecast interval (line 6, column 2), slightly less than the same as the average growth rate from 1953 to 2015 (line 6, column 1). Productivity

tends to grow faster in the nonfarm business sector than for the economy as a whole, because productivity in the government and household sectors of the economy is presumed (by a national-income accounting convention) not to grow (that is, output in those two sectors grows only through the use of more production inputs). The difference in these growth rates is expected to subtract 0.3 percentage point a year during the 11-year projection period, similar to the 0.2-percent-a-year decline during the long-term historical interval (line 10, columns 1 and 2). This productivity differential is equal to the sum of two other growth rates in the table: the ratio of nonfarm business employment to household employment (line 4) and the ratio of real GDP to nonfarm business output (line 7).

Summing the growth rates of all of its components, real GDP is projected to rise at an average 2.2 percent a year over the projection period (line 8, column 2), the same as the annual growth rate for potential real GDP (line 9, column 2). Actual GDP is expected to grow faster than potential GDP only in 2017 and 2018, and by a small margin that is invisible in the long-term averages shown in the table.

As noted earlier, but shown in more detail in this table, real potential GDP (line 9, column 2) is projected to grow more slowly than the long-term historical growth rate of 3.1 percent a year (line 9, column 1), primarily due to the lower projected growth rate of the working-age population and the retirement of the baby-boom cohort.

Upside and Downside Forecast Risks

Like any forecast, the Administration's economic forecast comes with possible errors in either direction, and several are worth enumerating here. One upside risk is from the homebuilding sector, which has some upside potential given the current low level of homebuilding relative to historic trends and its potential for increase. Additionally, labor force participation could continue to grow as it has this year, after decades of decline in participation among prime-age workers (Box 2-3). On the downside, it appears that global growth may remain sluggish and global trade growth has slowed dramatically, which may slow the growth of exports and investment. In addition, financial market developments—either reflecting spillovers from abroad or U.S.-specific issues—also pose downside risks. Over the longer-run, there are some downside risks to the estimate of potential output growth insofar as recent low productivity growth rates might continue.

Conclusion

The economy continued to strengthen during 2016, especially in the labor market with robust employment gains and continued declines in unemployment. Job growth continued to exceed the pace needed to maintain a steady unemployment rate (given that labor force participation is trending down with demographics). That job growth, along with solid wage growth, combined to generate rising household incomes and improving living standards. The American economic recovery has outpaced most of the other advanced economies and left a national economy well-prepared for continued resilience. The United States has domestic strengths, especially in the household sector, that have the potential to support continued solid growth in 2017—but at the same time, we face a set of challenges associated with the slowing global economy.

Looking ahead, some of the most important decisions that we make as a Nation are the structural policies that influence long-term growth and how it is shared. The President's FY 2017 budget set forth a number of policies that could be expected to increase the level or long-term growth rate of potential GDP. As the economy has approached its long-run natural rate of unemployment, it is these long-term structural policies that could lift growth and sustain long-term prosperity for a greater share of Americans.

CHAPTER 3

PROGRESS REDUCING INEQUALITY

In 2013, President Obama declared inequality "the defining challenge of our time." According to the Congressional Budget Office (CBO), in that year—the most recent year for which complete data are available—the 20 percent of households with the lowest incomes had an average pre-tax income of $25,000, while the 1 percent of households with the highest incomes had an average income of $1.6 million (CBO 2016b). Roughly 15 percent of Americans lived in poverty, even as mean household income reached $75,000 (Proctor, Semega, and Kollar 2016).[1] Moreover, these disparities persist across generations due to low levels of intergenerational mobility. Only 8 percent of children from the bottom 20 percent of the income distribution make it to the top 20 percent as adults, while 37 percent of children from the top 20 percent stay there (Chetty et al. 2014).

Inequality extends well beyond the distribution of income. Median wealth for non-Hispanic White families in 2013 was $142,000, compared with only $18,000 for all other families (Bricker et al. 2014). A 40-year-old man at the 95th percentile of the income distribution has a life expectancy 10 years longer than a man at the 5th percentile (Chetty et al. 2016). Students from families in the bottom 25 percent of the income distribution drop out of high school at a rate four times higher than students from families in the top 25 percent (NCES 2015).

Perhaps most troubling is the fact that rising inequality, in conjunction with slower productivity growth, has led to slow growth in inflation-adjusted incomes for the typical household for more than three decades. In previous work, the Council of Economic Advisers (CEA) found that if inequality had

[1] The Census Bureau and the Congressional Budget Office use different definitions of income in their estimates of the income distribution. CBO's definition is generally more comprehensive than that used by the Census Bureau. Mean income in 2013 per the Census Bureau was $75,000 while mean before-tax income in 2013 per CBO was $100,000.

not increased from 1973 to 2013, income for the typical household in 2013 would have been about 18 percent, or $9,000, higher (CEA 2015).

From his first days in office, President Obama has taken important steps to reduce inequality and make the economy work for all Americans. The policy response to the Great Recession directly reduced inequality in after-tax incomes through progressive tax and spending policies, such as temporary tax cuts for working and middle-class families and extensions of unemployment insurance; and indirectly, the response reduced earnings inequality by boosting employment. This policy response—including the American Recovery and Reinvestment Act (Recovery Act) and subsequent fiscal measures, bank stress tests, and other financial policy measures, support for the automobile industry, and the actions of the Federal Reserve—kept the unemployment rate 6 percentage points lower than it otherwise would have been between 2010 and 2012. By reducing the unemployment rate, these policies offset roughly half of the increase in earnings inequality that would have occurred as even more workers lost their jobs and saw their earnings fall to zero.

The Affordable Care Act (ACA), enacted in March 2010, provided Federal support to states to expand their Medicaid programs and financial assistance for families purchasing coverage through the Health Insurance Marketplace, leading to the largest reduction in the uninsured rate since the creation of Medicare and Medicaid and a substantial reduction in inequality in after-tax incomes. The ACA has resulted in 20 million additional American adults gaining health insurance coverage as of early 2016 and helped reduce the uninsured rate to 8.9 percent in the first half of 2016, the lowest level on record. The ACA reduced inequality in health insurance coverage by age, race, and income, with larger reductions in uninsured rates for groups with lower levels of coverage, including young adults, racial minorities, and low-income families. A growing body of research documents that expanded coverage under the ACA is greatly improving families' well-being by increasing their access to care, financial security, and health. Viewed as additions to income, expanded Medicaid eligibility and financial assistance for families purchasing health insurance through the Marketplace have dramatically reduced inequality in after-tax incomes.

Over the course of this Administration, the President has signed into law a series of progressive changes in tax policy that have increased tax rates for the highest-income Americans and increased the generosity of tax credits for working families, thereby reducing inequality in after-tax incomes. Changes in tax policy other than ACA coverage provisions will boost after-tax incomes in the bottom quintile by 2 percent in 2017 and reduce after-tax incomes for the top 0.1 percent by 9 percent relative to what incomes would

have been under 2008 policies.[2,3] (The policy impacts discussed in this chapter generally compare after-tax incomes in 2017 under current policy with counterfactual after-tax incomes in 2017 under 2008 policies. After-tax incomes include the value of government transfers such as Medicare and Medicaid.)

Together, changes in tax policy and the ACA coverage provisions will increase the share of after-tax income received by the bottom quintile in 2017 by 0.6 percentage point, or 18 percent, and the share received by the second quintile by 0.5 percentage point, or 6 percent. They will reduce the share received by the top 1 percent by 1.2 percentage points, or 7 percent. Moreover, they will boost incomes in the bottom quintile by 18 percent, equivalent to more than a decade of average income gains. And they will increase average tax rates for the top 0.1 percent of families, a group projected to have average pre-tax incomes over $8 million, by nearly 7 percentage points.

The legislation President Obama has signed into law represents a historic achievement in reducing inequality. Tax changes enacted since 2009 have boosted the share of after-tax income received by the bottom 99 percent of families by more than the tax changes of any previous administration since at least 1960. The President has also overseen the largest increase in Federal investment to reduce inequality since the Great Society programs of the Johnson Administration, an increase that largely reflects the coverage provisions of the ACA and expanded tax credits for working families.

However, while these accomplishments are historically large, much more work remains to be done to reverse the decades-long increase in inequality. From the business cycle peak in 1979 to the business cycle peak in 2007, the after-tax income share of the top 1 percent more than doubled. Changes in tax policy and the coverage provisions of the ACA have rolled back one-third of the decline in the share of after-tax income accruing to the bottom quintile of households over this period and one-tenth of the increase in the share accruing to the top 1 percent of households.

As the discussion above highlights, addressing the many manifestations of inequality requires a comprehensive set of policies. Inequality is a product of economic institutions, standards, and norms; technological

[2] Each quintile contains 20 percent of families, ranked by their incomes (adjusted for family size). For example, the bottom quintile contains the 20 percent of families with the lowest incomes, and the second quintile contains the 20 percent of families with the next lowest incomes. However, in this analysis, families with negative incomes are excluded from the bottom quintile as these families are typically quite different from other low-income families.
[3] As used in this report, the ACA coverage provisions include expanded Medicaid eligibility, the Premium Tax Credit, cost-sharing reductions, small employer tax credits, the individual shared responsibility payment, and the employer shared responsibility payment.

developments; individual behavior; and a multitude of other factors. Some policies—such as ensuring that everyone pays their fair share in taxes, expanding access to health insurance and to high-quality child care, raising the minimum wage, and expanding tax credits for working families—address inequality directly and in the near term, in addition to their longer-run benefits. Other policies—such as improving education, reforming intellectual property laws, and reforming land use and zoning regulations—work to reduce inequality primarily over the long term. Still others address the temporary inequality that accompanies economic downturns by providing appropriate countercyclical fiscal support to reduce economic slack and unemployment.

The President's policy proposals would further reduce inequality in both pre-tax and after-tax incomes. Increasing the minimum wage, as the President has called on Congress and State and local governments to do, would immediately boost incomes for millions of low-wage workers and reduce income inequality. Expanding access to high-quality child care and early education and ending family homelessness, as the President has proposed, would reduce inequality today while also increasing mobility and improving economic outcomes in the longer term. The tax reforms proposed in the Fiscal Year 2017 Budget would increase average tax rates on the top 0.1 percent by an additional 9 percentage points and would roll back an additional 13 percent of the increase in the after-tax income share of the top 1 percent of households between 1979 and 2007. Expanding the Earned Income Tax Credit (EITC) for workers without dependent children would provide 13 million low-income workers with a tax cut averaging nearly $500 for each worker, increasing the returns to work and supporting labor force participation.

This chapter focuses on three specific areas where the Administration has achieved its most substantial and immediate success in reducing inequality: restoring economic growth, expanding health insurance coverage, and enacting a fairer tax code (Table 3-1). However, the Administration also has undertaken a much broader set of initiatives designed to address inequality and promote opportunity. Some of these efforts, such as investments in early childhood education and job training, are designed to have longer-term impacts. (See Box 3-4 for an overview of additional policies that will reduce inequality by raising wages and expanding educational opportunity, but are not examined in detail in this chapter. Also see Chapter 5 for additional discussion of the Administration's record on education policy.)

The chapter first examines each of the three major policy areas listed above. It then places the Administration's record in historical context, comparing the reductions in income inequality first with previous Federal

Table 3-1
Timeline of Select Recovery, Health, and Tax Legislation, 2009-2015

Legislation	Date of Enactment	Key Inequality-Related Provisions
American Recovery and Reinvestment Act of 2009 (Recovery Act)	02/17/2009	Provided countercyclical fiscal support for the economy. The Recovery Act: • Created the Making Work Pay credit, a refundable tax credit of up to $400 for individuals and $800 for married couples, for 2009 and 2010; • Expanded the Earned Income Tax Credit (EITC) and Child Tax Credit (CTC), refundable tax credits for working families, for 2009 and 2010; • Created the American Opportunity Tax Credit (AOTC), a refundable tax credit to help pay for higher education, for 2009 and 2010; • Temporarily extended and enhanced unemployment insurance benefits, temporarily increased Supplemental Nutrition Assistance Program benefits, expanded Pell Grants, and provided other aid to individuals; and • Provided temporary fiscal relief to States through additional Medicaid payments and education grants to spur innovation and prevent layoffs of education workers.
Patient Protection and Affordable Care Act (Affordable Care Act)	03/23/2010	Reformed the American health care system to expand health insurance coverage, reduce health care costs, and improve health care quality, financed with reforms to health and tax policy. The ACA: • Provided Federal support to States that expand their Medicaid programs to cover individuals up to 138 percent of the poverty level; • Created the Premium Tax Credit and cost-sharing reductions to help low, moderate, and middle-income Americans afford coverage; introduced insurance reforms and an individual responsibility requirement; • Increased the Medicare payroll tax rate by 0.9 percentage point for high-income families and extended the tax to the investment income of high-income families.
Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010	12/17/2010	Extended the 2001/2003 income tax cuts through 2012. Reinstated the estate tax with a $5 million exemption and 35% rate. Cut the payroll tax rate by 2 percentage points for 2011. Extended the Recovery Act EITC and CTC improvements and the AOTC through 2012.
Middle Class Tax Relief and Job Creation Act of 2012	02/22/2012	Extended the 2 percentage point reduction in the payroll tax rate through 2012.
American Taxpayer Relief Act of 2012	01/02/2013	Repealed the 2001/2003 income tax cuts for high-income families and permanently extended them for all others. Increased the estate tax rate to 40 percent. Extended the Recovery Act EITC and CTC improvements and the AOTC through 2017.
Protecting Americans from Tax Hikes Act of 2015	12/18/2015	Permanently extended the Recovery Act EITC and CTC improvements and the AOTC.

Note: For simplicity, this chapter does not distinguish between the Affordable Care Act and the Health Care and Education Reconciliation Act of 2010, enacted on March 30, 2010.

action affecting income inequality since the 1960s and then with the growth in income inequality since the late 1970s. The chapter finishes by highlighting several of the President's proposals that would further reduce inequality.

The Recovery Act: Restoring Growth

When the President took office in January 2009, the country was experiencing the worst economic and financial crisis since the Great Depression. In the previous year, private employers shed 3.6 million jobs, household wealth dropped 16 percent, and the unemployment rate jumped from 5 percent to 7 percent on its way to a peak of 10 percent. One important aspect of combatting inequality is limiting macroeconomic downturns, during which unemployment rises and earnings inequality rises along with it. By taking timely, aggressive action to combat the financial crisis and economic downturn, the Administration limited the extent to which inequality rose during the Great Recession and its aftermath.

In February 2009, the President signed into law the American Recovery and Reinvestment Act (Recovery Act) to provide countercyclical fiscal support to the economy and to help boost employment, output, and wages. The Recovery Act included a mix of aid to affected individuals, support for State and local governments, public investments, and individual and business tax cuts. More than a dozen subsequent fiscal measures extended certain Recovery Act provisions and introduced additional countercyclical policies, such as the temporary payroll tax cut in effect during 2011 and 2012. In total, discretionary fiscal stimulus from 2009 through 2012 totaled $1.4 trillion and averaged around 2 percent of GDP (Furman 2015). The Recovery Act, subsequent fiscal measures, financial policy measures, support for the automobile industry, and the Federal Reserve's independent actions combined to substantially reduce the harm of the Great Recession, in part by moderating the increase in unemployment that would otherwise

Box 3-1: Trends in Inequality

Income, wealth, and consumption inequality have increased sharply in the United States in recent decades (Table 3-I). However, while overall inequality of income and wealth has increased, some other measures of financial inequality have decreased. For example, the gender pay gap has narrowed in recent decades, even as it remains too large (CEA 2016b). Similarly, while inequality in life expectancy at middle age has also increased, some other aspects of health inequality show signs of improvement.

Table 3-I
Measures of Inequality, 1980 and Most Recent Available

	1980	Most Recent Available
Income		
Top 1% Income Share *(CBO)*		
Market Income (Income Before Government Transfers)	10%	18%
Pre-Tax (Income Including Government Transfers)	9%	15%
After-Tax (Pre-Tax Income Less Federal Taxes)	8%	12%
Bottom 90% Income Share *(CBO)*		
Market Income (Income Before Government Transfers)	67%	57%
Pre-Tax (Income Including Government Transfers)	70%	62%
After-Tax (Pre-Tax Income Less Federal Taxes)	72%	66%
90-10 Ratio[1] *(Census)*	9.4	12.1
50-10 Ratio[1] *(Census)*	3.9	4.2
Gini Index (*CBO)*		
Market Income (Income Before Government Transfers)	0.48	0.60
Pre-Tax Income (Income Including Government Transfers)	0.40	0.48
After-Tax Income (Pre-Tax Income Less Federal Taxes)	0.36	0.44
Ratio of CEO Compensation to Worker Compensation *(EPI)*	34	276
Wealth		
Top 1% Wealth Share		
Survey of Consumer Finances[2]	30%	36%
Bricker et al. (2016)[2]	27%	33%
Saez-Zucman (2016)	24%	42%
Top 10% Wealth Share[2] *(CBO)*	68%	76%
Consumption		
Ratio of Top/Bottom Income Quintiles[3] *(Aguiar and Bils 2015)*	2.46	3.35
Gini Index *(Attanasio and Pistaferri 2014)*	0.22	0.26
Wages		
Gender Pay Gap[4] *(Census)*	0.40	0.20
Racial Pay Gap[4,5] *(Census)*		
Black-White	0.25	0.20
Hispanic-White	0.24	0.30
Health		
Percentage Point Gap Between Top and Bottom Income Quintiles at Age 50 in Probability of Reaching Age 85 *(National Academies 2015)*		
Men	18	40
Women	14	45
Ratio of Age 0-4 Mortality Rates Between Richest and Poorest Counties[6] *(Currie and Schwandt 2016)*		
Men	1.9	1.6
Women	1.9	1.6

[1]Adjusted for 1994 CPS redesign, most recent data values for 2013 (pre-2014 redesign); [2]Values for 1989 (earliest available); [3]Values for 1980-82 (closest available); [4]Pay gaps for full time workers (50-52 weeks) at least 15 years of age, 1980 value for civilian workers only, higher value represents larger gap; [5]Values for white alone, black alone, and Hispanic (any race); [6]Ratio of mortality rates for 95th and 5th percentile counties as ranked by poverty rate, value for 1990 (earliest available).

have occurred. In doing so, these policies partially offset the cyclical increase in earnings inequality associated with economic downturns. In addition, the progressive fiscal policies included in the Recovery Act and subsequent legislation, including tax cuts for working and middle-class families and extended unemployment insurance, further reduced inequality and helped families struggling to handle job loss, reduced working hours, and other consequences of the downturn.

Reducing Unemployment and Earnings Inequality

The economic suffering caused by recessions is distributed in a highly unequal manner. The unemployed, particularly the long-term unemployed, bear a disproportionate share of the burden. Countercyclical policy is thus not only essential to ensure that our economy operates at its potential, but also plays an important role in reducing inequality (Bivens 2015; Coibion et al. 2016).

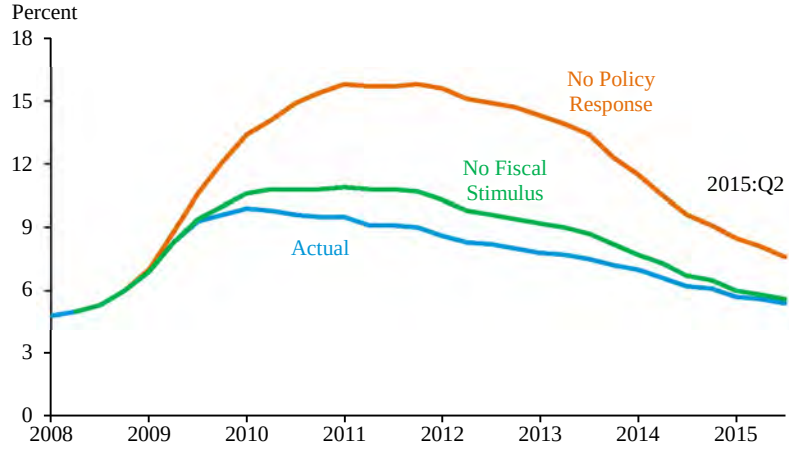
The Recovery Act and other elements of the fiscal policy response to the Great Recession boosted employment and output and reduced the unemployment rate relative to what they would have been absent the policy response. According to Blinder and Zandi (2015), the fiscal policy response boosted employment by roughly 2.5 million jobs and reduced the unemployment rate by 1.5 percentage points on average each year between 2010 and 2012 (Figure 3-1). The broader policy response, including not only fiscal policy but also financial measures pursued by the Administration, independent actions by the Federal Reserve, and support for the automobile industry, boosted employment by about 9 million jobs and reduced the unemployment rate by 6 percentage points on average each year from 2010 through 2012.[4] These estimates may even understate the impact of the policy response because they do not incorporate a role for negative long-term effects of recessions. If unemployment reduces the economy's potential going forward, the true impact of the policy response may exceed the impact shown here.

One particularly stark illustration of the unequal burden created by economic downturns is the disparity in unemployment rates by race and other demographic characteristics. The unemployment rate for the population as a whole increased 5 percentage points, from 5 to 10 percent, during the Great Recession and its immediate aftermath. However, the unemployment rate for African American workers rose 8 percentage points to nearly

[4] In previous work, CEA estimated that the Recovery Act and subsequent fiscal measures increased employment by about 9 million job-years through the end of 2012, broadly consistent with the estimates of the impact of the fiscal policy response by Blinder and Zandi (CEA 2014a). (A job year is the equivalent of a full-time job held for one year.)

Figure 3-1

Unemployment Rate by Policy Scenario, 2007–2015



Note: The no policy reponse scenario assumes no fiscal policy response, no financial policy by the Administration or by the Federal Reserve (e.g. TARP, QE), and no support for the auto industry. The no policy response scenario assumes the Fed does conduct traditional monetary policy via management of short-term interest rates.
Source: Blinder and Zandi (2015).

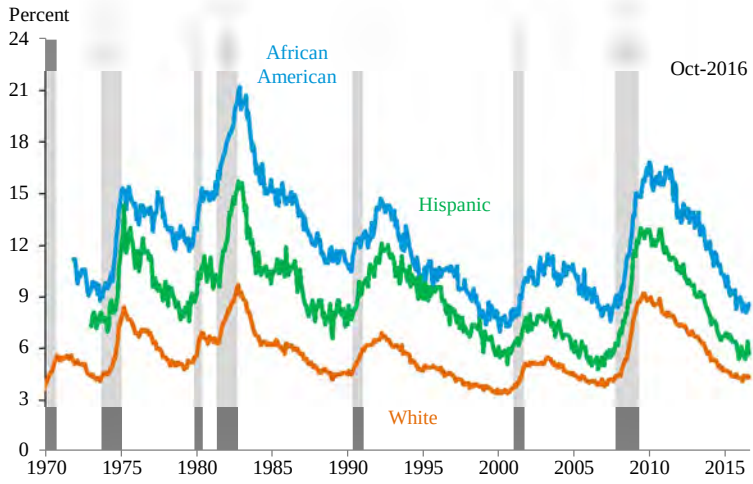
17 percent, and for Hispanic workers it rose 7 percentage points to 13 percent (Figure 3-2). As the overall unemployment rate has fallen during the recovery, the unemployment rates for African American and Hispanic workers have fallen by even more, though they continue to exceed the rates of unemployment for the overall population.

Through increases in the unemployment rate, economic downturns drive increases in earnings inequality. As measured by the Gini index, changes in inequality in weekly earnings for the population ages 18-64—including those not currently employed—closely track changes in the unemployment rate over time (Figure 3-3). (The Gini index is a summary measure of inequality that ranges from 0 to 1, with higher values indicating greater inequality.) During and immediately after recessions, earnings inequality increases sharply along with the unemployment rate. As the unemployment rate recovers, earnings inequality decreases. The correlation between unemployment and the Gini index reflects both the mechanical effect of higher unemployment as well as any changes in the distribution of earnings.

While earnings inequality increases during recessions, other measures of inequality can decrease. A decrease in inequality would be expected for measures of income inequality that rely on more comprehensive definitions of income, that are more sensitive to changes in average incomes for the highest-income families, or that measure incomes over longer periods of

Figure 3-2

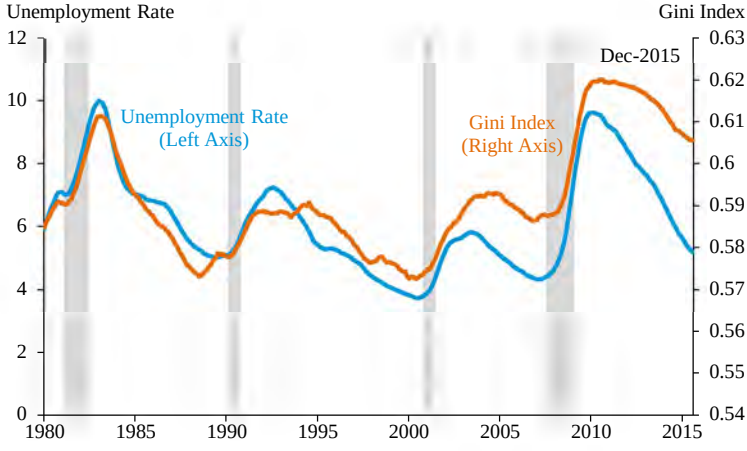
Unemployment Rate by Race, 1970–2016



Note: Shading denotes recession.
Source: BLS.

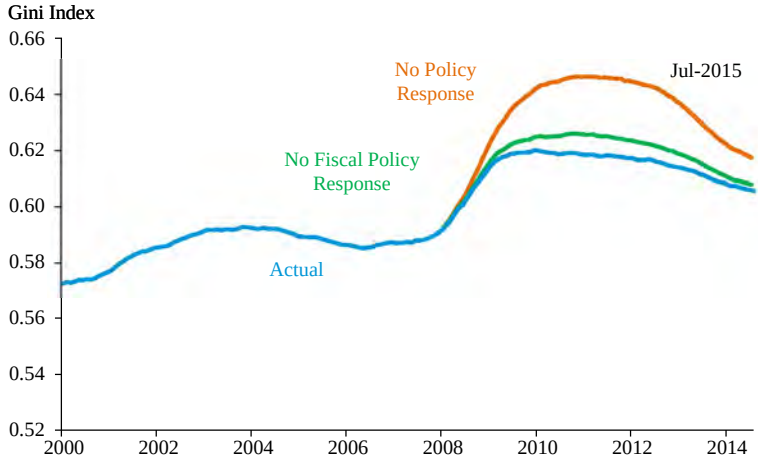
Figure 3-3

Unemployment and Earnings Inequality, 1980–2015



Note: Twelve-month moving average of not seasonally adjusted data. Gini index for the population ages 18-64, including those not currently employed. Unemployment rate for labor force participants ages 18-64. Shading denotes recession.
Source: BLS; CEA calculations.

Figure 3-4
Earnings Inequality, 2000–2015



Note: Twelve-month moving average of not seasonally adjusted data. Gini index for the population ages 18-64, including those not currently employed.
Source: BLS; Blinder and Zandi (2015); CEA calculations.

time. Investment income is concentrated among high-income families and generally falls sharply during recessions, which reduces the income share of these families when using broader measures of income or measures of inequality that are particularly sensitive to high incomes. Similarly, safety-net policies provide partial protection against income losses that result from unemployment even though earnings fall to zero, thus reducing the recessionary increase in inequality in broader measures of income. The different behavior of these inequality measures provides important insights into how different parts of the economy vary with the business cycle. Earnings inequality reflects individuals' experiences in the labor market, while inequality in more comprehensive measures of income tracks the financial resources families have available. (Another important issue in evaluating inequality is distinguishing short-term cyclical developments from longer-term trends. See Box 3-2 at the end of this section for a discussion of this issue as it relates to the evolution of the income share of the top 1 percent of households since 2000.)

To quantify the impact of the policy response to the Great Recession on inequality, Figure 3-4 shows the actual Gini index for earnings since 2000 and the Gini index for two simulations reflecting what might have occurred

without the policy response.[5] These calculations suggest that the policy response to the Great Recession reduced the increase in the Gini index for earnings by roughly half compared with what would have occurred absent the policy response.

Supporting Struggling Families

In addition to their effects on unemployment and earnings, the Recovery Act and subsequent fiscal measures also had a direct impact on inequality in after-tax incomes through the progressive fiscal policies that they incorporated to support struggling families.

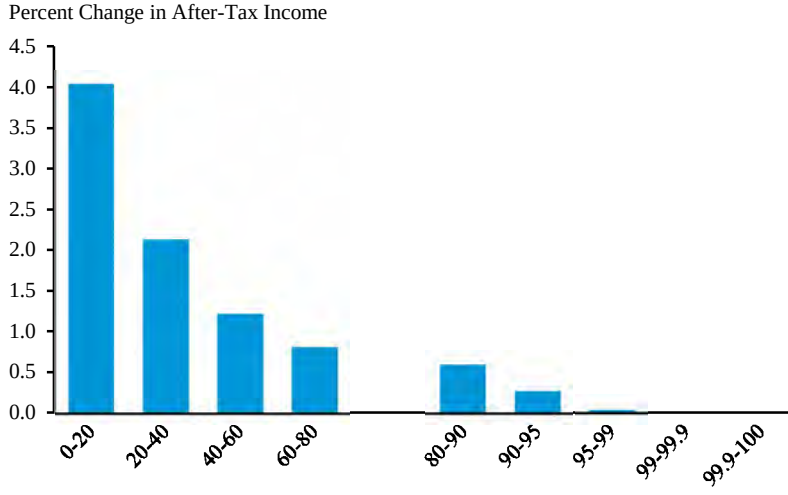
A large portion of the fiscal policy response consisted of tax cuts for working and middle-class families. The Recovery Act created the Making Work Pay credit and expanded the Earned Income Tax Credit (EITC) and Child Tax Credit (CTC) for 2009 and 2010, among other provisions. The Making Work Pay credit provided a tax cut for 95 percent of workers of up to $400 for individuals and $800 for couples. In 2009, the Making Work Pay credit and the EITC and CTC expansions boosted after-tax incomes for families in the lowest quintile of the income distribution by 4 percent and boosted incomes in the second quintile by 2 percent (Figure 3-5). In dollar terms, these provisions provided average tax cuts of $400 and $500, respectively, for families in the first two quintiles. In 2011, the Making Work Pay credit was replaced by a 2 percentage-point reduction in the payroll tax rate, sometimes referred to as the payroll tax holiday, which was subsequently extended through 2012. All told, for a family of four making $50,000 a year, the Making Work Pay credit and payroll tax holiday provided a cumulative tax cut of $3,600 over the first four years of the Administration.

A second key plank of the fiscal policy response was enhancements to the unemployment insurance (UI) system. Both the pre-existing UI system and the enhancements enacted during the Great Recession provided essential support for hard-working American families struggling with the loss of a job during the downturn. The U.S. Census Bureau estimates that unemployment insurance kept more than 11 million people out of poverty

[5] Using data from the Current Population Survey, the simulation randomly re-assigns employed individuals to unemployment (and thus zero earnings) within 64 demographic cells in numbers calibrated to match the aggregate trends as estimated by Blinder and Zandi (2015), assuming proportional increases in unemployment across all cells. Two important sources of uncertainty in the estimate are the (unknown) distribution of earnings for those who would have lost their jobs absent the policy response and the earnings impacts for those who remain employed. This estimate assumes the earnings distribution for those who would have lost their jobs absent the policy response is identical to the overall earnings distribution within demographic cells and assumes no change in earnings for those who remain employed. A sensitivity exercise suggests that the conclusion is not substantially affected unless the workers who would have lost their jobs absent the policy response were selected primarily from the tails of the earnings distribution.

Figure 3-5

Percent Change in After-Tax Income by Income Percentile: MWP and Recovery Act EITC and CTC Expansion, 2009



Source: Urban-Brookings Tax Policy Center; CEA calculations.

cumulatively between 2008 and 2012, according to the Supplemental Poverty Measure (CEA and DOL 2013). (This is not a causal estimate because it does not account for any changes in recipients' behavior that might occur in the absence of UI.) In 2012 alone, UI kept 2.5 million people out of poverty. Between 2008 and 2013, more than 24 million workers received extended benefits through either the Emergency Unemployment Compensation program or Extended Benefits program. Including workers' families, more than 70 million people—including 17 million children—were supported by extended UI benefits over this period (CEA and DOL 2013).

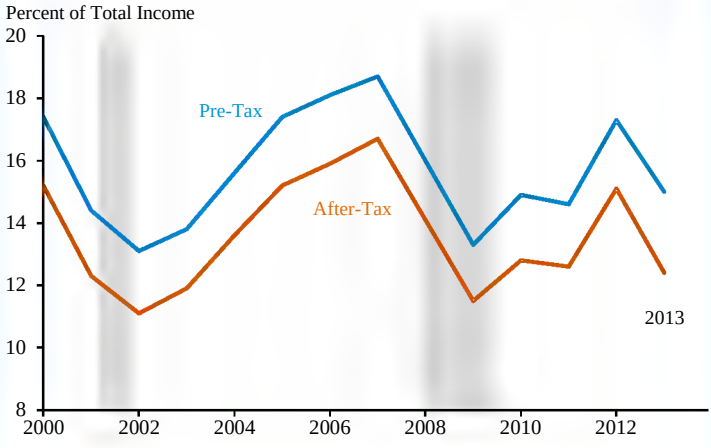
The Recovery Act also temporarily expanded benefits in the Supplemental Nutrition Assistance Program, provided emergency benefits through the Temporary Assistance for Needy Families program, and ended or prevented homelessness for over 1.3 million families through the Homelessness Prevention and Rapid Rehousing Program (CEA 2014a). It provided temporary support for States to sustain Medicaid coverage and made investments in health centers, workforce programs, prevention, and electronic health records.

In total, the pre-existing social insurance system, combined with the expansions in the Recovery Act and subsequent extensions, offset nearly 90 percent of the increase in poverty that would otherwise have occurred, even without accounting for impacts in moderating the recession itself (CEA

Box 3-2: Income Inequality and the Business Cycle

Income inequality is highly sensitive to economic conditions, and short-term trends can easily differ from longer-term developments (see Box 3-1 for a description of developments over the last 30 years). As a result, interpreting year-to-year changes in measures of income inequality, such as the share of income accruing to the highest-income 1 percent of households, must be done with attention to the business cycle. The most recent business-cycle peak in 2007 saw the pre-tax income share of the top 1 percent reach a record high of 19 percent, only to fall to 13 percent two years later in the depths of the Great Recession (Figure 3-i). Both its sharp drop between 2007 and 2009 and subsequent rebound are likely primarily cyclical developments.

Figure 3-i
Top 1 Percent Income Shares, 2000–2013

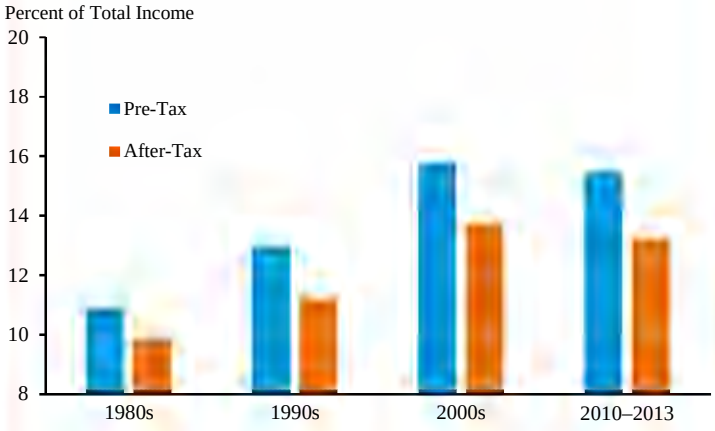


Note: Households ranked by pre-tax income for both pre-tax and after-tax income shares. Shading denotes recession.
Source: CBO (2016b); CEA calculations.

Notwithstanding this short-term cyclical variation, income inequality has increased sharply in recent decades. This longer-term trend of rising income inequality culminated in the record-high income share of the top 1 percent in 2007. The top 1 percent income share in 2013, the most recent year for which comprehensive CBO estimates are available, was below this record level but still high by historical standards. Averaged across years, the income share of the top 1 percent has increased through each complete decade from the 1980s to the present (see Figure 3-ii).

Figure 3-ii

Top 1 Percent Income Share by Decade, 1980–2013



Note: Households ranked by pre-tax income for both pre-tax and after-tax income shares.
Source: CBO (2016b); CEA calculations.

Notably, however, the growth rate of inequality may have slowed or paused in recent years according to this measure. Since 2000, the income share of the top 1 percent has been highly cyclical, but relatively little-changed on net. At the same time, other measures of inequality, such as the Gini index for market incomes, have continued to increase. These data raise the possibility that the rapid increase in income inequality that the United States has experienced over recent decades may be entering a new phase. However, even if the growth in inequality has slowed, the elevated level of inequality will remain a pressing concern.

2014a). Although the economy was dealt its most severe blow since the Great Depression, the poverty rate measured to include the effects of antipoverty policy measures rose just half a percentage point. Excluding these measures, the poverty rate would have risen 4.5 percentage points—9 times greater than the actual increase.

The Affordable Care Act: Providing Affordable, Accessible Health Insurance

In 2008, 44 million Americans lacked health insurance. Individuals with pre-existing conditions were often locked out of health insurance,

unable to obtain insurance at any price. For many others, health insurance was available but unaffordable. Many workers faced strong financial incentives to remain in low-quality jobs, or jobs for which they were poorly matched, because they needed the health insurance those jobs provided, even when a better job was available or they saw an opportunity to go back to school or to start a business.

The Affordable Care Act (ACA) introduced comprehensive reforms to address these and other problems in the health care system. It requires insurers to offer health insurance on the same terms to all applicants regardless of their health status. Families can use the Health Insurance Marketplace to compare and purchase policies with the certainty that they will not be denied coverage, and the law provides financial assistance to ensure that coverage is affordable. The law also supported an expansion of Medicaid for the lowest-income Americans. In total, the ACA has resulted in an additional 20 million American adults gaining health insurance coverage; reduced disparities in coverage by age, race, and income; and reduced poverty and inequality. (See Chapter 4 for further discussion of the Obama Administration's record on health care policy.)

Reducing Disparities in Health Coverage and Health Status

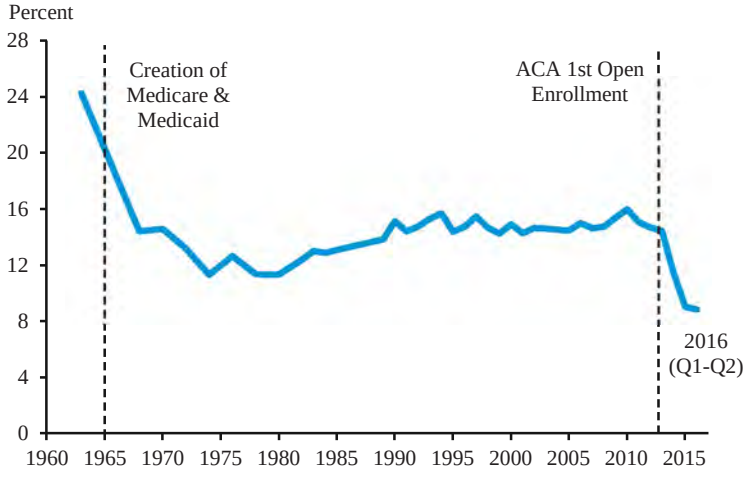
The ACA has substantially reduced inequality in access to health care. It has increased the number of American adults with health insurance by 20 million as of early 2016 and contributed to the largest drop in the share of the population without health insurance since the creation of Medicare and Medicaid in the 1960s (Furman and Fiedler 2014e; Uberoi, Finegold, and Gee 2016). From 2010—the year of the law's enactment—through the first half of 2016, the share of the population without health insurance (the uninsured rate) has fallen from 16.0 percent to 8.9 percent (Figure 3-6).

Uninsured rates varied markedly across different population groups in 2010 (Figures 3-7A, 3-7B, and 3-7C). Uninsured rates for African Americans, Hispanics, and Native Americans were substantially higher than those for Whites. And while nearly every American over age 65 had health coverage thanks to Medicare, more than 30 percent of those between the ages of 19 and 26 lacked health insurance. Families with incomes below 150 percent of the Federal poverty line lacked health insurance at a rate 9 times that for families with incomes above 400 percent of the poverty line.

Improvements in health insurance coverage have reduced inequality in access to health insurance along numerous dimensions, as demonstrated by the particularly large coverage gains for groups with elevated uninsured rates prior to reform. Between 2010 and 2015, coverage rates increased by 25 percentage points for Native Americans, 11 percentage points for Hispanics,

Figure 3-6

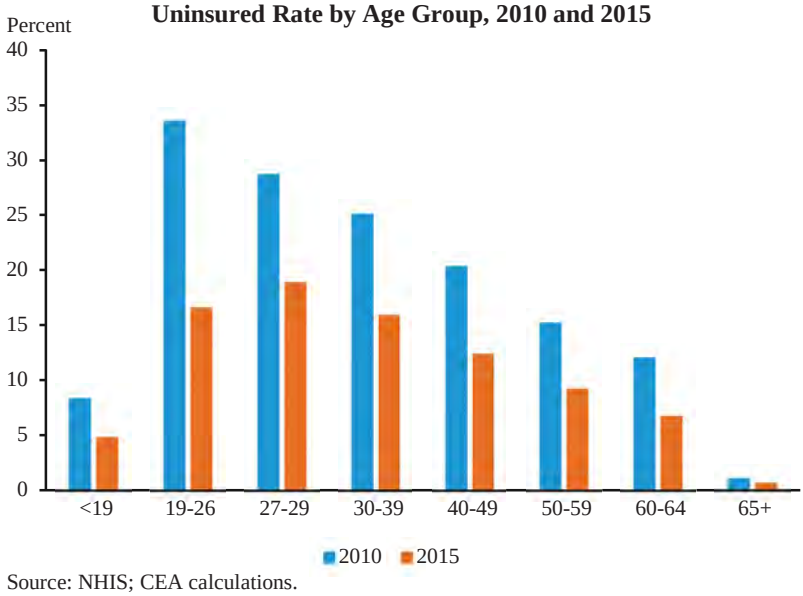
Percent of Population Without Health Insurance, 1963–2016



Note: For 2016, data reflect the first two quarters only. For years 1989 and later, data are annual. For prior years, data are generally but not always biannual.
Source: CEA analysis of NHIS and supplemental sources described in Furman and Fiedler (2014).

Figure 3-7A

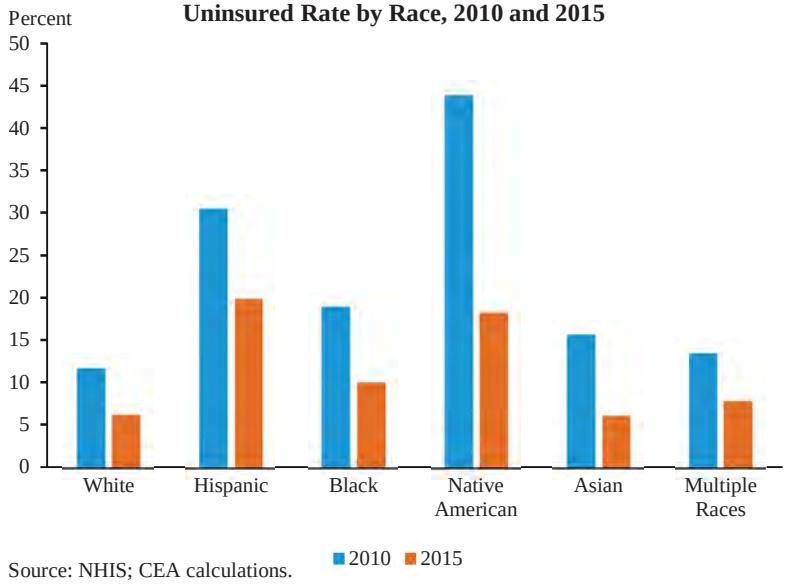
Uninsured Rate by Age Group, 2010 and 2015



Source: NHIS; CEA calculations.

Figure 3-7B

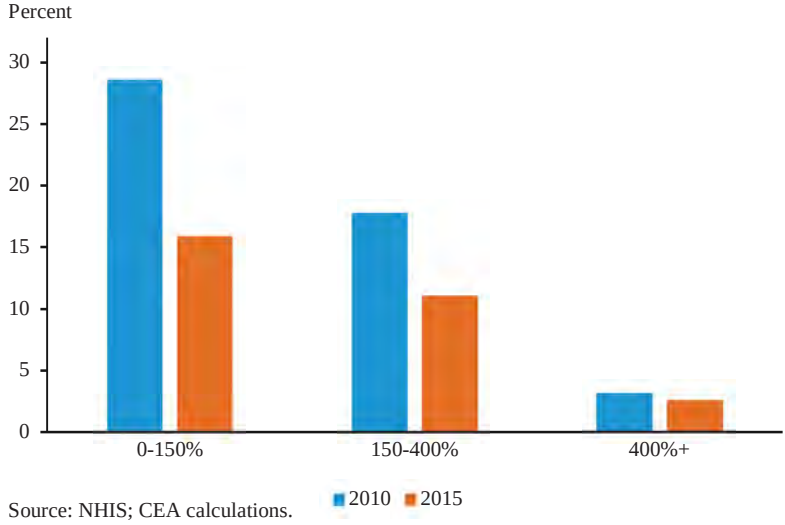
Uninsured Rate by Race, 2010 and 2015



Source: NHIS; CEA calculations.

Figure 3-7C

Uninsured Rate by Family Income as Percent of Federal Poverty Level, 2010 and 2015



Source: NHIS; CEA calculations.

and 9 percentage points for African Americans, compared with 7 percentage points overall. Coverage increased by 17 percentage points among those ages 19 to 26, with this age group no longer exhibiting the lowest rates of coverage, and coverage increased by 13 percentage points for families with incomes below 150 percent of the poverty line.

A growing body of research finds that the coverage expansions resulting from the ACA are generating important improvements in families' well-being. Perhaps the most visible goal of expanding health insurance coverage is improving access to care. Examining data through March 2015, Shartzer, Long, and Anderson (2015) find that the share of non-elderly adults with a usual source of care and the share who received a routine checkup in the last 12 months has risen with expanded insurance coverage, while the share reporting problems accessing care or forgoing care due to cost has fallen. Examining a similar time period, Sommers et al. (2015) report similar improvements in access to care, including reductions in the share of non-elderly adults reporting problems affording care or lacking a personal physician. The pattern of gains in these studies is consistent with the gains having been caused by the ACA. Both studies report notably larger gains in Medicaid expansion states, and Shartzer, Long, and Anderson (2015) find that the largest gains in access were realized by low- and moderate-income adults, a population that saw the largest gains in insurance coverage as a result of the ACA's coverage provisions.

This research also provides early evidence that gains in access to care are translating into better health. Sommers et al. (2015), for example, find reductions in the share of non-elderly adults reporting that they are in fair or poor health, as well as reductions in the percentage of days that respondents report having their activities limited by health problems. There is also evidence that these gains are larger in states that have expanded their Medicaid programs (Sommers et al. 2016). Further research will be required to examine the effects of the law on a broader array of health outcomes, though it is notable that studies of prior coverage expansions targeting populations similar to those targeted by the ACA's coverage provisions concluded that those expansions reduced mortality among those gaining coverage (Sommers, Baicker, and Epstein 2012; Sommers, Long, and Baicker 2014).

The coverage expansions resulting from the ACA also appear to be achieving one of the other key goals of health insurance coverage: protecting the sick from financial hardship. Survey data show substantial reductions in the share of families reporting problems paying medical bills, with particularly large reductions for low- and moderate-income adults as the law's coverage provisions have taken effect (Shartzer, Long, and Anderson 2015). Studies using data from consumer credit reports to compare states that have

and have not expanded Medicaid found similar improvements in financial security, with one study estimating that Medicaid expansion reduced the amount of debt sent to collection by $600 to $1,000 per person gaining coverage (Dussault, Pinkovskiy, and Zafar 2016; Hu et al. 2016).

Reducing Poverty and Income Inequality

To facilitate this dramatic expansion in health insurance coverage, the ACA combined Federal support for states that expand their Medicaid programs with financial assistance for people purchasing coverage in the individual market so as to make health insurance more affordable for all Americans. These policies have directly reduced poverty and income inequality.

The value of the Medicaid benefits and Marketplace financial assistance made available by the ACA is substantial. Average medical expenses covered by Medicaid for adults newly eligible in 2017 as a result of the ACA will be an estimated $5,400 (CMS 2015).[6] CBO has estimated that individuals receiving subsidized coverage through the Health Insurance Marketplaces in 2017 will receive benefits of around $4,500 (CBO 2016a). For working families struggling to make ends meet, these forms of assistance can be the difference between health insurance coverage and medical bankruptcy or going without necessary care.

Analysis from the Treasury Department highlights the powerful inequality-reducing effects of the ACA coverage provisions. Treasury estimates that the ACA coverage provisions will boost incomes in the lowest decile by 25 percent and for the bottom quintile as a whole by 16 percent in 2017. They will also boost incomes for families in the second quintile by 5 percent. The average benefit for families in the first quintile from the ACA coverage provisions will be about $1,900 and for families in the second quintile about $1,400.[7]

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[6] Different analysts compute the value of health insurance to households in different ways when measuring the income distribution. CBO (2016a) values Medicare and Medicaid at the average cost to the government of providing those benefits and the analysis here follows the same approach in valuing expanded Medicaid programs in the ACA at the cost to the government. Other approaches are also possible. For example, one recent study has argued for valuing Medicaid at less than cost because some of the care provided by Medicaid was previously being received from other sources for free (Finkelstein, Hendren, and Luttmer 2015). In this case, some of the value of the coverage expansions will accrue to whatever entities bear the cost of providing the care that goes uncompensated, a combination of medical providers themselves; privately insured individuals; and local, State, and Federal governments.

[7] After-tax incomes include the value of the Premium Tax Credit and cost-sharing reductions even if the assistance is realized as a reduction in premiums or out-of-pocket expenses rather than a direct payment.

Enacting a Fairer Tax Code

In 2008, average tax rates on high-income families had fallen to their lowest levels in many years. Since then, President Obama has signed into law new tax cuts for working and middle-class families, restored Clinton-era tax rates for high-income Americans, created new tax credits to make health insurance affordable for all Americans, and fully paid for the coverage expansions of the ACA with responsible tax increases for high-income families.

These tax policies have served many purposes: restoring growth and boosting employment, expanding access to health care, helping working families get ahead, and reducing the deficit. In addition to their other purposes, the combined effect of these policies has been to reduce inequality substantially. Changes in tax policy, other than the ACA coverage provisions, will boost after-tax incomes in the bottom quintile by 2 percent in 2017 and reduce after-tax incomes for the top 0.1 percent by 9 percent relative to what incomes would have been under 2008 policies.

Cutting Taxes to Support Work, Reduce Poverty, and Strengthen Opportunity

During his first term in office, the President signed into law legislation that cut taxes for a family of four making $50,000 a year by a cumulative total of $3,600 between 2009 and 2012. As part of the Recovery Act, the President and Congress enacted the Making Work Pay credit, which provided 95 percent of workers with a tax cut of up to $400 ($800 for couples) in 2009 and 2010. In 2011 and 2012, the Making Work Pay credit was replaced with a 2 percentage-point reduction in the payroll tax rate. These policies were progressive in their own right, and also reduced inequality through their contribution to the economic recovery, as discussed earlier in this chapter. In addition, the Recovery Act expanded the Earned Income Tax Credit (EITC) and Child Tax Credit (CTC), helping 16 million working families make ends meet each year. These expansions now directly lift 1.8 million Americans out of poverty as measured by the Supplemental Poverty Measure, and reduce the severity of poverty for an additional 15 million Americans (Figure 3-8).

Research finds that refundable tax credits for working families lead to better short- and long-run outcomes for children. For example, one study finds each additional $1,000 increase in the EITC reduces the incidence of low birth weight by 2 to 3 percent, in part due to increased pre-natal care (Hoynes, Miller, and Simon 2015). Other research suggests that the EITC and refundable CTC increase test scores and college enrollment (Chetty,

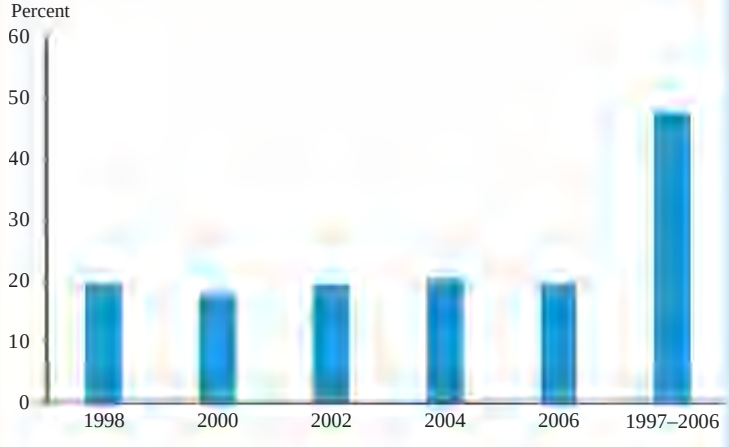
Box 3-3: Safety Net Policies as Insurance

Distributional analysis can be conducted on either an annual or a lifetime basis. Annual estimates, like those presented in this chapter, provide a snapshot of the impact of policies in a particular year. Although they generally require richer data and stronger assumptions, lifetime estimates quantify the impact of policies over an entire lifecycle. This lifecycle perspective captures an important additional aspect of safety-net and anti-inequality policies that can be lost in annual analysis: their role as periodic supports in times of economic distress. For example, a two-earner family that is not eligible for the Earned Income Tax Credit (EITC) in most years may become eligible when one earner experiences an extended period of unemployment that depresses the family's annual income. Most individuals, in fact, experience such temporary shocks over a lifetime: a recent study indicated that more than 60 percent of Americans fall into the bottom 20 percent of incomes for at least one year between ages 25 and 60 (Rank and Hirschl 2015).

For this reason, the share of Americans that benefit from safety-net and anti-inequality policies over a longer horizon substantially exceeds the share that benefit in a single year. The ACA, for example, provides financial support to states that expand their Medicaid programs and to individuals for purchasing health insurance through the Marketplaces—

Figure 3-iii

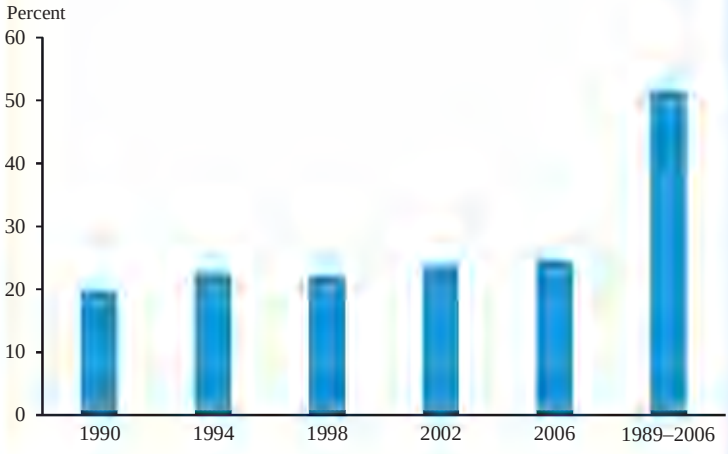
Percent of Nonelderly Americans Uninsured for at Least One Month, 1997–2006



Source: U.S. Treasury, Office of Economic Policy (2009).

Figure 3-iv

Percent of Families with Children Claiming the Earned Income Tax Credit, 1989–2006



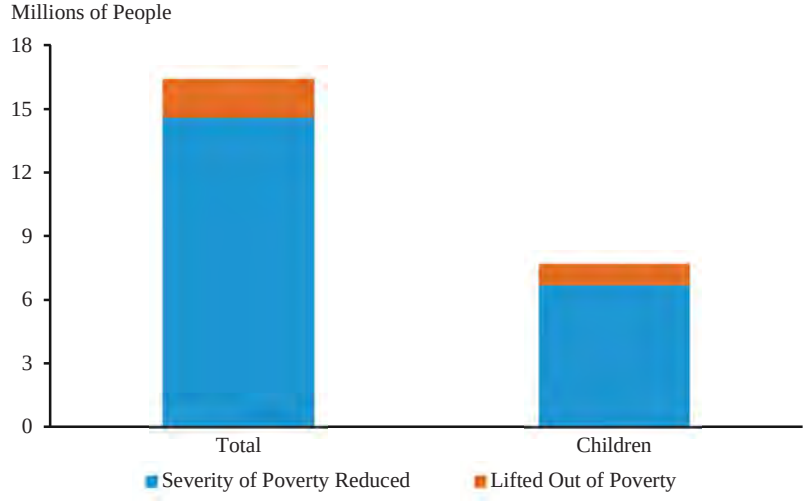
Source: Dowd and Horowitz (2011).

provisions that provide greatest value to those who would otherwise be uninsured. In the decade prior to the enactment of the ACA, roughly 20 percent of the population was uninsured for at least one month in any particular year and thus stood to benefit from the law's coverage provisions during that year (see Figure 3-iii). However, over the course of the decade as a whole, more than twice as many people—roughly half the population—were uninsured for at least one month and thus would have had the opportunity to benefit from the law's coverage expansion. Similarly, about 25 percent of families with children claim the EITC in any given year, but 50 percent claim the EITC at some point during a 20-year period (Figure 3-iv).

In this way, the inequality-reducing tax and health care policies that the President has signed into law will ultimately benefit a much larger fraction of working and middle-class Americans than they do in a single year, as do existing policies like unemployment insurance and the Supplemental Nutrition Assistance Program.

Figure 3-8

Impact of Recovery Act EITC and CTC Improvements on Number of People in Poverty, 2018



Source: Marr, Dasilva, and Sherman (2015).

Friedman, and Rockoff 2011; Dahl and Lochner 2012; Manoli and Turner 2016).[8]

The Recovery Act also created the American Opportunity Tax Credit (AOTC), which provides up to $10,000 over four years to help pay for college. The AOTC is the first education tax credit to be at least partially refundable. The partial refundability of the AOTC is critical because it allows low-income families with no income tax liability to claim the credit, and students who do not attend college come disproportionately from families with lower incomes. In addition, the Administration has expanded the maximum Pell Grant for low- and moderate-income college students by more than $1,000 and, for the first time, tied aid to inflation to maintain its value—an important policy that is not included in the estimates in this section, which focus solely on the tax system. (See Chapter 5 for additional discussion of changes in education policy during this Administration.)

Restoring Tax Rates to Their Level in the 1990s and Increasing Progressivity

Additional tax reforms enacted since 2009 have increased the progressivity of the tax code, helped pay for the ACA, and contributed to responsible

[8] For further discussion of the long-run benefits of refundable tax credits see CEA (2016a).

deficit reduction. At the beginning of 2013, the President signed into law a permanent extension of expiring tax cuts for middle-class families while also restoring Clinton-era tax rates for the highest-income families. Restoring Clinton-era tax rates for these families, along with other components of this legislation, will reduce the deficit by more than $800 billion over the next 10 years. In addition, the ACA extended Medicare taxes to cover the investment income of high-income families and modestly increased the Medicare tax rate for these same families. In combination, these reforms have restored effective tax rates on high-income Americans to the level that prevailed in the mid-1990s (Figure 3-9).

Reducing Poverty and Income Inequality

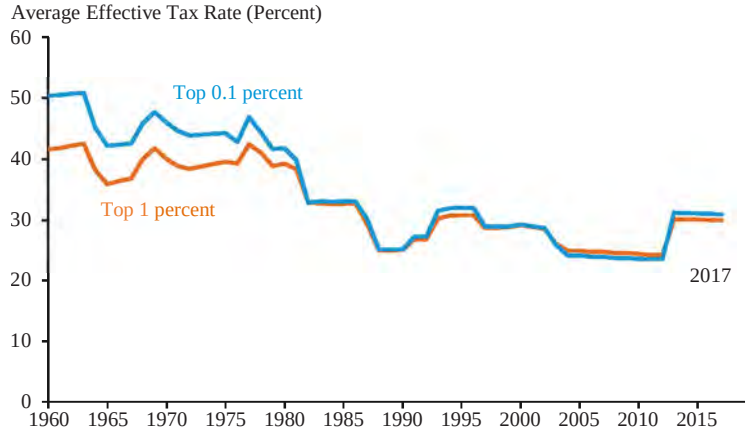
The tax policies the President has signed into law since 2009 have boosted incomes for working families, increased taxes on the highest-income families, and reduced income inequality (Figure 3-10). These policies, primarily the expansion of the CTC for low-income working families and expansion of the EITC for families with three or more children, will boost incomes in the first quintile by 2 percent in 2017 compared with what they would have been under the continuation of 2008 policies. These estimates do not take into account the additional, temporary income boosts these families saw from the temporary tax cuts enacted earlier in the Administration, including the Making Work Pay credit and the payroll tax holiday that have now expired.

The tax increases enacted by the Administration have been concentrated among the highest-income families. Families in the top 0.1 percent of the distribution, who are projected to have average pre-tax incomes of more than $8 million in 2017, will experience a tax increase of more than $500,000 on average and a reduction in after-tax incomes of 9 percent in that year. Families in the top 1 percent, but not the top 0.1 percent, will experience a tax increase of $30,000 on average and a reduction in after-tax incomes of 5 percent. In addition to their contribution to deficit reduction and to help finance the expansion of health insurance coverage made possible by the ACA, these high-income tax increases have directly reduced inequality in after-tax incomes.

The impact of these changes in tax policy are measured relative to a policy counterfactual in which 2008 tax policy remains in place. This policy counterfactual assumes the extension of the major individual and estate tax cuts scheduled to expire at the end of 2010; a set of individual, business, and energy tax provisions that have been regularly extended by Congress in the past (referred to as "extenders"); a set of provisions limiting the scope of the

Figure 3-9

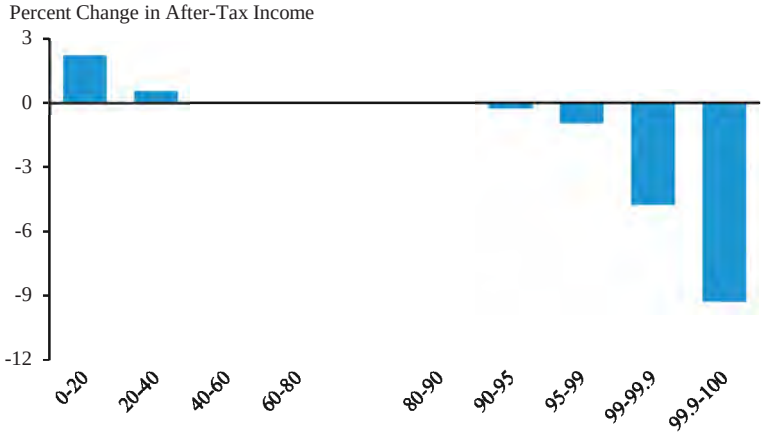
Effective Tax Rates for a Fixed Pre-Tax Income Distribution, 1960–2017



Note: Average effective Federal (individual income plus payroll) tax rates for a 2006 sample of taxpayers augmented with non-filers constructed from the CPS. Pre-tax incomes adjusted in proportion to changes in the National Average Wage Index.
Source: IRS, Statistics of Income Public Use File; Bureau of Labor Statics, Current Population Survey; National Bureau of Economic Research. TAXSIM: CEA calculations.

Figure 3-10

Percent Change in After-Tax Income by Income Percentile: Changes in Tax Policy Since 2009 Excluding ACA Coverage Provisions, 2017



Source: U.S. Treasury, Office of Tax Analysis.

individual Alternative Minimum Tax; and the Federal Unemployment Tax Act surtax.

The Obama Administration's Record in Historical Context

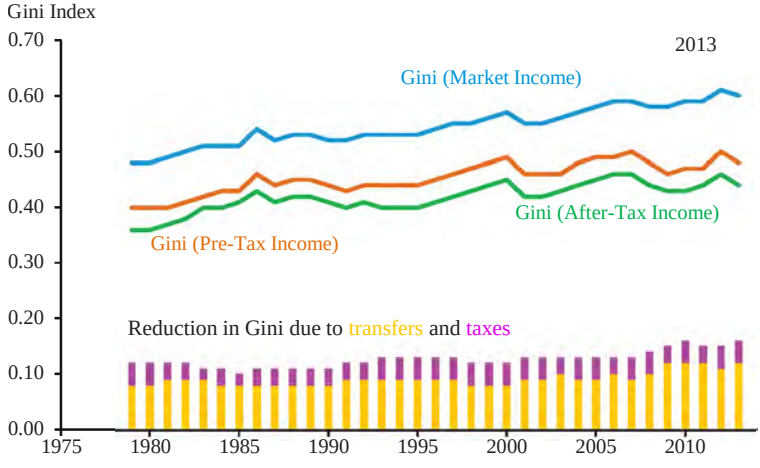
President Obama has overseen the largest increase in Federal investment to reduce inequality since the Great Society programs of the Johnson Administration, largely reflecting the coverage provisions of the ACA and expansions of tax credits for working families. However, despite the historic nature of the Obama Administration's accomplishments, inequality remains much higher today than it was a few decades ago, and substantial work remains to continue reducing inequality and expanding economic opportunities for all Americans (Figure 3-11).

The Combined Impact of Changes in Tax Policy and the ACA Coverage Provisions

Earlier sections of this chapter separately examine the impact of the coverage provisions of the ACA and changes in tax policy on the distribution of income. This section examines their combined impact. Changes in tax policy since 2009 and the coverage provisions of the ACA will boost 2017

Figure 3-11

Inequality in Market Income, Pre-Tax Income, and After-Tax Income, 1979–2013



Source: CBO (2016b).

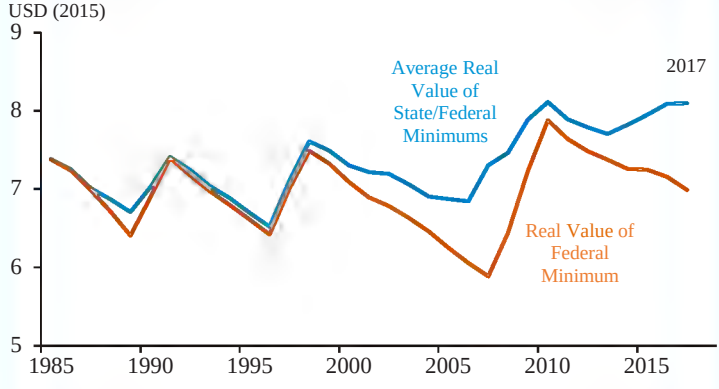
Box 3-4: Additional Actions to Make the Economy Work for All American

This chapter focuses on the Administration's accomplishments in restoring growth, guaranteeing access to health insurance, and enacting a fairer tax code. However, the Administration has taken many other critical steps to reduce inequality, including both actions with more immediate effects, such as spurring State action to raise minimum wages, and actions with primarily longer-term effects, such as improving our educational system. This box describes the Administration's actions on wages and education.

Raising Wages: In his 2013 State of the Union address, the President called for an increase in the Federal minimum wage. While Congress has not acted, 18 states and the District of Columbia have enacted legislation raising their minimum wages since that time. In part due to these increases, the decline in the value of the effective minimum wage (the higher of the Federal and State minimum wage in each state weighted by worker hours) has been reversed, and the effective minimum wage has now reached roughly the same inflation-adjusted value it had in 2009 when the Federal minimum last increased (Figure 3-v). However, despite this progress, too many Americans continue to work

Figure 3-v

Real Value of Federal and State Minimum Wages, 1985–2017



Note: Average State and Federal minimums are weighted by statewide weekly worker hours as recorded in the CPS and described further in Autor, Manning, and Smith (2016). For the combined trendline, the Federal minimum is used in place of State minimums where the former binds.
Source: Autor, Manning, and Smith (2016); BLS; CBO; CEA calculations.

Figure V

for a minimum wage that is too low, and the President continues to call for a higher minimum wage.

The President has also worked to improve working conditions and wages by strengthening worker protections. As part of this effort, the Department of Labor completed an update to Federal overtime regulations in early 2016, extending overtime protections to more than 4 million additional workers. Unions also play an important role in supporting working conditions and wages, and the President has worked to ensure that the National Labor Relations Board is able to fulfill its role in enforcing workplace protections and upholding the rights of workers. In addition, the Administration has sought to support new approaches to enabling worker voice.

Promoting Educational Opportunity: In contrast to higher minimum wages and changes in tax and transfer policy, which generate immediate reductions in inequality, educational investments pay off over a longer time horizon. Educational investments are critical to ensure equal opportunity for children today and to reduce inequality over the long term. During the recession, the Department of Education provided over $60 billion in funding to states to support education budgets, and these resources helped prevent layoffs of education workers at a time when State and local spending was being cut. As part of the Recovery Act, the Administration encouraged states to raise educational standards, turn around the lowest-performing schools, develop effective support for teachers and leaders, and create uniform data systems to enhance instruction through the Administration's Race-to-the-Top initiative. Today, as a result of this initiative, nearly every state has adopted college and career-ready standards.

The bipartisan Every Student Succeeds Act, which the President signed into law in December 2015, codifies the requirement that every state set academic standards that prepare students for college and careers, and that the state intervene to improve both their lowest-performing 5 percent of schools as well as schools where too many students do not graduate on time—principles that were central to the funding provided under the Recovery Act. In 2014, the Administration invested $750 million in new resources to expand access to high quality early education programs, through Early Head Start-Child Care Partnership grants for infants and toddlers and Preschool Development Grants to states. Today, all but 4 States are investing in preschool, with more than 40 percent of four-year olds in the United States enrolled in publicly funded preschool. In addition, the Administration announced the availability of $135 million in competitively awarded grants to expand Early Head Start and create new Early Head Start-Child Care Partnerships in 2016, building on

$294 million in newly appropriated funds for fiscal year 2016 to ensure that more Head Start children will receive services for a full school day and full school year. The Administration has also provided new funds to support the implementation of new requirements in the reauthorized Child Care and Development Block Grant Act of 2014.

The Administration has also made progress in promoting college opportunity, affordability, and completion by expanding Pell Grants and tax credits; making student loans more affordable by cutting interest rates and allowing borrowers to cap student loan payments at 10 percent of income; making access to financial aid and college information simpler and faster; and promoting innovation and competition to bring down costs and improve college quality. Today, more students are graduating college than ever, and student loan defaults and delinquencies are trending downward.

Lastly, the Administration has worked to increase training and skills for workers during their careers. In 2015, the President signed into law the first-ever annual funding for apprenticeship grants, totaling $90 million. These investments follow earlier investments through the American Apprenticeship Grants to promote and expand job-driven apprenticeship programs in the United States. In addition, the Administration has launched a series of initiatives, partnerships, and grants to facilitate training for the American workforce. In April 2015, the White House hosted an Upskill Summit at which the President called on companies to expand education benefits and training opportunities, and employers have responded to this call—the Aspen Institute's Upskill America Initiative reports that participating companies have enhanced the skills of tens of thousands of frontline workers. The Department of Labor has also awarded a wide variety of competitive training grants. These grants have ranged from TechHire grants, which are supporting public-private partnerships to help train tomorrow's workforce in rapid-growth sectors, to America's Promise Job-Driven Training grants, which are creating and expanding innovative regional and sector partnerships between community colleges and the workforce system to create more tuition-free education and training programs for in-demand middle and high-skilled jobs across the country.

incomes in the bottom quintile by 18 percent, or $2,200, and in the second quintile by about 6 percent, or $1,500, relative to what they would have been under the continuation of 2008 policies (Figure 3-12).[9] These policies will also boost incomes in the middle quintile by 0.7 percent, or $300. In contrast, these policies will reduce the after-tax incomes of very high-income families, particularly those in the top 1 percent. Targeted tax increases will reduce after-tax incomes by 5 percent for the 99th through 99.9th percentiles and reduce after-tax incomes by 10 percent for the families in the top 0.1 percent, a group projected to have average incomes over $8 million in 2017.

Average tax rates provide an alternative perspective on the impact of these polices. Changes in tax policy since 2009 and tax-related coverage provisions of the ACA will increase the average tax rate for the top 0.1 percent by 7 percentage points in 2017, from 31 percent to 38 percent. For families in the top 1 percent but not the top 0.1 percent, these changes will increase average tax rates by 4 percentage points.

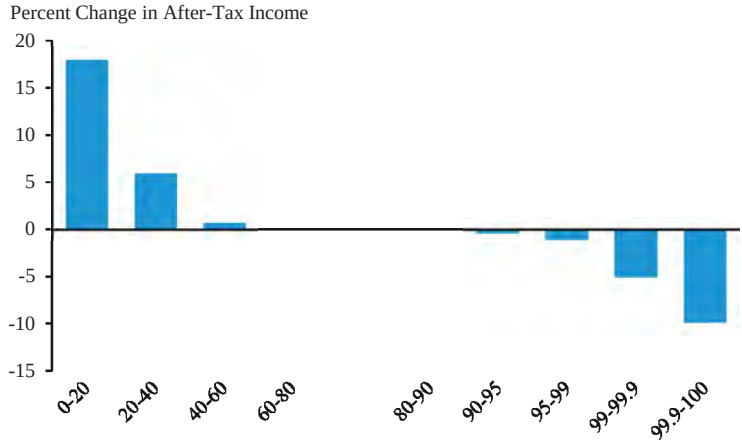
These changes in tax policy and the coverage provisions of the ACA have led to commensurate changes in the distribution of income. As a result of these policies, the share of income received by the top 1 percent will decrease by 1.2 percentage points in 2017, or 7 percent, from 16.6 percent to 15.4 percent (Figure 3-13). The share of income accruing to the bottom 99 percent of Americans will increase by a corresponding 1.2 percentage points. Income shares in the first quintile will rise by 0.6 percentage point, or 18 percent; in the second quintile by 0.5 percentage point, or 6 percent; and in the third quintile by 0.1 percentage point, or 1 percent.

The robust reduction in inequality resulting from these policies is apparent across a wide range of inequality measures (Figure 3-14). The impact of fiscal policies enacted during the Obama Administration on inequality varies by measure, ranging from a 3-percent reduction in the Gini index to a more than 20-percent reduction in the ratio of average incomes in the top 1 percent to the bottom 20 percent, but all measures show a meaningful reduction in inequality. Changes in tax policy and the coverage provisions of the ACA have had their largest effects on very high-income families, where the restoration of Clinton-era tax rates and responsible tax increases to finance the ACA are most important, and in the bottom third of the distribution, where the ACA's expansion of health insurance coverage to 20 million more Americans has had its largest impact. Thus, not surprisingly,

[9] The ACA coverage provisions and tax changes enacted since 2009 have offsetting effects on the 2017 deficit judged relative to a 2008 current-policy baseline, with the coverage provisions increasing the deficit and the tax changes decreasing it. Allocating an additional fiscal adjustment proportional to income to achieve zero net effect on the deficit would not substantially affect the results. Such an adjustment can be critical in assessing the ultimate distributional impact of deficit-financed policy changes.

Figure 3-12

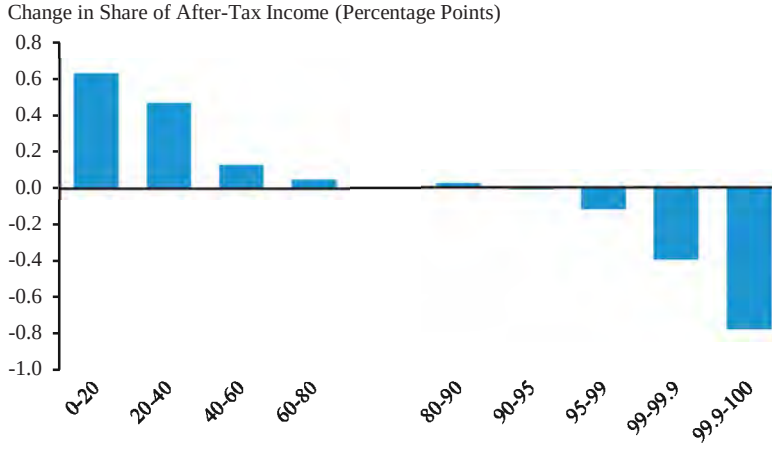
Percent Change in After-Tax Income by Income Percentile: Changes in Tax Policy Since 2009 and ACA Coverage Provisions, 2017



Source: U.S. Treasury, Office of Tax Analysis.

Figure 3-13

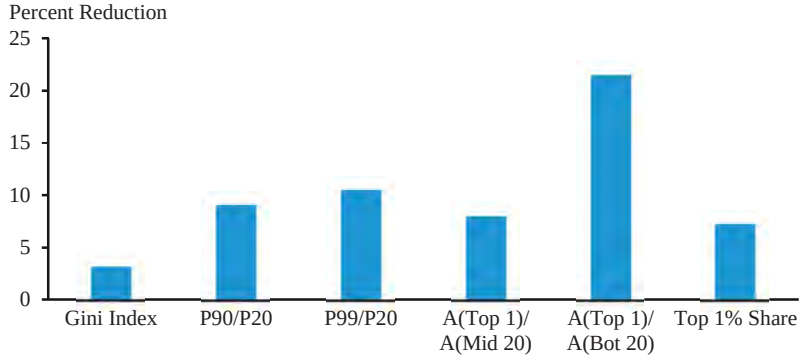
Change in Share of After-Tax Income by Income Percentile: Changes in Tax Policy Since 2009 and ACA Coverage Provisions, 2017



Source: U.S. Treasury, Office of Tax Analysis.

Figure 3-14

Percent Reduction in Income Inequality Due to Changes in Tax Policy and ACA Coverage Provisions, 2017



Note: P90/P20 is the ratio of the after-tax income at the 90th percentile of the distribution to the after-tax income at the 20th percentile. P99/P20 is defined similarly. A(Top 1)/A(Mid 20) is the ratio of the average after-tax income in the top 1 percent to the average after-tax income in the middle 20 percent. A(Top 1)/A(Bot 20) is defined similarly. Incomes are adjusted for family size in computing the Gini Index and percentile ratios and for purposes of ranking families in computing ratios of average incomes and income shares.
Source: U.S. Treasury, Office of Tax Analysis.

measures that are most sensitive to these points in the distribution, such as the ratio of average incomes for families in the top 1 percent to those in the bottom quintile, show the largest effects.

Obama Administration Achievements Relative to Other Federal Action in Recent Decades

The decrease in income inequality resulting from changes in tax policy since 2009 and the coverage provisions of the ACA is large not only in absolute terms but also relative to previous Federal action to reduce inequality.

There are important limitations and uncertainties in any effort to assign policy changes to particular Presidential administrations. Policies enacted in one administration may phase in through the next administration. Broader economic and demographic changes in one administration will interact with the entire history of policy changes leading up to that point. Polices may be repeatedly extended on a temporary basis and automatic adjustments may be introduced in ways that make it difficult to consistently interpret action and inaction (for instance, the introduction of automatic inflation adjustments for income tax brackets and other parameters of the tax code in the 1980s). Notwithstanding these difficulties, this section compares the anti-inequality accomplishments of the Obama

Administration with those of previous administrations, first with respect to tax policy and then with respect to spending.

Figure 3-15 shows the change in the share of after-tax income accruing to the bottom 99 percent of families attributable to changes in tax policy for Presidential administrations since 1960. The analysis holds the income distribution constant as it existed in 2006 and adjusts income levels for growth in the National Average Wage Index, thus isolating the impact of changes in policy from other sources of variation in tax rates. It focuses on individual income and payroll tax liabilities. The change for each administration is defined as the difference between the share of income received by the bottom 99 percent in the last complete calendar year of that administration and the share in the last complete calendar year of the prior administration.[10] Implicitly, tax liabilities in the final year of the previous administration provide the baseline used to assess changes in tax policy across administrations.

The tax changes enacted during the Obama Administration have had historically large effects on the distribution of income, increasing the share of income accruing to the bottom 99 percent of Americans by about 1 percentage point, an inequality-reducing shift in the tax burden more than twice as large as that achieved during the Clinton Administration, which ranks second by this measure.[11]

While the Administration's accomplishments are large by almost any measure, different measures of inequality focus on different points in the income distribution and thus can rank administrations in different ways. Under some measures, the Ford Administration, during which the Earned Income Tax Credit was created, ranks first; under others, the Clinton Administration, which substantially expanded the Earned Income Tax Credit and increased top income tax rates, ranks first.

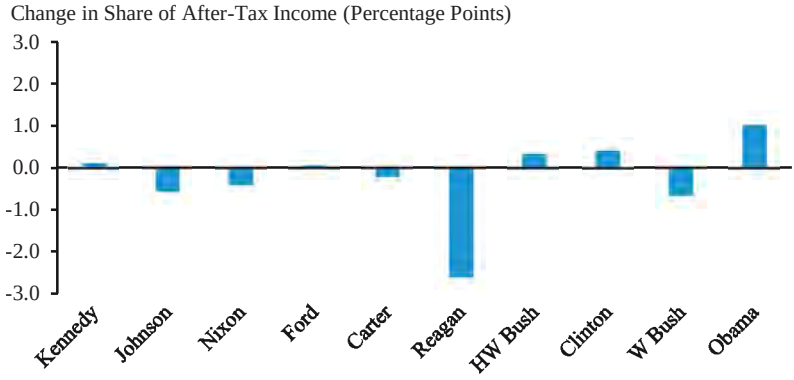
In addition to inequality-reducing changes in tax policy, the President has also signed into law a historic investment in Federal anti-inequality programs. Figure 3-16 shows the change in Federal spending on these programs

[10] For purposes of these comparisons, 1963 is treated as the last complete year of the Kennedy Administration. The change for the Kennedy Administration is measured relative to 1960 because the NBER TAXSIM model (on which this analysis relies heavily) can only generate tax liabilities back to 1960.

[11] This estimate differs from other estimates presented in this chapter for four reasons. First, this estimate excludes the Medicaid expansion but includes all other ACA coverage and tax provisions, a combination of policies not reflected in other estimates. Second, Treasury estimates incorporate a more complete set of taxes, including corporate, excise, and estate taxes, which is not possible with the NBER Internet TAXSIM model. Third, the Treasury estimates apply to calendar year 2017, while these estimates are based on the distribution of income in 2006 held constant over time. And fourth, the NBER Internet TAXSIM model and CEA imputations underlying Figure 3-15 necessarily differ from Treasury's tax models on a variety of technical dimensions.

Figure 3-15

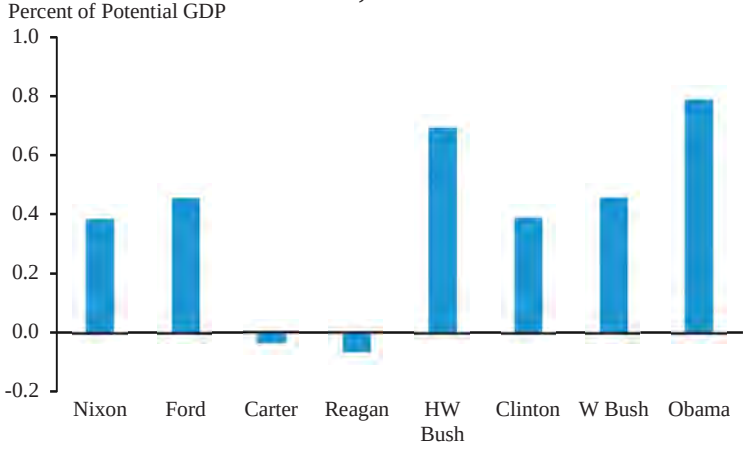
Change in Bottom 99% Share of After-Tax Income for a Fixed Pre-Tax Income Distribution, 1960–2016



Note: Share of income received by the bottom 99% of families after Federal income and payroll taxes in the last complete year of each Administration relative to the last year of the prior Administration for a 2006 sample of taxpayers augmented with non-filers constructed from the CPS. Pre-tax incomes adjusted in proportion to changes in the National Average Wage Index.
Source: IRS, Statistics of Income Public Use File; Bureau of Labor Statics, Current Population Survey; National Bureau of Economic Research, TAXSIM; CEA calculations.

Figure 3-16

Change in Spending on Major Anti-Inequality Programs by Term, 1968–2016



Note: Major anti-inequality programs defined as Medicaid/CHIP, SNAP, the refundable portion of the EITC and CTC, SSI, TANF and other family support, educational assistance, Pell grants, housing assistance, the refundable portion of the Premium Tax Credit, and cost-sharing reductions.
Source: OMB; CBO; CEA calculations.

as a share of potential GDP by Presidential administrations since 1968. For purposes of these comparisons, the major anti-inequality programs are defined as Medicaid and the Children's Health Insurance Program, the Supplemental Nutrition Assistance Program, the refundable portion of the Earned Income Tax Credit and Child Tax Credit, Supplemental Security Income, Temporary Assistance for Needy Families and other family support, educational assistance, Pell grants, housing assistance, and the ACA's Marketplace financial assistance. Social Security and Medicare are excluded due to their universal nature and because, in the case of Social Security, benefit increases in the last 50 years have often been accompanied by payroll tax increases. In addition, most of the change in Medicare spending over this period reflects changes in demographics, health care costs, and other factors, not changes in policy. Unemployment insurance is also excluded as most variation reflects cyclical factors, not changes in underlying policy.

Under President Obama, the Federal investment in reducing inequality has increased by about 0.8 percent of potential GDP, more than any previous President since the Great Society. Much of this increase reflects the coverage provisions of the ACA and expanded tax credits for working families first enacted as part of the Recovery Act. Federal support for states expanding their Medicaid programs, financial assistance for families purchasing health insurance through the Marketplace, and the Recovery Act's EITC and CTC expansions comprise a more than $100 billion annual investment in reducing health and income inequality in 2016, amounting to roughly 0.5 percent of potential GDP.

Earlier expansions of the safety net are also apparent in Figure 3-16, including the expansion of the Supplemental Nutrition Assistance Program (then the Food Stamp Program) during the Nixon Administration, the phase in of Supplemental Security Income through the Ford Administration, and the creation of the Children's Health Insurance Program in the Clinton Administration.

A simple comparison of spending over time combines changes in policy with broader economic and demographic changes that affect spending for existing programs. Thus, an increase in Medicaid spending may reflect the introduction of a new and expensive treatment, an eligibility expansion, or other economic changes. For example, spending on inequality-reducing policies, largely Medicaid, rose sharply during the first Bush Administration. However, research finds that most of the increase in Medicaid spending over this period reflects changes in health care prices, the early 90s recession, and other factors, not contemporaneous policy changes (Holahan et al. 1993).

An alternative comparison of each administration's policy accomplishments would focus only on those increases or decreases attributable

to policy changes enacted during each administration, but the length of the historical period, the substantial changes in demographics and the economy, and the number and complexity of policy changes involved make such a comparison infeasible.

A comparison along these lines, however, would not change the conclusion that the Obama Administration's investments in reducing inequality have been historic, and it would be unlikely to change the relative ranking of the Obama Administration and previous administrations in an important way. As noted above, the increase during the Obama Administration largely reflects new programmatic investments in the form of the coverage provisions of the ACA and expanded tax credits for working families. Much of the increase in the investment in anti-inequality programs during the first Bush Administration, which ranks second by the simple change in spending over time, is attributable to factors other than changes in policy, as discussed above. And the increase in the investment in anti-inequality programs occurring during all other administrations since the Great Society is much more modest than the increase during the Obama Administration.

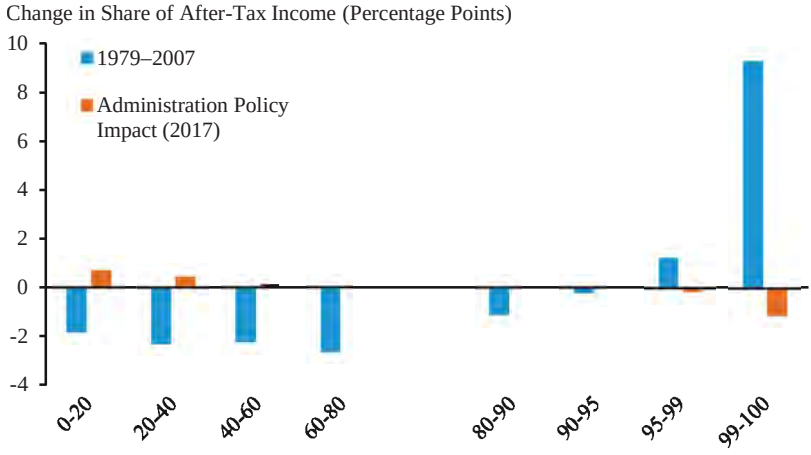
A Partial Reversal of Increasing Inequality

The historic investments in reducing inequality made during the Obama Administration have achieved a partial reversal of the increase in income inequality in recent decades. However much more work remains due to the sheer size of the increase in inequality between 1979 and 2007. According to CBO, the share of after-tax income received by the bottom quintile of households fell from 7.4 percent at the business cycle peak in 1979 to 5.6 percent at the business cycle peak in 2007, and the share accruing to the top 1 percent increased from 7.4 percent in 1979 to 16.7 percent in 2007 (CBO 2016b). While CBO's estimates of the income distribution and the Treasury estimates of the distribution of changes in tax policy and the ACA coverage provisions are not precisely comparable due to different methodological choices, they are sufficiently similar to make broad comparisons informative.[12]

[12] The comparisons presented in this chapter implement one adjustment to the Treasury analysis before comparing to CBO. Treasury percentiles are defined to contain an equal number of tax families while CBO defines percentiles to contain an equal number of people. An approximate adjustment is applied to the Treasury figures to put them on a similar equal-people basis that assumes families shifted between percentiles have the average family size of the percentile range into which they are shifted, incomes equal to the boundary between the income classes, and a tax rate equal to the simple average of the tax rate in the classes on either side of the boundary. This adjustment is applied only in determining the fraction of the increase in inequality reversed and the equivalent growth rate; the changes in shares and changes in after-tax income reported in this section are unchanged from the prior section for consistency.

Figure 3-17

Changes in the Distribution of After-Tax Income



Source: CBO (2016b); U.S. Treasury, Office of Tax Analysis; CEA calculations.

The share of after-tax income received by the bottom quintile increased by roughly 0.6 percentage point as a result of laws enacted during this Administration, equivalent to a roll back of roughly a third of the deterioration in the income share for this population between 1979 and 2007 (Figure 3-17). At the top, the policy changes signed into law have reversed roughly a 10th of the increase in the share of after-tax income accruing to the top 1 percent over the last three decades.

Another way of contextualizing the impact of the policies enacted by this Administration is to compare them with the growth rate in incomes. As noted above, the laws enacted during the Obama Administration have boosted incomes in the bottom quintile by about 18 percent. Between 1979 and 2007, immediately prior to the onset of the Great Recession, cumulative growth in after-tax incomes for the bottom quintile amounted to about 45 percent. Thus, these policies provided the equivalent of more than a decade of average income growth for these families.

Next Steps to Further Boost Incomes, Expand Opportunity, and Reduce Inequality

During his eight years in office, President Obama signed into law legislation achieving a historic reduction in inequality through changes in

tax policy and the coverage provisions of the ACA. However, as the preceding section makes clear, even with these accomplishments, much more work remains to be done. In the FY 2017 Federal Budget and elsewhere, the President has proposed an array of policies that would further boost incomes, expand opportunity, and reduce inequality.

Making Work Pay

Well-paying jobs are essential to reducing poverty and inequality, but too many Americans continue to work for a wage that is too low. Increasing the Federal minimum wage would be an important step in addressing the insufficient rate of wage growth in recent decades. For this reason, the President called for a minimum wage increase in his State of the Union address in February 2013. Since then, 18 states and the District of Columbia have passed increases in their minimum wages, but much more progress needs to be made.

Expanding the EITC—one of the largest and most effective anti-poverty programs—also helps make work pay. The FY 2017 budget proposes an expansion of the EITC for workers without dependent children, whose eligibility for only a very small tax credit limits the power of the EITC to reduce poverty for this population (Figure 3-18). Currently, workers without dependent children are the only group of workers taxed into poverty by the current tax code (Marr and Dasilva 2016). Expanding the EITC for workers without dependent children would provide 13 million low-income workers with a tax cut averaging nearly $500 for each worker, while also providing an additional incentive to work. This expansion would build on the success of the EITC expansions for families with three or more children and for married couples enacted as part of the Recovery Act.

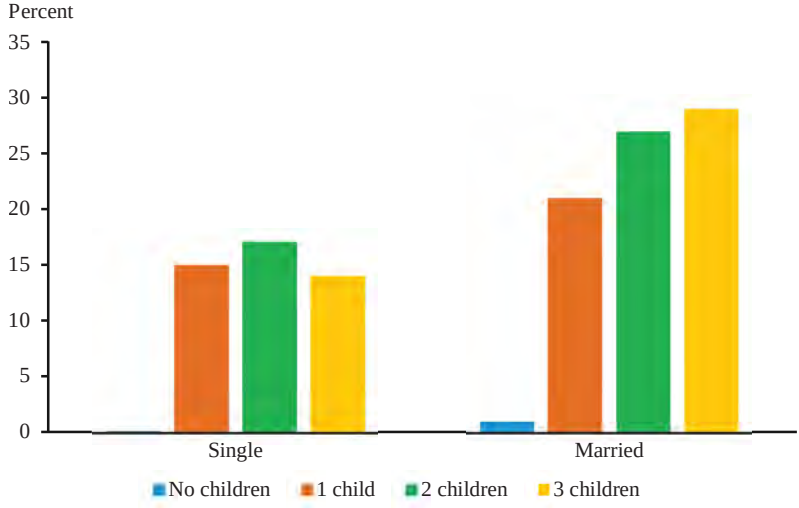
Investing in Children and Families

Not only is inequality in living standards for children an immediate concern, but recent research highlights the importance of investments in children and families for future outcomes as well (CEA 2014b; CEA 2014c; Furman and Ruffini 2015). The FY 2017 budget proposes a number of inequality-reducing investments in children and families, including in child care, early education, and ending family homelessness.

First, the President has proposed a historic investment in child care to ensure that all working families from low- and moderate-income backgrounds can access safe, affordable, and high-quality care for infants and toddlers. Research finds that quality, affordable child care can promote parental employment and earnings as well as healthy child development, in addition to helping families make ends meet (CEA 2014b).

Figure 3-18

Share of Otherwise-Poor Families Lifted Out of Poverty by the EITC Based on Family Structure, 2012



Source: Crandall-Hollick (2016).

Second, the budget proposes to further expand high-quality early education through the President's Preschool for All Initiative. This initiative would provide all four-year-old children from low- and moderate-income families with access to high-quality preschool through a new Federal-State partnership, while encouraging states to expand those programs to reach additional children from middle-class families. The President would also continue investments in high-quality learning before preschool through expansions of the Early Head Start-Child Care partnership, as well as expansions of home visitation programs for new and expecting parents. A large body of research has found that quality early education programs have high returns for both the participants and for society as a whole (CEA 2016a; CEA 2014b).

Third, the budget puts forward a package of proposals that would strengthen the Temporary Assistance for Needy Families program so it does more to help poor families get back on their feet and work toward self-sufficiency. For example, recognizing that 20 years of frozen funding has eroded the inflation-adjusted value of the block grant, the budget proposes to increase funding for TANF; the additional funds would be coupled with an increased focus on helping families prepare for and find jobs, along with new financial and programmatic accountability standards for states. The budget also includes a TANF Economic Response Fund that would provide

budgetary flexibility for additional assistance when economic conditions deteriorate, so as to increase the efficacy of TANF during downturns.

Outside of TANF, the budget proposes to invest $12 billion to ensure adequate food for low-income children during the summer months, as many low-income children receive food at little or no cost during the school year but lose this support when school is not in session.

Finally, the budget proposes an $11 billion investment to prevent and end family homelessness by 2020. Reducing homelessness directly improves inequality today, and recent research suggests that moving children and their families to better neighborhoods can generate substantial earnings gains when those children become adults (Chetty and Hendren 2015; Chetty, Hendren, and Katz 2016).

In addition, an expansion of paid leave would also help reduce inequalities in childhood investment, employment, and incomes. While current law allows many workers to take time off without pay to care for a new baby or a sick family member, millions of families cannot afford to do so. Employers are not required to offer paid leave in most states even though research shows that the availability of paid maternity leave increases the likelihood that mothers return to their jobs following the birth of a child, which leads to better outcomes for infants (CEA 2014c).

As documented throughout this report, the ACA has already resulted in an additional 20 million American adults with health insurance and, in doing so, has substantially reduced income inequality. Writing in the *Journal of the American Medical Association*, the President outlined a number of suggestions as to how the country can continue making progress in expanding health insurance coverage, improving the quality of care, and reducing health care costs (Obama 2016). These suggestions include the adoption of a Medicaid expansion by all 50 states, increasing the financial assistance available to families purchasing Marketplace coverage, and considering a public option to promote additional competition in the exchanges. In addition, as the ACA covers the full cost of State Medicaid expansions only through 2016 before gradually reducing the level of Federal support to 90 percent, the budget proposes to cover the full cost of Medicaid expansion for the first three years after a state expands, regardless of when this expansion occurs, to better support states taking action to expand Medicaid.

Reforming the Tax System

The budget also proposes responsible tax increases on the most fortunate Americans to finance inequality-reducing investments in working and middle-class families and to drive down future deficits. The budget proposes to reform the taxation of capital income by increasing the top tax

rate on capital gains and dividends to 28 percent and by closing a loophole that allows wealthy families to avoid ever paying tax on their capital gains if they hold assets until death. The budget would also reform tax expenditures to limit their value for high-income families and would close loopholes that allow some wealthy business owners to avoid paying Medicare taxes by classifying certain income as neither employment nor investment income. It would also increase the tax paid by the very largest estates. All told, the tax reforms in the budget would reduce the share of income received by the top 1 percent of families by 1.3 percentage points, rolling back an additional 13 percent of the increase in the after-tax income share of the top 1 percent between 1979 and 2007.

Conclusion

During his eight years in office, President Obama has overseen the largest increase in Federal investment to reduce inequality since the Great Society. The policy response to the Great Recession reduced the unemployment rate relative to what it otherwise would have been by 6 percentage points on average each year between 2010 and 2012 and offset roughly half of the increase in earnings inequality that would otherwise have occurred. The Affordable Care Act and changes in tax policy will boost incomes in the bottom quintile of families by 18 percent in 2017 and increase average tax rates for the highest-income 0.1 percent of families by nearly 7 percentage points. Together, these policies will increase the share of after-tax income received by the bottom 99 percent by 1.2 percentage points in 2017 with a corresponding reduction in the income share of the top 1 percent.

Despite this progress, income inequality remains much higher today than it was a few decades ago, and the President's Fiscal Year 2017 Budget proposes spending and tax reforms that would further reduce inequality. These steps include, among others, reforms to tax benefits for high-income Americans; an expansion of the Earned Income Tax Credit for workers without dependent children; and a landmark commitment to ensuring all low- and moderate-income families have access to quality, affordable child care that allows parents to work or pursue education and training. Taken together, the policies proposed in the budget would build on the progress made in reducing income inequality since 2009, helping to ensure that all Americans have the opportunity to succeed.

Appendix: Distribution of Changes in Tax Policy Since 2009 and ACA Coverage Provisions

Table A1
Distribution of Changes in Tax Policy Since 2009 and ACA Coverage Provisions[1]
(2017 Income Levels under 2017 Current Law)

Adjusted Cash Income Percentile[2]	Number of Families	Distribution of Cash Income	Average Federal Tax Rate[3]		Average Transfer and Tax Change from 2008 Policy to Current Policy[4]	Change in After-Tax Income from 2008 Policy to Current Policy[4]	Distribution of After-Tax Income	
			2008 Policy	Current Policy			2008 Policy	Current Policy
	(millions)	(%)	(%)	(%)	($)	(%)	(%)	(%)
0 to 10[5]	16.4	1.0	-0.6	-10.3	-2,080	27.1	1.1	1.4
10 to 20	17.2	2.1	0.7	-4.5	-2,289	13.9	2.4	2.7
20 to 30	17.2	2.8	4.7	1.4	-2,079	9.4	3.2	3.5
30 to 40	17.2	3.7	7.4	5.5	-1,005	3.4	4.3	4.5
40 to 50	17.2	5.0	10.0	9.2	-410	1.1	5.7	5.7
50 to 60	17.2	6.6	12.7	12.3	-243	0.5	7.3	7.3
60 to 70	17.2	8.5	14.9	14.9	-7	0.0	9.2	9.2
70 to 80	17.2	11.2	17.5	17.6	70	-0.1	11.6	11.6
80 to 90	17.2	15.5	20.7	20.8	135	-0.1	15.5	15.5
90 to 100	17.2	45.1	26.4	28.9	9,710	-3.4	41.8	40.5
Total[5]	172.1	100.0	20.2	20.9	189	-0.3	100.0	100.0
90 to 95	8.6	11.2	22.9	23.2	541	-0.4	10.8	10.8
95 to 99	6.9	15.2	24.6	25.4	2,706	-1.1	14.4	14.3
99 to 99.9	1.5	9.4	29.0	32.6	31,863	-5.0	8.4	8.0
Top .1	0.2	9.4	31.0	37.7	548,941	-9.7	8.2	7.4

Notes:

[1] Both current policy and 2008 policy include a list of individual, business and energy tax provisions that are scheduled to expire at the end of 2016 but have been regularly extended by Congress (provisions referred to as "extenders"). Current policy is current law with the extenders. 2008 policy eliminates from current law a number of key provisions enacted during the Obama administration, including: the higher tax rate on tobacco enacted in CHIPRA; the AOTC and the expansions of the child tax credit and EITC enacted in ARRA; provisions in the Affordable Care Act, including expanded Medicaid eligibility, the premium tax credit, cost-sharing reductions, the additional Medicare tax, the net investment income tax, the individual shared responsibility payment, the employer shared responsibility payment, the small business tax credit, the higher floor for itemized deductions for medical expenses, the excise tax on indoor tanning services, fees on branded prescription drug manufacturers and importers, and fees on insured and self-insured plans; and the higher top ordinary and capital gains and dividend tax rates, and the reinstatement of the personal exemption phaseout (PEP) and phaseout of itemized deductions (Pease) enacted in ATRA. 2008 policy also replaces the AMT parameters enacted in ATRA with a more generous AMT "patch." In addition, 2008 policy replaces the estate tax adopted in ATRA with the carryover basis provisions provided for under EGTRRA. Finally, 2008 policy restores the 0.2% FUTA surtax that expired in 2011.

[2] Cash Income consists of wages and salaries, net income from a business or farm, taxable and tax-exempt interest, dividends, rental income, realized capital gains, cash and near-cash transfers from the government, retirement benefits, and employer-provided health insurance (and other employer benefits). Employer contributions for payroll taxes and the federal corporate income tax are added to place cash on a pre-tax basis. Families are placed into deciles based on cash income adjusted for family size, by dividing income by the square root of family size. Percentiles begin at family size-adjusted cash income of: $10,902 for 10 to 20; $16,165 for 20 to 30; $21,713 for 30 to 40; $28,753 for 40 to 50; $37,516 for 50 to 60; $48,381 for 60 to 70; $61,100 for 70 to 80; $80,449 for 80 to 90; $117,224 for 90 to 95; $165,373 for 95 to 99; $379,371 for 99 to 99.9 and $1,734,164 for Top .1.

[3] The taxes included are individual and corporate income, payroll (Social Security, Medicare and unemployment), excises, customs duties, and estate and gift taxes. Individual income taxes are assumed to be borne by payers, payroll taxes (employer and employee shares) by labor (wages and self-employment income), excises on purchases by individuals in proportion to relative consumption of the taxed good and proportionately by labor and capital income, excises on purchases by businesses and customs duties proportionately by labor and capital income, and estate and gift taxes by decedents. The share of the corporate income tax that represents cash flow is assumed to have no burden in the long run; the share of the corporate income tax that represents a tax on supernormal returns is assumed to be borne by supernormal corporate capital income as held by shareholders; and the remainder of the corporate income tax, the normal return, is assumed to be borne equally by labor and positive normal capital income. The denominator for the tax rates is cash income under 2017 current law, including ACA Medicaid expansion.

[4] Transfers (e.g. Medicaid) are treated as negative taxes for calculating total changes. The ACA coverage provisions are expanded Medicaid eligibility, the premium tax credit, cost-sharing reductions, the individual shared responsibility payment, the employer shared responsibility payment, and the small business tax credit. Pre-ACA, after-tax income under 2008 policy is the denominator used for calculating the percentage changes in after-tax income due to the transfer and tax changes.

[5] Families with negative incomes are excluded from the lowest income decile but included in the total line.

Source: Department of the Treasury, Office of Tax Analysis.

CHAPTER 4

REFORMING THE HEALTH CARE SYSTEM

Introduction

The health care system has profound effects on Americans' lives. Access to high-quality health care contributes to good health, which helps Americans meet obligations to their families, succeed in the workplace and the classroom, and enjoy an overall high quality of life. At the same time, health care is a major expense for families and governments alike, so the health care system's ability to deliver needed care at a reasonable cost is an important determinant of Americans' overall standard of living.

When President Obama took office, he confronted a health care system that was falling short both in ensuring broad access to high-quality care and in providing care at a reasonable cost. These shortcomings were the result of large gaps in our health insurance system and a health care delivery system that too often provided inefficient, low-quality care. Through the Affordable Care Act (ACA) and other legislation enacted under this Administration, as well as accompanying administrative actions, the United States has made considerable progress in addressing these two major problems.

Turning first to the health insurance system, more than one-in-seven Americans—44 million people—lacked health insurance coverage in 2008, the year before the Obama Administration began. Many uninsured individuals were simply unable to afford coverage, while many others were locked out or priced out of the individual health insurance market because they had pre-existing health conditions. Their lack of insurance coverage kept them from being able to obtain the care they needed, and left them vulnerable to financial catastrophe if they became seriously ill. Meanwhile, even many Americans with health insurance faced similar risks due to significant gaps in their coverage.

In his first month in office, President Obama took an initial step toward ensuring that all Americans had access to affordable, high-quality

health insurance coverage by signing legislation improving the Children's Health Insurance Program (CHIP). Slightly more than a year later, the President signed the ACA, which reformed the individual health insurance market to ensure that all Americans could find affordable, high-quality coverage, provided generous financial support to states that wished to expand their Medicaid programs to cover more of their low-income residents, and allowed young adults to remain on a parent's plan until age 26. Together, these actions led to a historic expansion in the number of people with health insurance. Because of the coverage provisions of the ACA, an estimated 20 million additional adults now have health insurance. In addition, thanks in large part to the ACA and the improvements to CHIP that the President signed into law, the uninsured rate among children has fallen by almost half since the President took office, providing health insurance to more than 3 million additional children. Following these gains, the uninsured rate stands below 9 percent for the first time ever.

A growing body of evidence demonstrates that broader insurance coverage is generating major benefits for the newly insured and the health care system as a whole. Access to medical care has improved substantially; the share of people reporting that they have recently forgone medical care because they could not afford it has fallen by more than a third since the ACA became law. Expanded coverage has also reduced the burden of medical debt and generated corresponding reductions in the amount of uncompensated care. Nationwide, uncompensated care has fallen by more than a quarter as a share of hospital operating costs from 2013 to 2015, corresponding to a reduction of $10.4 billion. Early evidence also suggests that expanded coverage is driving improvements in health that are consistent with those observed in prior research; if experience under the ACA matches what was observed under Massachusetts health reform, an estimated 24,000 deaths are already being avoided annually. Looking beyond the health care sector, the ACA has also sharply reduced income inequality, and it has achieved this broad range of benefits without the adverse near-term effects on the labor market that the ACA's critics predicted, while also helping to lay the foundation for a stronger labor market over the long term.

The ACA also introduced reforms to improve financial security and access to care for those who were already insured. These reforms are generating important benefits. Because of the law, private insurance plans are generally required to limit enrollees' annual out-of-pocket spending. Due to the spread of out-of-pocket limits since 2010, an estimated 22 million additional people enrolled in employer-sponsored plans are protected against catastrophic costs in 2016. Similarly, because of the ACA's provision phasing out the Medicare Part D coverage gap, more than 11 million Medicare

beneficiaries have received cumulative savings on prescription drugs averaging more than $2,100 a person as of the middle of 2016.

Turning next to the health care delivery system, the United States devoted roughly a sixth of its gross domestic product (GDP) to health care when President Obama took office, a far larger share than peer nations. Yet health outcomes in the United States were, at best, no better. At the same time, health care spending and health outcomes varied widely across regions of the United States, with no evidence that higher-spending areas achieved better outcomes. This and other evidence showed that there were major opportunities to reform the health care delivery system in ways that could reduce the burden that health care spending placed on the U.S. economy, while improving health outcomes.

The ACA and related legislation have implemented comprehensive reforms to make the health care delivery system more efficient and improve the quality of care. The ACA achieved significant near-term savings by better aligning payments to medical providers and private insurers in Medicare with the costs of providing services. The law also set in motion a long-term effort to develop and deploy alternative payment models (APMs) that reward providers who deliver efficient, high-quality care, unlike existing fee-for-service payment systems, which base payment chiefly on the quantity of services delivered. Using the tools provided by the ACA, the Administration has made considerable progress in deploying APMs, including accountable care, bundled payment, and medical home models. As of early 2016, more than 30 percent of traditional Medicare payments were estimated to be associated with APMs, up from virtually none in 2010. The tools provided by the ACA, which were enhanced by the bipartisan physician payment reform legislation enacted in 2015, will drive further progress in the years ahead.

Changes in Medicare's payment systems appear to be catalyzing similar changes by private payers. Indeed, at the beginning of 2016, 17 million—or roughly one in ten—private insurance enrollees are estimated to have been covered under payment arrangements similar to the accountable care contracts being deployed in Medicare, up from virtually none as recently as 2011. Similarly, one large survey found that around a quarter of provider payments made by private insurers were associated with APMs in 2015. The Administration has also taken several steps to accelerate the diffusion of APMs in the private sector by directly engaging private payers in payment reform efforts in Medicare and Medicaid, facilitating information sharing across payers, and fostering the development of common standards. The ACA's excise tax on high-cost employer-sponsored coverage, scheduled to take effect in 2020, will provide an additional impetus for private sector plans to engage in payment reform efforts over the coming years.

The six years since the ACA became law have seen very encouraging trends in both health care costs and health care quality. Prices of health care goods and services have grown at a slower rate under the ACA than during any period of the same length since these data began in 1959. Recent years have also seen exceptionally slow growth in per enrollee spending in both public programs and private insurance. In parallel, there have been promising indications that quality of care is improving. The rate at which patients are harmed while seeking hospital care has fallen by 21 percent since 2010, which is estimated to have led to approximately 125,000 avoided deaths cumulatively through 2015. Medicare beneficiaries' risk of returning to the hospital soon after discharge has also declined substantially, corresponding to an estimated 565,000 avoided readmissions from April 2010 through May 2015.

A considerable body of research has aimed to understand the causes of these encouraging trends. The Great Recession does not appear to have been an important driver of the slow growth in health care costs in recent years. The recession had little effect on Medicare spending, and, while the Great Recession did dampen private sector spending growth in the years during and immediately after the downturn, its ability to explain slow growth over the last few years is limited. Similarly, neither demographic changes nor changes in cost sharing appear to explain much of the slow growth in health care costs under the ACA.

It therefore appears that recent years' favorable trends in health care costs and quality primarily reflect structural changes in the health care delivery system. While multiple factors are likely playing a role, payment reforms introduced in the ACA have made substantial, quantifiable contributions to slowing the growth of health care costs in both Medicare and private insurance. Congressional Budget Office (CBO) estimates imply that the ACA has reduced the growth rate of per beneficiary Medicare spending by 1.3 percentage points a year from 2010 through 2016. "Spillover" effects of the ACA's Medicare reforms on the prices that private insurers pay for care have likely subtracted between 0.6 and 0.9 percentage point a year from the growth rate of per enrollee private insurance spending over the same period. Moreover, there is reason to believe that the ACA has had systemic effects on trends in health care costs and quality that go beyond what can be directly quantified.

Recent positive developments in the health care delivery system are generating major benefits to families and the economy. The average premium for people who hold employer-based family coverage was nearly $3,600 lower in 2016 than if premium growth since the ACA became law had matched the preceding decade, savings families will receive directly in the

form of lower premium costs and indirectly in the form of higher wages. Far from offsetting the slowdown in premium growth, growth in out-of-pocket costs has slowed as well, and accounting for out-of-pocket costs increases these savings to $4,400 in 2016.

People who get coverage outside the workplace have also realized important savings on premiums and cost sharing. The typical Medicare beneficiary enrolled in traditional Medicare will incur around $700 less in premiums and cost sharing in 2016 than if Medicare spending trends had matched what was projected in 2009 under the policies then in place. This figure does not include reductions in cost sharing on prescription drugs due to the combination of the ACA's provision closing the Medicare Part D coverage gap and slower-than-expected growth in prescription drug spending, so it actually understates the total savings to Medicare beneficiaries.

Because State and Federal governments finance a substantial share of health care spending, slower growth in health care costs has also greatly improved the fiscal outlook. Due in large part to the ACA's provisions slowing the growth of health care costs, CBO projects that the law will reduce deficits by increasing amounts in the years ahead, rising to an average of 1 percent of GDP over the decade starting in 2026. Over the next two decades as a whole, the law is projected to reduce deficits by more than $3 trillion. In addition, since just after the ACA became law, CBO has reduced its projections of Medicare spending under current policies by an additional $125 billion in 2020 or around 0.6 percent of GDP in that year, further improving the fiscal outlook. The combination of the ACA and broader trends in the health care sector have also added 11 years to the life of the Medicare Trust Fund relative to 2009 projections.

The remainder of this chapter provides additional detail on the challenges the United States health care system faced when the President took office, the actions this Administration has taken to meet those challenges, and the progress that has been achieved to date. The first section of this chapter focuses on progress in expanding and improving health insurance coverage, and the second focuses on improvements in the health care delivery system. The final section concludes.

Expanding and Improving Health Insurance Coverage

Prior to the Obama Administration, the United States last made substantial progress in expanding health insurance coverage in the years after

Medicare and Medicaid were created in 1965, as illustrated in Figure 4-1.[1] Over the decade that followed, the United States uninsured rate fell by more than half, from 24 percent in 1963 to 11 percent in 1974, driven by the ramp-up of Medicare and Medicaid, legislative improvements that expanded those programs to people with serious disabilities, and the continued spread of employer-based health insurance. But progress stalled by the mid-1970s, and the uninsured rate rose steadily through the 1980s before stabilizing in the 1990s. In 2008, the year before President Obama took office, 44 million people—nearly 15 percent of the U.S. population—lacked health insurance.

This section of the chapter reviews the progress that has been made under this Administration in expanding and improving health insurance coverage. The section begins by describing the features of the pre-ACA health insurance landscape that caused so many Americans to go without coverage. It then discusses the actions taken under this Administration to increase health insurance coverage and presents evidence that those actions have been highly effective. It closes by surveying early evidence demonstrating that expanded coverage is improving access to care, health, and financial security for the newly insured, reducing the burden of uncompensated care for the health care system, and reducing income inequality, all without the adverse effects on labor markets that the law's critics predicted.

Barriers to Obtaining Health Insurance Coverage Before the Obama Administration

Prior to the reforms introduced during this Administration, uninsured Americans faced a pair of often-insurmountable barriers to obtaining coverage. The first was the high cost of health insurance, which made coverage unaffordable for many. The second was the dysfunction of the pre-ACA individual health insurance market, which caused many people to be locked out or priced out of the market due to pre-existing health conditions and kept many others from finding high-quality coverage. The role of each of these factors is discussed in greater detail below.

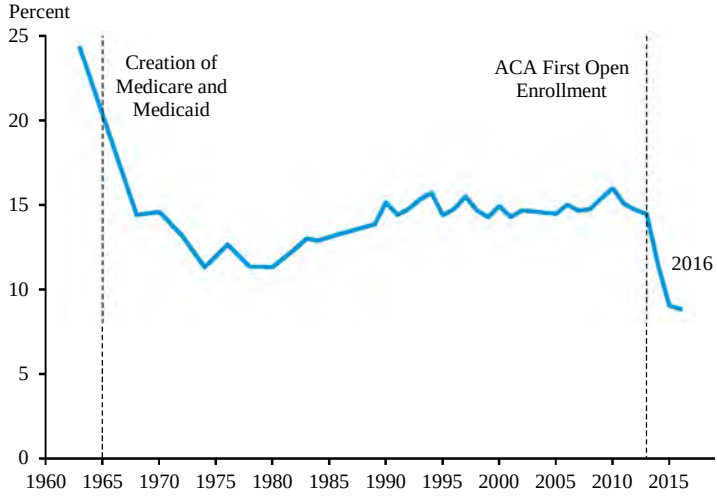
Cost Barriers to Obtaining Health Insurance Coverage

Health insurance has long been one of the most costly products that most families purchase. In 2008, the average premium for a policy offered in the employer market was $4,700 for single coverage and $12,700 for

[1] This discussion draws upon the historical health insurance series described in CEA (2014). The series is based primarily on analysis of data from the National Health Interview Survey. The methods described by Cohen et al. (2009) and Cohen (2012) were used to construct a consistent series over time. For 1980 and earlier, data from the NHIS were supplemented with information from other survey data sources and administrative data on enrollment in Medicare and Medicaid.

Figure 4-1

Uninsured Rate, 1963–2016



Note: Estimate for 2016 reflects only the first two quarters. Other estimates are full-year.
Source: National Health Interview Survey and supplemental sources described in CEA (2014).

family coverage (KFF/HRET 2016). These amounts would have been a major expense for most families, but they represented a particularly heavy burden for low- and moderate-income families already struggling to meet other basic needs. As illustrated in Figure 4-2, for a family of four with an income below 200 percent of the Federal Poverty Level, the average premium for an employer-sponsored family policy would have consumed 30 percent or more of family income. For a family below the poverty line, it would have consumed 60 percent or more of family income, an essentially insurmountable barrier.[2]

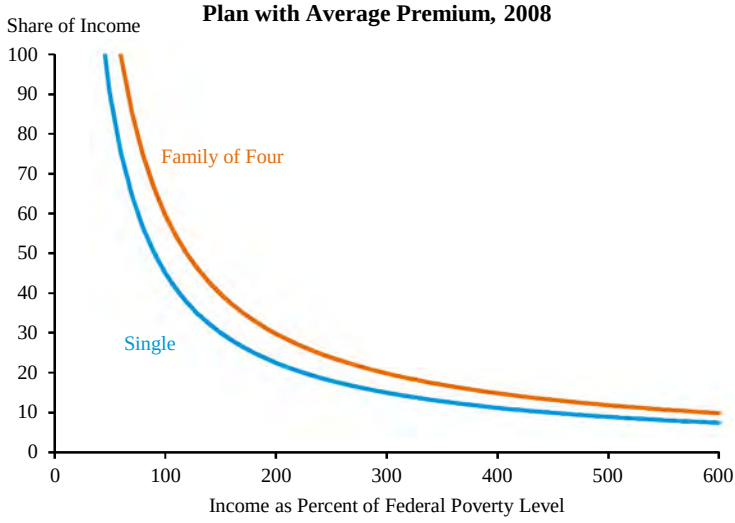
Public policy played an important role in helping families meet these affordability challenges, but the adequacy of these efforts varied widely by age. For people age 65 and older, Medicare had succeeded in achieving nearly universal coverage at all income levels, as illustrated in Panel C of Figure 4-3. But individuals under age 65 were served by a patchwork of programs and incentives that left significant gaps.

For people with access to coverage through an employer, the tax code provided a large implicit subsidy for purchasing coverage. Unlike cash compensation, the compensation employers provide in the form of health

[2] Families bore these burdens whether they purchased coverage directly or, as was typically the case, obtained it through an employer. While employers typically pay around three-quarters of the total premium, economic theory and evidence indicate that employees ultimately bear the cost of that subsidy in the form of lower wages and salaries (for example, Summers 1989; Baicker and Chandra 2006).

Figure 4-2

Share of Income Required to Purchase Employer-Sponsored Plan with Average Premium, 2008



Source: KFF/HRET Employer Health Benefits Survey; CEA calculations.

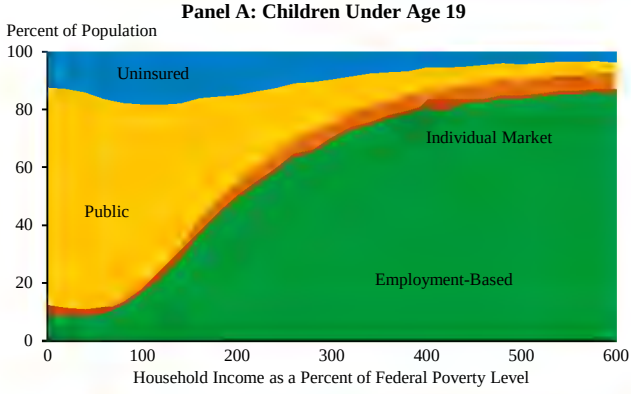
insurance is excluded from payroll and income taxation. The Federal marginal tax rate on labor income averages around 35 percent, so for each dollar of compensation a family received in the form of health insurance instead of wages, the family saved 35 cents in Federal taxes, reducing the effective cost of that dollar of health insurance coverage to just 65 cents.[3] This favorable tax treatment played a central role in making coverage affordable for many middle- and upper-middle class families.[4]

However, the tax benefit for employer-sponsored coverage was inadequate to make coverage affordable for many low- and moderate-income families. As depicted in Panels A and B of Figure 4-3, the likelihood of having private insurance from any source fell sharply with income. Bipartisan efforts during the 1980s and 1990s had made significant progress in filling these gaps for low- and moderate-income children by broadening eligibility for Medicaid and creating the Children's Health Insurance Program (CHIP).

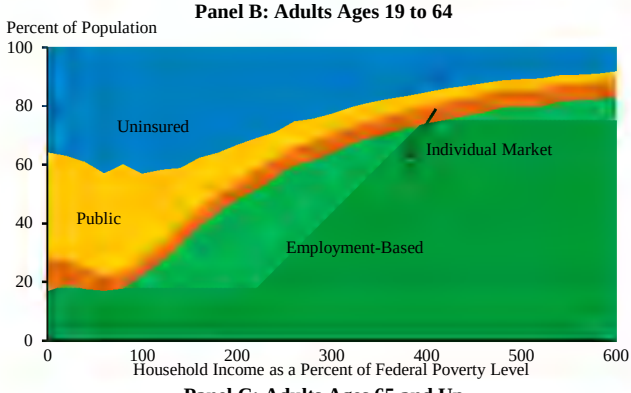
[3] The Federal marginal tax rate reported here was estimated using data from Urban-Brookings Tax Policy Center Tables T13-0253 and T14-0091. States also generally exclude employer-provided health insurance coverage from taxation, so the value of the tax subsidy is somewhat larger than reported here.

[4] While this favorable tax treatment played an important role in making coverage affordable for many families, its unlimited nature also encouraged some employers to offer inefficient and overly generous plans. The ACA introduced a tax reform that maintains this tax benefit, but mitigates the inefficiencies created by its unlimited nature; this reform is discussed in the second half of the chapter.

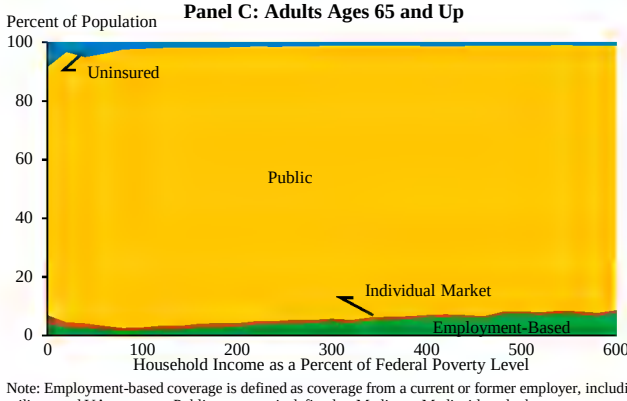
Figure 4-3
Health Insurance Coverage Status by Household Income, 2008
Panel A: Children Under Age 19



Panel B: Adults Ages 19 to 64



Panel C: Adults Ages 65 and Up



Note: Employment-based coverage is defined as coverage from a current or former employer, including military and VA coverage. Public coverage is defined as Medicare, Medicaid, and other government coverage for people with low-incomes or a disability. Individuals reporting multiple sources of coverage were assigned to a single insurance type using the following hierarchy: Medicare; military health coverage; VA health coverage; Medicaid and other government coverage for people with low-incomes or disabilities; coverage through a current or former employer; and coverage purchased directly from an insurance company. This hierarchy was applied prior to categorizing individuals into the coverage groups described above.
Source: American Community Survey; CEA calculations.

But these efforts left significant gaps even for children. They left even larger gaps for adults. Prior to the ACA, most state Medicaid programs did not cover adults without children, no matter how low their incomes, and the median state only covered working parents with incomes below 61 percent of the Federal Poverty Level (Heberlein, Brooks, and Alker 2013). As a result, low- and moderate-income non-elderly adults were by far the age and income group most likely to lack health insurance, as illustrated in Panel B of Figure 4-3.

Failures of the Individual Health Insurance Market

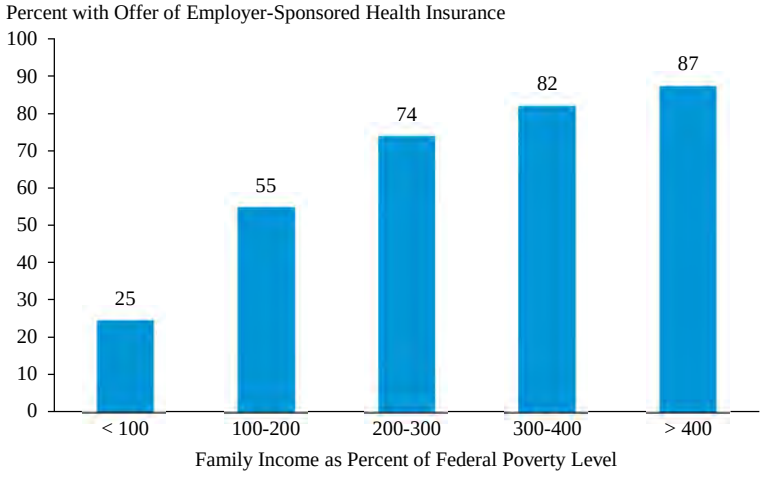
In addition to the affordability challenges described above, many uninsured Americans faced an additional barrier: the dysfunction of the individual health insurance market. While most non-elderly individuals had access to coverage through an employer, it was far from universal, even at relatively high income levels, as depicted in Figure 4-4. Retirees, many students, the self-employed, people working part-time due to family or other obligations, and the unemployed were all particularly likely to lack access to coverage through the workplace, as were individuals who happened to work at smaller firms or in industries where insurance coverage was not commonly offered. These individuals, if they did not qualify for public programs, had no choice but to turn to the individual market.

The fundamental flaw of the pre-ACA individual health insurance market was that, unlike the employer market, the individual market lacked a mechanism for forming broad pools that included both relatively healthy and relatively sick individuals. The employer market forms broad pools by taking advantage of the fact that people are matched to employers based on a wide variety of factors, many of which are only loosely related to health status. In addition, employers typically cover around three-quarters of the premium, ensuring participation by a broad cross-section of their workforces, including both healthier and sicker workers (KFF/HRET 2016). Insurers offering coverage through employers can therefore be confident that their products will attract a balanced pool of healthier and sicker enrollees. As a result, their economic incentives generally drive them to design products that maximize the well-being of the pool as a whole.

By contrast, insurers in the individual market had to contend with the possibility of "adverse selection," the tendency of people with greater health care needs—and thus higher costs to insurers—to prefer more generous insurance coverage. Insurers' concerns that they would attract an adversely selected pool drove them to engage in a wide range of practices aimed at discouraging enrollment by sicker individuals. These practices kept the individual market from performing the core functions of a health insurance

Figure 4-4

Share of Non-Elderly Individuals With an Offer of Employer-Sponsored Health Insurance in the Family, 2008



Source: National Health Interview Survey; CEA calculations.

market: sharing risk between the healthy and the sick; providing robust financial protection against unexpected health shocks; and facilitating access to needed health care.

Most destructively, insurers typically offered coverage on worse terms or not at all to people with pre-existing health conditions, a group estimated to include between 50 million and 129 million non-elderly Americans, depending on the definitions used (ASPE 2011). Before issuing a policy, insurers generally required applicants to submit information about their health history. Individuals with a pre-existing condition might then be charged a higher premium, offered a policy that excluded care related to the condition, or denied coverage entirely. While estimates of the frequency of these practices vary, they were clearly quite common. An industry survey found that 34 percent of individual applicants were charged higher-than-standard rates based on demographic characteristics or medical history (AHIP 2009). Similarly, a report by the Government Accountability Office (2011) estimated that, as of early 2010, the denial rate among individual market applications was 19 percent, and the most common reason for denial was health status. A 2009 survey found that, among adults who had individual market coverage or shopped for it in the previous three years, 36

percent were denied coverage, charged more, or had exclusions placed on their policy due to pre-existing conditions (Doty et al. 2009).

Insurers' desire to discourage enrollment by individuals with significant health care needs also led them to limit coverage in ways that undermined enrollees' access to care and financial security. For example, plans offered on the individual market frequently excluded or charged a high premium for services like maternity care, prescription drugs, and mental health care (Whitmore et al. 2011). One study estimated that, in 2011, 62 percent of individual market enrollees lacked coverage for maternity services, 34 percent lacked coverage for substance abuse services, 18 percent lacked coverage for mental health services, and 9 percent lacked prescription drug coverage (ASPE 2011). Individual market policies also frequently imposed very high cost-sharing requirements or placed annual, lifetime, or other limits on the amount they would cover. Half of individual market enrollees were estimated to be in policies that covered less than 60 percent of their total medical spending (Gabel et al. 2012). Similarly, an estimated 89 percent of those purchasing individual health coverage had a lifetime limit on their benefits (Musco and Sommers 2012).

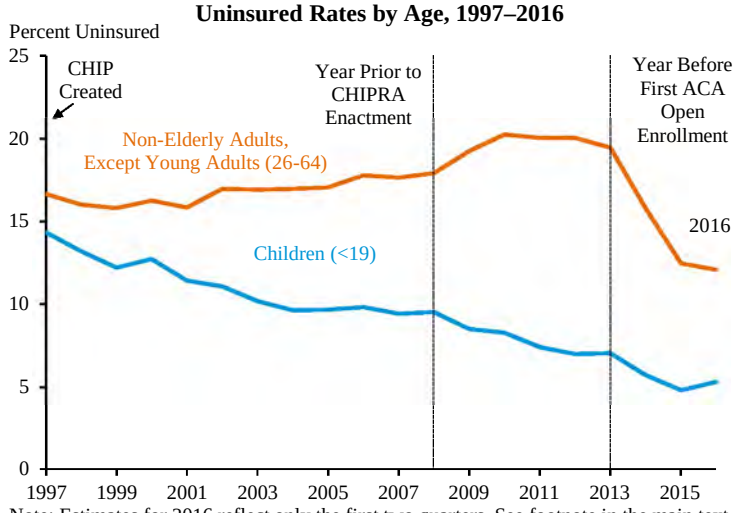
Reforms to Expand Health Insurance Coverage

The Obama Administration has implemented a series of reforms designed to overcome the barriers described above and ensure that all Americans can access high-quality, affordable health insurance coverage. This work began in February 2009 with the enactment of legislation improving CHIP and continued with the enactment and implementation of the ACA, which made broader reforms to the health insurance system in the United States. These reforms, as well as the evidence that they have dramatically expanded access to health insurance coverage, are described in detail below.

Strengthening the Children's Health Insurance Program

The Children's Health Insurance Program (CHIP) was created in 1997 and provides financial support beyond what is available through the existing Medicaid program to states wishing to cover additional low- and moderate-income children. Research has found that CHIP was highly effective in increasing insurance coverage among children and implies that CHIP was likely the main reason that the uninsured rate among children declined almost without interruption from the late 1990s through the mid-2000s, as

Figure 4-5
Uninsured Rates by Age, 1997–2016



Note: Estimates for 2016 reflect only the first two quarters. See footnote in the main text for additional detail on calculation of the 2016 estimates.
Source: National Health Interview Survey; CEA calculations.

illustrated in Figure 4-5 (Howell and Kenney 2012).[5] Progress stalled after the mid-2000s, however, and 9.5 percent of children still lacked health insurance coverage in 2008.

In February 2009, just weeks after taking office, President Obama signed the Children's Health Insurance Program Reauthorization Act (CHIPRA). CHIPRA aimed to further reduce the uninsured rate among children by making a range of improvements to CHIP. Notably, the law: provided new options for states that wanted to simplify enrollment, improve outreach, or expand eligibility; created financial incentives for states to adopt best practices; and extended the program's funding.

In the years after CHIPRA's enactment, the children's uninsured rate resumed its rapid decline. From 2008 through 2013, the uninsured rate among children declined by around a quarter, equivalent to 1.9 million children gaining coverage. The timing of these gains, combined with the fact that uninsured rates actually rose during this period for adults—likely due to the Great Recession and its aftermath—suggests that policy changes introduced by CHIPRA played an important role in reducing the uninsured

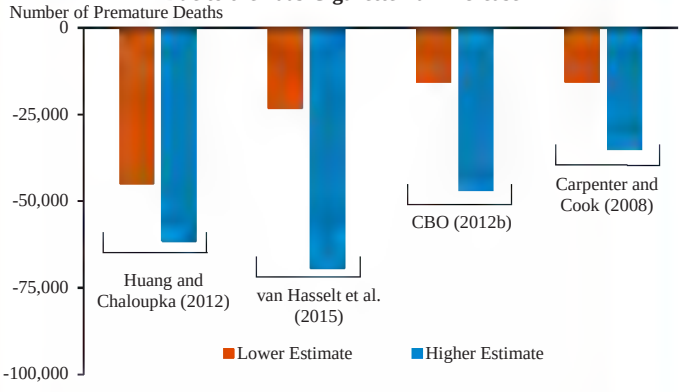
[5] Estimates of the uninsured rate for 0-18 year olds have not yet been reported for 2016, so the uninsured rate for 0-18 year olds reported in Figure 4-5 was calculated by extrapolating the 2015 estimate using the percentage point change for 0-17 year olds, which has been reported. Similarly, estimates of the uninsured rate for 26-64 year olds were extrapolated using the percentage point change for the larger group consisting of 18 year olds and 26-64 year olds.

Box 4-1: Public Health Benefits of CHIPRA

In addition to extending and improving CHIP, CHIPRA also raised the Federal cigarette tax from $0.39 per pack to approximately $1.01 per pack. By increasing cigarette prices, cigarette taxes substantially reduce smoking rates and generate large improvements in public health. Research examining the impact of Federal cigarette tax increases on the number of teen or young-adult smokers imply that the 2009 Federal cigarette tax increase will reduce youth smoking by between 3 and 15 percentage points (van Hasselt et al. 2015; Huang and Chaloupka 2012; CBO 2012b; Carpenter and Cook 2008). Assuming that roughly a third of youth smokers die prematurely due to smoking (U.S. Surgeon General 2014), these estimates suggest that the 2009 cigarette tax increase plausibly reduced the number of premature deaths due to smoking in each cohort by between 15,000 and 70,000, as illustrated in Figure 4-i.

Figure 4-i

Estimated Reduction in Smokers in a Cohort of 18 Year-Olds Due to the 2009 Cigarette Tax Increase



Note: Lower estimate for van Hasselt et al. (2015) based on results for 18-25 year-olds, higher based on results for 12-17 year-olds.
Source: Huang and Chaloupka (2012); van Hasselt et al. (2015); CBO (2012b); Carpenter and Cook (2008); CEA calculations.

rate among children.[6] Consistent with this time-series evidence, research examining specific changes in state CHIP and Medicaid programs enabled by CHIPRA has concluded these changes were effective in expanding coverage for children (Blavin, Kenney, and Huntress 2014; Goldstein et al. 2014).

[6] Figure 4-5 uses adults ages 26-64 (rather than all non-elderly adults) as a comparison group in order to exclude any effects of the Affordable Care Act's dependent coverage expansion, which took effect in late 2010. That coverage expansion is discussed in greater detail below.

Legislative actions subsequent to CHIPRA have ensured that CHIP can continue to be a source of affordable coverage for low- and moderate-income children. The ACA extended funding for CHIP through fiscal year 2015 and increased the share of CHIP costs paid by the Federal Government, making the program even more financially attractive for states. In 2015, the Medicare Access and CHIP Reauthorization Act (MACRA) extended funding for CHIP, as well as many of the policy improvements introduced in CHIPRA and the ACA, through fiscal year 2017.

Expanding Access to Coverage for Young Adults

The ACA's comprehensive reforms to ensure access to health insurance coverage are described below, but the law also included a targeted provision to reduce the particularly high uninsured rate among young adults, which is illustrated in Figure 4-6. Young adults' uninsured rates exceeded those for older adults for a number of reasons. Because many young adults are still in school, and those who have already joined the labor force are less likely to be offered health insurance through work, they were much less likely to have employer coverage. They also were much less likely to have Medicaid coverage than children, reflecting the stricter eligibility rules that apply to adults.

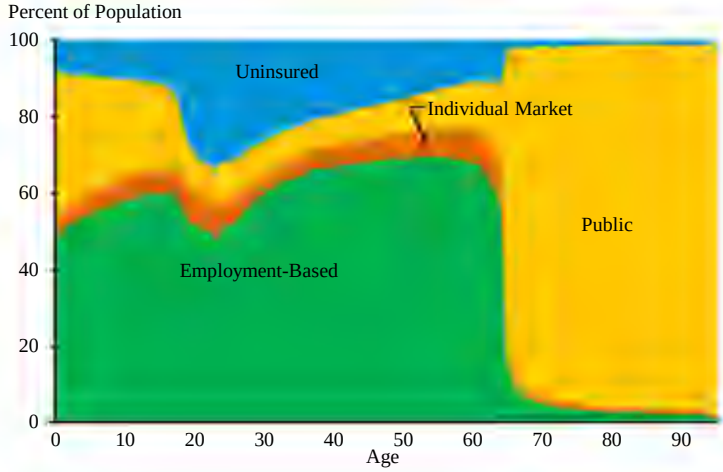
To address the unique challenges faced by young adults, the ACA required private insurance plans to allow young adults to remain on a parent's policy until age 26. Immediately after this policy took effect during September 2010, the uninsured rate among young adults ages 19-25 started declining rapidly, as shown in Figure 4-7.[7] The uninsured rate fell from 34.1 percent in the four quarters ended in September 2010 to 26.7 percent in the four quarters of 2013, just before the ACA's broader coverage provisions took effect. The timing of this decline, combined with the fact that the uninsured rate for older non-elderly adults was essentially flat during this period is strong evidence that the decline was caused by the ACA provision.

On the basis of these data, the U.S. Department of Health and Human Services (HHS) estimates that 2.3 million young adults gained coverage because of this provision (ASPE 2015). The broader academic literature has also concluded that the provision generated substantial gains in young adult coverage, though estimates vary across studies, with some reporting estimates higher than ASPE's and others reporting lower estimates (Cantor et al. 2012; Antwi, Moriya, and Simon 2013; Porterfield and Huang 2016).

[7] The estimates of the uninsured rate for 26-64 year olds reported in Figure 4-7 were derived using the same approach described in footnote 5.

Figure 4-6

Health Insurance Coverage Status by Age, 2008



Note: Individuals were categorized into coverage groupings using the procedure described in the note to Figure 4-3.
Source: American Community Survey; CEA calculations.

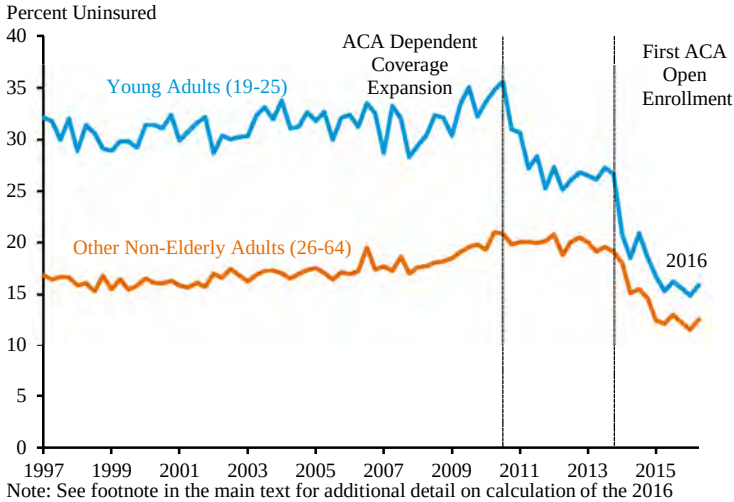
Comprehensive Coverage Expansions

Starting in 2014, the ACA implemented broad-based coverage expansions designed to ensure that all Americans could access affordable, high-quality health insurance coverage. These expansions consisted of two main pieces: an expansion of eligibility for Medicaid coverage and comprehensive reforms to the individual health insurance market. Each of these reforms is described in greater detail below.

To provide affordable coverage options for the lowest-income Americans, the ACA provided states with generous financial assistance to expand Medicaid coverage to all non-elderly people with incomes below 138 percent of the Federal Poverty Level (FPL), around $16,200 for an individual and $33,500 for a family of four in 2016.[8] As specified in the ACA, the Federal Government has funded 100 percent of the cost for newly eligible individuals to date, and this share gradually phases down to 90 percent in 2020 and subsequent years. This generous matching rate makes expanding Medicaid a very attractive proposition for states, particularly since research has generally concluded that states that expand Medicaid realize significant

[8] The base income eligibility threshold is 133 percent of the FPL. However, Medicaid program rules provide for an additional "income disregard" of 5 percent of income, which brings the effective eligibility threshold to 138 percent of the FPL. The dollar amounts reported in the text reflect the 2015 version of the FPL because those are the amounts used to determine eligibility for coverage during 2016.

Figure 4-7
Uninsured Rates by Age, 1997–2016



Note: See footnote in the main text for additional detail on calculation of the 2016 estimates.
Source: National Health Interview Survey; CEA calculations.

offsetting savings elsewhere in their budgets, including in existing portions of their Medicaid programs, in programs that defray the costs of uncompensated care, and in programs that provide mental health services (Buettgens, Dorn, and Carroll 2011; Dorn, McGrath, and Holahan 2014). To date, 31 states and the District of Columbia have expanded Medicaid under the ACA.

For Americans with incomes too high to qualify for Medicaid, the ACA implemented an interlocking set of reforms in the individual health insurance market. The first component of these reforms was a new set of consumer protections that guaranteed access to high-quality health insurance coverage. Most importantly, to ensure that both healthy and sick individuals could access coverage, the law required insurers to offer coverage on common terms to all enrollees, regardless of whether they had pre-existing health conditions, with premiums allowed to vary based solely on age, geography, and tobacco use. In order to ensure that the coverage available on the reformed market offered real access to medical care and financial protection, the law required all plans to cover a set of essential health benefits and provide a basic level of protection against out-of-pocket costs. As a complement to these reforms, the law created a risk adjustment program that compensates insurers that attract a sicker-than-average group of enrollees, thereby ensuring that insurers have incentives to design plans that meet the needs of all types of consumers, both healthy and sick. Finally, to foster competition, the law created the Health Insurance Marketplaces

(Marketplaces), web-based markets that help consumers comparison shop to find a plan that matches their particular preferences and needs.

The second component of these reforms was designed to ensure that coverage on the reformed individual market was affordable. To overcome the affordability challenges that kept many low- and middle-income Americans from obtaining coverage before the ACA, the law created a premium tax credit for people with incomes between 100 percent and 400 percent of the FPL who purchase coverage through the Marketplaces.[9] The premium tax credit ensures that all consumers have affordable coverage options by limiting the amount enrollees must contribute to a "benchmark" plan to a specified percentage of their income; if the premium for the benchmark plan exceeds that amount, the tax credit makes up the difference. For individuals with incomes below 250 percent of the FPL, the law also provides cost-sharing reductions that reduce enrollees' out-of-pocket costs. As an additional measure to keep premiums affordable, the law implemented an individual responsibility provision that requires people who can afford coverage to make a payment if they elect to go without it. This requirement encourages healthy individuals to enroll in coverage, which protects the individual market's ability to pool risk between the healthy and the sick, thereby helping keep premiums affordable; indeed, the Congressional Budget Office has estimated that individual market premiums would be around 20 percent higher in the absence of this provision (CBO 2015b). The provision also discourages individuals from shifting their health care costs to others in the form of uncompensated care.

The U.S. uninsured rate has declined dramatically since these reforms took effect at the beginning of 2014, falling from 14.5 percent in 2013 to 8.9 percent in the first half of 2016, as illustrated in Figure 4-1. The decline in the uninsured rate seen over this period is, by far, the largest decline since the years following the creation of Medicare and Medicaid in 1965. Consistent with the nearly unprecedented magnitude of this decline, research aimed at isolating the effect of the ACA from other trends in the health care system or the economy has concluded that the overwhelming majority of these gains are directly attributable to the ACA's reforms (Courtemanche et al. 2016; Blumberg, Garrett, and Holahan 2016). Using a methodology that controls for unrelated economic and demographic changes, HHS estimates that 17.7 million non-elderly adults have gained coverage since the end of 2013 because of the ACA's comprehensive reforms (Uberoi, Finegold, and Gee 2016). Combining these gains since 2013 with the gains for young adults

[9] In states that have expanded Medicaid, people with incomes between 100 and 138 percent of the FPL receive coverage through Medicaid. In non-expansion states, these people are generally eligible for subsidized coverage through the Marketplace.

because of the ACA's provision allowing young adults to remain on a parent's plan until age 26, an estimated 20 million adults have gained coverage because of the ACA.

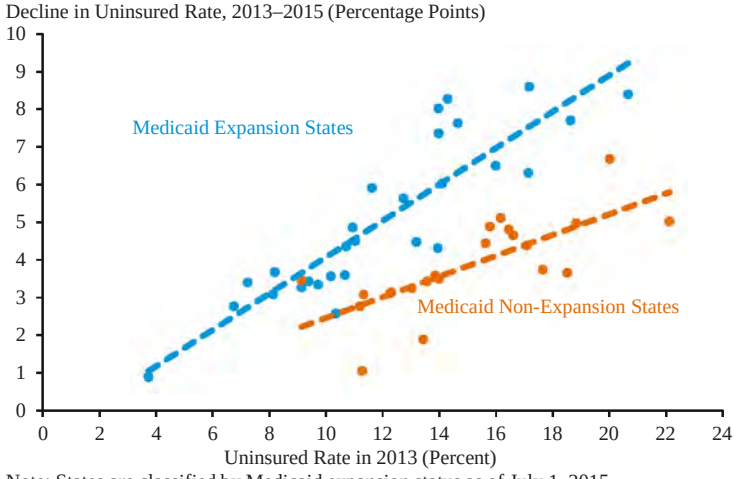
The ACA's main coverage provisions have also driven further coverage gains among children, which are not captured in the data from the Gallup-Healthways Well-Being Index used by Uberoi, Finegold, and Gee (2016). As illustrated in Figure 4-5 above, the uninsured rate among children has seen another sharp decline as the ACA's major coverage expansions have taken effect, equivalent to an additional 1.2 million children gaining coverage.[10] Combining the gains that began in 2014 with the gains in children's coverage from 2008 through 2013 that were discussed above, an additional 3.1 million children have coverage in 2016 because of the decline in the uninsured rate among children since 2008.

Both the law's Medicaid expansion and its reforms to the individual health insurance market are contributing to this major expansion in health insurance coverage. To illustrate this, Figure 4-8 reports the decline in the uninsured rate from 2013 to 2015 by state in relation to that state's uninsured rate in 2013. While every state in the country has seen a decline in its uninsured rate since 2013, states that have taken advantage of the law's Medicaid expansion have seen markedly larger declines, with the largest declines in those states that both took up Medicaid and had high uninsured rates before the ACA's reforms took effect. However, even those states that have not taken up Medicaid expansion have made considerable progress in reducing the uninsured rate, indicating that the law's reforms to the individual health insurance market are also working to expand insurance coverage.

The pattern of coverage gains by income provides additional evidence that the law's reforms to the individual health insurance market are contributing to coverage gains, alongside Medicaid expansion. In particular, Figure 4-9 shows that the uninsured rate has declined markedly among individuals with incomes above the Medicaid eligibility threshold of 138 percent of the FPL, and these declines are similar in proportional terms to those for individuals with incomes below 138 percent of the FPL. Notably, declines have been seen both for people with incomes between 138 percent and 400 percent of the FPL, who are generally eligible for financial assistance

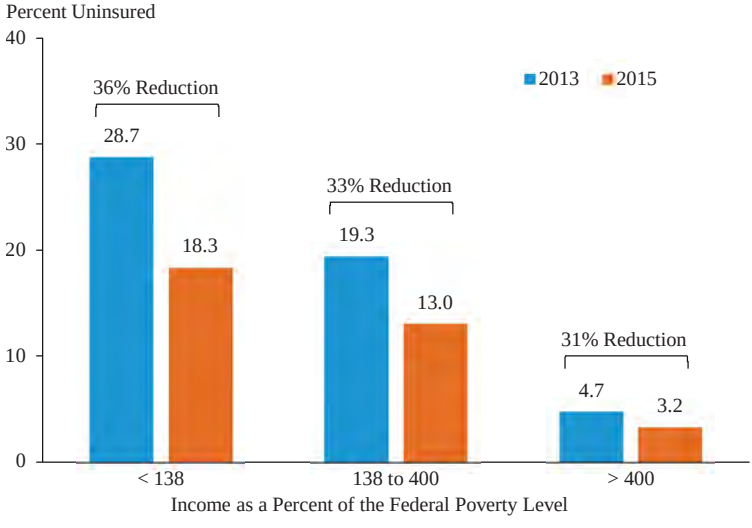
[10] The 1.2 million figure cited here reflects coverage gains for individuals ages 0 to 17 from 2013 through the first half of 2016, as reported in the National Health Interview Survey. The data reported in Figure 4-5 include individuals ages 0 to 18 because 18-year-olds are considered children for Medicaid and CHIP eligibility purposes, making this the most appropriate age range to examine when discussing CHIPRA. By contrast, 18-year-olds are already included in the estimate reported by Uberoi, Finegold, and Gee (2016) regarding the effects of the ACA, so including 18-year-olds in this estimate would double-count post-2013 gains for 18-year-olds.

Figure 4-8
Decline in Uninsured Rate from 2013 to 2015 vs. Level of Uninsured Rate in 2013, by State



Note: States are classified by Medicaid expansion status as of July 1, 2015.
Source: American Community Survey; CEA calculations.

Figure 4-9
Nonelderly Uninsured Rate by Income, 2013 and 2015



Source: National Health Interview Survey; CEA calculations.

Box 4-2: Dynamics in the Individual Health Insurance Market

After two years of moderate premium growth for plans offered through the Health Insurance Marketplace, premiums are increasing at a faster pace for 2017, though experience will vary widely across states (ASPE 2016b). This box discusses the factors that are driving changes in Marketplace premiums in 2017, as well as their implications for the future of the individual market. Contrary to some recent claims, a range of evidence demonstrates that this year's premium changes are part of the ordinary process of adjustment in a new market, not a harbinger of future market instability.

Factors Driving 2017 Premium Changes

Insurers faced significant challenges in setting premiums in the years immediately following implementation of the ACA's reforms to the individual market. The ACA brought many new people into the individual market, including people with pre-existing health conditions who had previously been locked out of the market and people who could newly afford coverage because of the law's financial assistance. These major changes made predicting average medical costs in the reformed market difficult. This in turn created a significant risk that insurers would underestimate or overestimate the level of premiums required to finance those claims. In addition, some insurers may have intentionally underpriced when setting premiums in an attempt to attract the many new consumers who have entered the individual health insurance market during its first few years, accepting losses in the short run in exchange for higher market shares in the long run.

It is now clear that, on average, insurers underpriced in the early years of the new market. Insurers are estimated to have incurred losses of around 5 percent of premium revenue on ACA-compliant health insurance policies in 2014, the market's first year (McKinsey 2016). To achieve sustainable pricing in subsequent years, insurers needed to make up for these initial losses while also accommodating two additional factors. The first was the ordinary upward trend in medical costs, which averaged around 4 percent a year, though, as discussed below, this has likely been partially offset by ongoing improvements in the ACA-compliant risk pool relative to 2014. The second was the scheduled phasedown of the ACA's transitional reinsurance program, which defrayed a portion of insurers' claims spending on high-cost enrollees in 2014 through 2016. The decline in payments from this program added around 7 percent to premium growth in each of 2015, 2016, and 2017. The net effect of these various factors is that returning premiums to a sustainable level by 2017 likely required premium increases averaging a bit more than 10 percent per year in 2015, 2016, and 2017. But the premium for the second-lowest

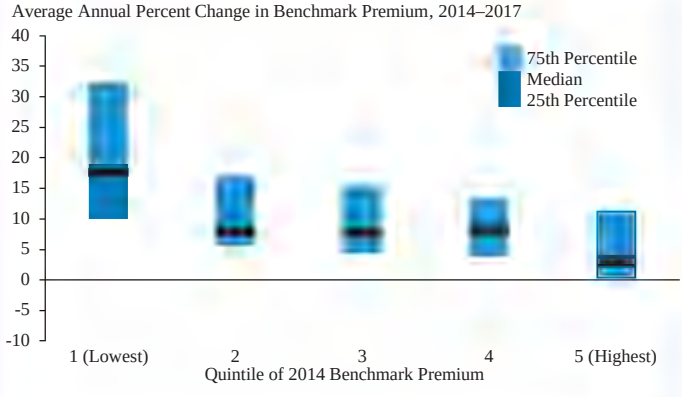
silver (or "benchmark") plan increased by just 2 percent in 2015 and 7 percent in 2016 in the states using the HealthCare.gov enrollment platform, necessitating much more significant adjustments in 2017.

The pattern of premium changes across areas strongly supports the view that Marketplace premium changes are being driven in substantial part by insurers' efforts to bring premiums in line with costs after having initially underpriced. Figure 4-ii illustrates how the annual percentage increase in the premium for the benchmark plan from 2014 to 2017 varies based on the level of the benchmark premium in 2014. In the four-fifths of the country with higher benchmark premiums in 2014, the median person has seen average annual increases in the benchmark of below 10 percent, less than what would have been needed to cover normal increases in medical costs and the gradual phasedown of the ACA's transitional reinsurance program. By contrast, the fifth of the country that had the lowest premiums in 2014 has seen much larger increases since then. This pattern is what would have been expected if insurers in some areas significantly underpriced in 2014 and have been working to bring premiums back in line with costs since then, while insurers in other areas priced appropriately or overpriced.

It is also important to note that, even after the increases seen for 2017, Marketplace premiums remain roughly in line with CBO's initial projections (ASPE 2016b). The average benchmark premium for 2014 was about 15 percent *below* what the Congressional Budget Office had

Figure 4-ii

Average Annual Change in Benchmark Premium, by Quintile of 2014 Benchmark Premium, 2014–2017



Note: Premiums analyzed at the county level. Quintiles defined to have equal non-elderly populations. Data limited to states using HealthCare.gov in all years.
Source: Department of Health and Human Services; American Community Survey; CEA calculations.

projected during the debate over the ACA (CBO 2014), and analysts have estimated that premiums remained between 12 percent and 20 percent below CBO's initial projections in 2016, depending on the methodology used (Levitt, Cox, and Claxton 2016; Adler and Ginsburg 2016). The 2017 increases are therefore taking Marketplace premiums back to their originally expected trajectory, consistent with the view that these increases are a one-time correction, not an indication of underlying problems in the individual market.

Implications of 2017 Premium Changes for the Future of the Individual Market

By bringing insurers' premium revenue back in line with their claims costs, the premium increases being implemented for 2017 help create the conditions for a more stable market in the years ahead. However, some analysts and commentators have taken a more negative view. They argue that premium increases will drive large reductions in individual market enrollment, particularly among healthy individuals. This decline in enrollment among the healthy, they argue, will increase average medical costs in the individual market, triggering further premium increases and enrollment reductions. Some observers have even speculated this feedback loop between higher premiums and falling enrollment will become so intense that it will cause a "death spiral," a scenario in which enrollment in the individual market ultimately falls nearly to zero. Some of these observers have further suggested that the premium increases seen for 2017 are evidence that this type of vicious cycle has already begun.

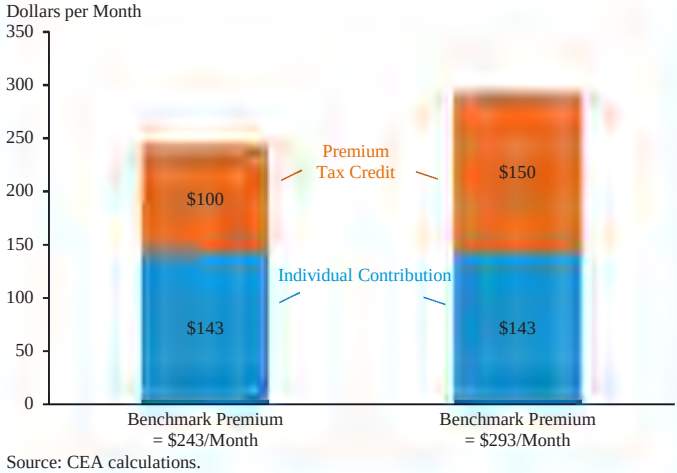
In fact, there is no evidence that a death spiral is underway. The defining feature of a death spiral is declining enrollment, particularly among the healthy, resulting in a deteriorating risk pool. In fact, the exact opposite is occurring. Marketplace enrollment has grown every year since the Marketplace opened in 2014, and enrollment in the individual market as a whole was estimated to be around 18 million in early 2016, up from around 11 million in 2013 (ASPE 2016a). Furthermore, it appears that the average individual market enrollee is actually getting *healthier* over time. Using data on medical spending in the individual market submitted by insurers as part of the ACA's transitional reinsurance program, the Centers for Medicare and Medicaid Services (CMS) estimate that nominal per member per month medical spending fell slightly from 2014 to 2015, and an outside analysis of a private claims database supports a similar conclusion (CMS 2016a; Avalere Health 2016). Due to the underlying upward trend in medical costs, per member per month spending would have been expected to increase if the average

health status of individual market enrollees had held steady, so these data suggest that the average health status improved from 2014 to 2015.

Looking to the future, the design of the ACA's premium tax credit ensures that a death spiral can never occur in this market. The tax credit is designed so that an individual's contribution to the benchmark plan is capped at a specified percentage of income; the tax credit pays the remainder of the premium. Figure 4-iii provides a concrete example of how this works for a single person making $25,000 per year. This individual's required contribution to the benchmark plan is $143 a month in 2017. If the premium for the benchmark plan in the individual's area were $243 a month, the tax credit would then pay the remaining $100 per month, as illustrated in the left column of the Figure. If the premium for the benchmark plan were $50 a month higher, as in the right column of the Figure, the individual's contribution would remain at $143 a month, and the tax credit would increase to $150 a month. Thus, the individual is fully protected from the higher benchmark premium. Importantly, even individuals who qualify for only modest premium tax credits benefit from this protection since their required contribution, though larger, also does not depend upon the actual level of premiums.

Around 85 percent of individuals who get coverage through the Marketplace receive the premium tax credit, and about two-thirds of people in the individual market as a whole are eligible for tax credits (ASPE 2016a). The premium tax credit therefore ensures that the over-

Figure 4-iii
Premium for the Benchmark Plan for an Individual Making $25,000 Per Year, 2017



Source: CEA calculations.

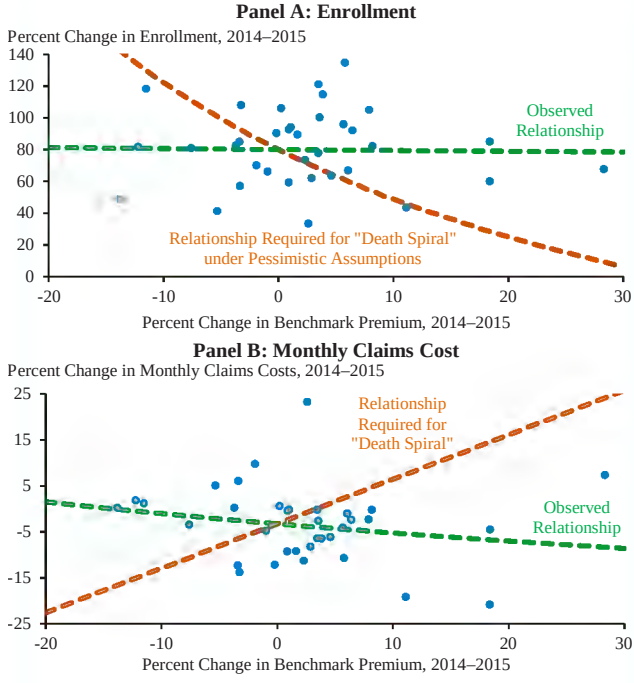
whelming majority of Marketplace enrollees and the sizeable majority of individuals in the individual market overall are protected against premium increases and have no reason to leave the market when premiums rise. That, in turn, stabilizes the overall individual market risk pool and helps keep premiums affordable for people who are not eligible for tax credits. The result is that any negative effects of higher premiums on enrollment and the risk pool will be greatly attenuated, arresting the feedback loop of falling enrollment and higher premiums that would cause the market to unravel.

Consumers' actual behavior under the ACA to date provides no support for the view that premium increases will trigger significant market unraveling. Panel A of Figure 4-iv examines the relationship between changes in the average benchmark premium in each state from 2014 to 2015 and the corresponding changes in enrollment in the state's ACA-compliant individual market (including both on- and off-Marketplace enrollment). For there to be any risk of a death spiral, premium changes would need to have very large negative effects on enrollment, akin to the scenario illustrated by the orange dashed line. In fact, there was essentially no difference in enrollment growth across areas experiencing larger and smaller increases in the benchmark premium from to 2014 to 2015, as illustrated by the green dashed line.

Similarly, Panel B of Figure 4-iv examines the relationship between the change in the benchmark premium in each state from 2014 to 2015 and the change in average claims costs in the ACA-compliant market in that state. For there to be any risk of a death spiral, increases in premiums would have to result in substantial increases in claims costs (as a result of healthy individuals leaving the market), akin to the relationship between premium and cost changes illustrated by the orange dashed line. In fact, consistent with the evidence from Panel A that premium increases did not meaningfully affect enrollment, there is no evidence that premium increases adversely affected the risk pool. If anything, larger premium increases appeared to be associated with slightly *slower* year-over-year growth in monthly claims costs, as illustrated by the green dashed line.

Complete data on how enrollment and claims in the ACA-compliant individual market changed from 2015 to 2016 are not yet available. However, the county-level relationship between changes in benchmark premiums and changes in the number of people selecting Marketplace plans, depicted in Figure 4-v, reinforces the conclusion that the individual market is at no risk of unraveling. As above, for the individual market to be at risk of a death spiral, counties experiencing larger increases in the benchmark premium would have to see much smaller growth in plan selections, akin to the scenario illustrated by the

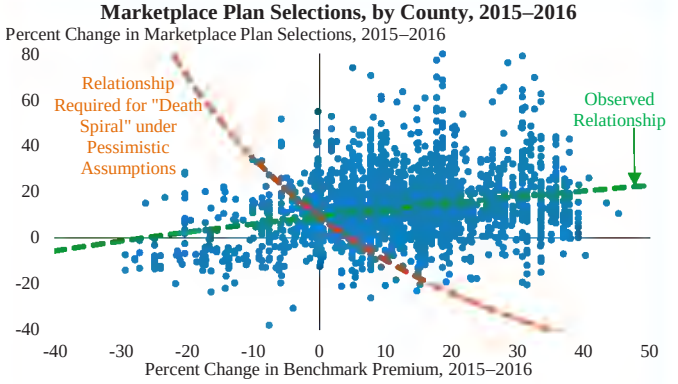
Figure 4-iv
Change in Benchmark Premium vs. Change in Individual Market Enrollment and Claims Costs, by State, 2014–2015



Note: Sample is limited to States that used HealthCare.gov in all years due to availability of data on benchmark premiums. Changes in benchmark premiums are calculated on a population-weighted basis. Enrollment and monthly claims spending for the ACA-compliant market are measured using data submitted to CMS for the risk adjustment and reinsurance programs. Enrollment is measured as the number of member months of enrollment during the year. Monthly claims spending is measured as aggregate claims in the State's individual market divided by the aggregate number of member months of enrollment. Observed relationships use a simple log-log fit. The "Relationship Required for 'Death Spiral'" lines use the same intercept coefficient estimated for the "Observed Relationship" lines, but different slope coefficients. In Panel A, the "Relationship Required for 'Death Spiral'" line reflects a slope coefficient of -2; for a demand elasticity of -2 to allow a death spiral, individuals who leave the market in response to higher premiums would need to have claims costs half as large as individuals who remain enrolled, a relatively extreme scenario. In Panel B, the "Relationship Required for 'Death Spiral'" line depicts a slope coefficient of 1, which is sufficient to ensure that additional revenue from higher premiums is fully offset by higher claims costs.
Source: Centers for Medicare and Medicaid Services; Department of Health and Human Services; Census Bureau; CEA calculations.

orange dashed line. To the contrary, counties that saw larger increases in the benchmark premium from 2015 to 2016 actually seem to have seen slightly *larger* increases in Marketplace plan selections over that period. Notably, while average premium increases were lower in 2016 than 2017, some counties saw rate increases of 30 percent or more in 2016, and even these counties show no clear evidence of slower enrollment growth.

Figure 4-v
Change in Benchmark Premium vs. Change in Marketplace Plan Selections, by County, 2015–2016



Note: Observed relationship reflects a simple log-log fit. The "Relationship Required for 'Death Spiral'" lines uses the same intercept coefficient estimated for the "Observed Relationship" line, but a slope coefficient of -2. For a demand elasticity of -2 to allow a death spiral, individuals who leave the market in response to higher premiums would need to have claims costs half as large as individuals who remain enrolled, a relatively extreme assumption.
Source: Centers for Medicare and Medicaid Services; Department of Health and Human Services; Census Bureau; CEA calculations.

to purchase Marketplace coverage, and people above 400 percent of the FPL, who are not eligible for financial assistance. The substantial coverage gains among the higher-income group, individuals who are not eligible for financial assistance through the Marketplaces, indicates that the combination of the ACA's consumer protections guaranteeing access to coverage and its individual responsibility requirement are also proving effective in increasing health insurance coverage.

Improvements in Existing Health Insurance Coverage

In addition to implementing reforms that have greatly increased the number of people with health insurance coverage, the ACA has also implemented reforms that are improving insurance coverage for people who were already insured, including people covered through an employer or through Medicare. Because of these reforms, tens of millions more Americans are now better protected against catastrophic out-of-pocket costs in the event of serious illness and have greater access to needed medical care.

One such set of reforms is ensuring that all private insurance plans provide real protection against catastrophic costs. When the ACA became law in 2010, 18 percent of workers enrolled in single coverage through an employer were exposed to potentially unlimited out-of-pocket spending, as

illustrated in Figure 4-10 (KFF/HRET 2016). To address this problem, the ACA required that all non-grandfathered private insurance plans place a limit on enrollees' annual out-of-pocket spending starting in 2014.[11] The share of enrollees lacking an out-of-pocket limit fell modestly in the years immediately after the ACA became law (likely in part because some firms elected to make changes in advance of 2014) then fell sharply as the ACA requirement took effect. In 2016, just 2 percent of enrollees in single coverage lacked an out-of-pocket limit. If the share of enrollees in employer coverage who lack an out-of-pocket limit had remained at its 2010 level, at least 22 million additional people enrolled in employer coverage would lack this protection today.[12] The ACA also prohibits private insurance plans from imposing lifetime limits on the amount of care they will cover and, with the exception of a dwindling number of grandfathered policies in the individual market, imposing annual limits on benefits.

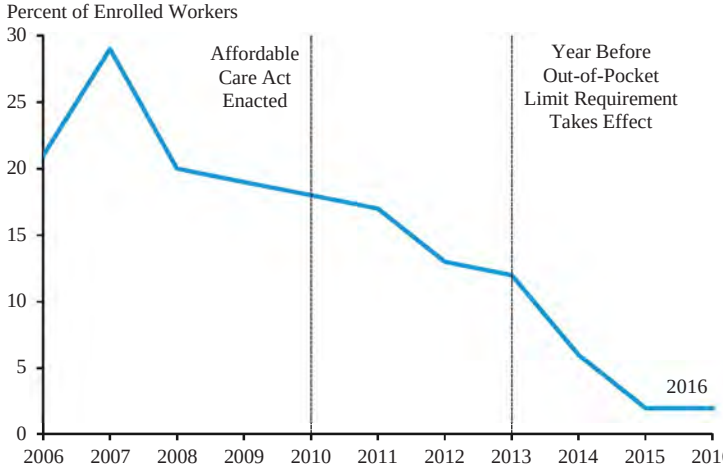
The ACA also strengthened protections against high out-of-pocket costs in Medicare Part D, the portion of Medicare that provides prescription drug coverage. The original Medicare Part D benefit design included a gap in coverage, commonly referred to as the "donut hole." Because of the coverage gap, Medicare beneficiaries spending more than about $2,700 on prescriptions in 2009 were required to pay the next roughly $3,500 entirely out of pocket. The ACA is phasing out the coverage gap and will close it entirely by 2020. In 2015, the most recent full year for which data are available, 5.2 million Medicare beneficiaries with high drug costs saved $5.4 billion, an average of more than $1,000 per affected beneficiary (CMS 2016d). Cumulatively through July 2016, more than 11 million beneficiaries have saved $23.5 billion, an average savings of more than $2,100 per beneficiary (CMS 2016b).

Another set of ACA reforms sought to encourage greater use of preventive services. Research prior to the ACA had documented that many preventive services—such as blood pressure screenings, mammograms, and colonoscopies—were seriously underutilized, despite strong evidence of their effectiveness (McGlynn et al. 2003; Commonwealth Fund 2008).

[11] The ACA specified that certain insurance policies in place prior to the law's enactment would be "grandfathered" and thus not subject to some of the insurance reforms implemented under the law. The number of grandfathered policies has fallen steadily over time (KFF/HRET 2016).

[12] Trends for those enrolled in family coverage are similar to those reported for single coverage in Figure 4-10. In 2010, 17 percent of family coverage enrollees lacked an out-of-pocket limit, and the decline in this percentage almost exactly paralleled the decline for single coverage through 2014; estimates for family coverage have not been reported for years after 2014. To be conservative, the 22 million estimate presented in the text assumes that the overall share of enrollees lacking an out-of-pocket limit declined from 17 percent in 2010 to 2 percent in 2016. It assumes that 150 million people were enrolled in employer coverage in 2016, consistent with KFF/HRET (2016).

Figure 4-10
Share of Workers in Single Coverage Without an Out-of-Pocket Limit, 2006–2016



Source: Kaiser Family Foundation/Health Research and Educational Trust Employer Health Benefits Survey.

To encourage greater utilization, the ACA required that private insurance plans and Medicare cover preventive services that are recommended by the United States Preventive Services Task Force without cost sharing. While the research literature examining the effects of this provision is still limited, one recent study examined plans that implemented this provision at different times and concluded that eliminating cost sharing had the expected effect of increasing use of the service studied, in this case contraception (Carlin, Fertig, and Dowd 2016).

Economic Consequences of Broader Health Insurance Coverage

The historic expansion in insurance coverage described in the last section is still very new, so research to evaluate its consequences is just beginning. Early evidence shows, however, that recent coverage gains are already generating major benefits similar to those documented in prior research on the effects of health insurance coverage. This evidence demonstrates that the law has already succeeded in improving access to care, health, and financial security for the newly insured and in reducing the burden of uncompensated care for the health care system as a whole. Looking beyond the health care sector, the law is helping to reduce income inequality, and it is achieving this broad range of benefits without the negative near-term effects on the labor market that many of the law's critics had predicted, while laying the foundation for a stronger labor market over the long term. This subsection of the

chapter reviews this evidence base, with a particular focus on the effects of the major coverage provisions of the Affordable Care Act that took effect at the start of 2014.

Improved Access to Care

One objective of expanding insurance coverage is to ensure that individuals can access needed health care.[13] Research examining prior coverage expansions leaves little doubt that expanding insurance coverage is an effective tool for increasing access to care. For example, the Oregon Health Insurance Experiment, a randomized-controlled trial of expanding Medicaid coverage to low-income adults, found that Medicaid increased receipt of health care services, including preventive services, prescription medications, and physician visits (Baicker et al. 2013). Studies in many other contexts, including the RAND Health Insurance Experiment (Newhouse et al. 1993), studies of past Medicaid expansions targeting adults (Sommers, Baicker, and Epstein 2012) and children (Howell and Kenney 2012), studies of the effect of gaining Medicare eligibility at age 65 (McWilliams et al. 2007; Card, Dobkin, and Maestas 2009), and studies of Massachusetts health reform (Van der Wees, Zaslavsky, and Ayanian 2013; Sommers, Long, and Baicker 2014), have similarly concluded that having health insurance or having more generous health insurance enhances individuals' ability to obtain care.

A range of evidence demonstrates that recent coverage expansions are having similar effects on individuals' ability to access care. One important measure of individuals' ability to access care is the share of people reporting that they failed to obtain needed medical care due to cost during the last 12 months. As illustrated in Figure 4-11, this share rose by more than 50

[13] While many non-economists consider it a self-evidently good thing when expanded insurance coverage increases use of health care, a long-standing strand of economic research emphasizes the possibility that health insurance will drive overconsumption of health care by insulating enrollees from the cost of services, a phenomenon referred to as "moral hazard" (Pauly 1968). For several reasons, however, moral hazard is not the appropriate analytic lens for considering increases in the use of health care that arise from a coverage expansion. First, health insurance can increase the use of health care services by increasing the resources that individuals have available to them when seriously ill, thereby allowing them to access very expensive, but cost-effective treatments (Nyman 1999); these types of increases in use of care do not represent overconsumption. Second, in light of evidence that many effective services are persistently underused, increases in the use of care that result from reducing the cost of accessing care may, in some cases, reflect a reduction in underconsumption rather than a shift toward overconsumption (Baicker, Mullainathan, and Schwartzstein 2015). Third, the standard moral hazard analysis defines care as excessive if the individual would prefer to receive a cash payment equal to the cost of the care in lieu of that care. Because low- and moderate-income families face serious constraints on their budgets, they will often prefer a cash payment even to highly effective health care services, so care that is judged excessive by the moral hazard definition may still be quite valuable when judged using a broader social perspective.

percent during the decade preceding the ACA's passage, with particularly sharp increases coinciding with the onset of the Great Recession. By contrast, since 2010, the overall share of individuals reporting these types of affordability problems has declined by more than a third, returning to levels last seen 15 years ago.

The recovery from the Great Recession has likely played some role in reducing cost barriers to accessing care, as increased employment and rising wages have reduced financial stress on families. However, the fact that this measure is now so far below its pre-recession trend, combined with the particularly sharp declines seen after 2013, strongly suggests that recent coverage expansions are playing an important role. Consistent with that interpretation, Figure 4-12 looks across states and demonstrates that states experiencing larger reductions in their uninsured rates from 2013 to 2015 experienced larger reductions in the share of individuals reporting difficulty accessing care due to cost. State-level data show that larger coverage gains are also strongly associated with increases in the share of individuals with a personal doctor and the share of individuals with a checkup in the last 12 months, as shown in Figure 4-13.

Researchers using other survey data sources have documented similar sharp improvements in access to care as the ACA's coverage provisions have taken effect. For example, examining data through March 2015, Shartzer, Long, and Anderson (2016) report that the share of non-elderly adults with a usual source of care and the share who received a routine checkup in the last 12 months has risen alongside insurance coverage, while the share reporting problems accessing care or forgoing care due to cost has fallen. Examining a similar time period, Sommers et al. (2015) report reductions in the share of non-elderly adults reporting that they lack easy access to medicine, lack a personal physician, or are unable to afford care. As with the trends reported in Figure 4-12 and Figure 4-13, the pattern of the access gains reported in these studies is consistent with their having been caused by the ACA's coverage expansion. Both studies cited above, as well as Simon, Soni, and Cawley (2016) and Wherry and Miller (2016), document that gains in access to care have been largest in states that expanded their Medicaid programs. Similarly, Shartzer, Long, and Anderson (2016) find that low- and moderate-income adults, who saw the largest coverage gains, also saw the largest improvements in access to care.

Better Health Outcomes

The ultimate goal of expanding access to health care services is improving health. Research examining prior coverage expansions that targeted populations similar to those targeted under the ACA provides a basis

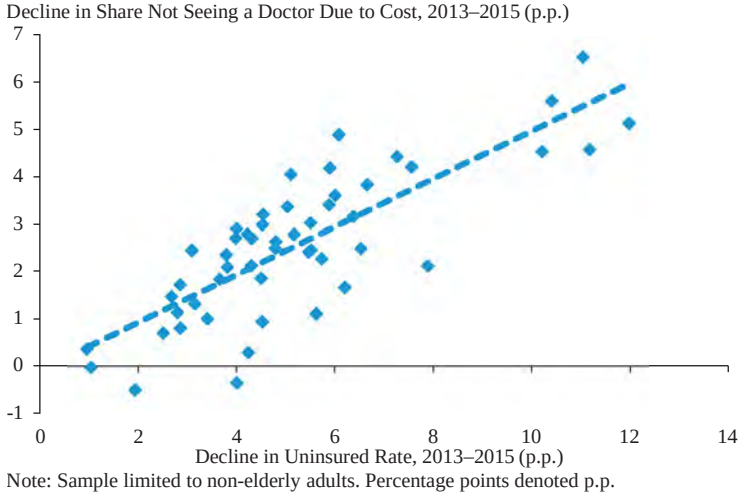
Figure 4-11

Share of Population Not Receiving Needed Medical Care Due to Cost in the Last 12 Months, 1997–2015

Source: National Health Interview Survey; CEA calculations.

Figure 4-12

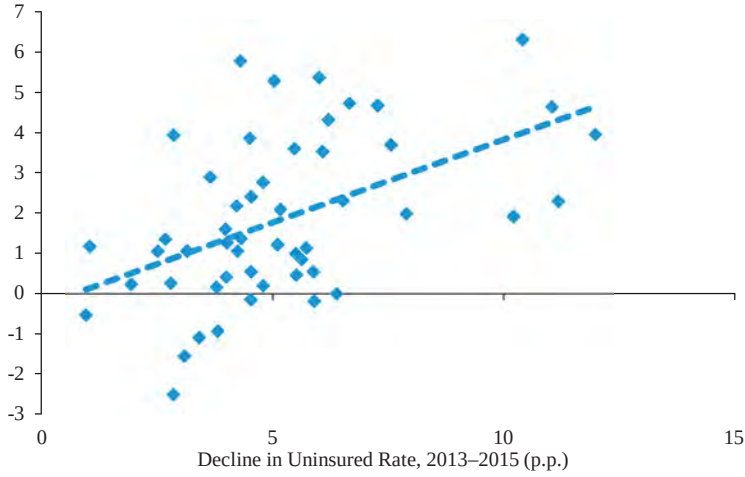
Decline in Share Not Seeing a Doctor Due to Cost vs. Decline in Uninsured Rate, by State, 2013–2015



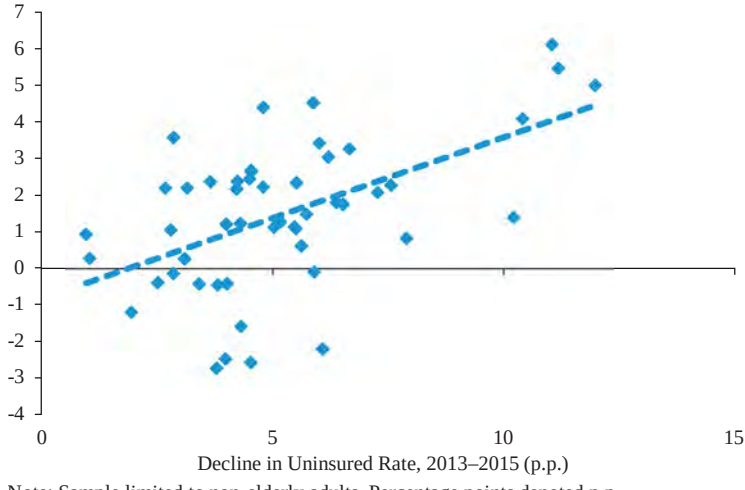
Note: Sample limited to non-elderly adults. Percentage points denoted p.p.
Source: Behavioral Risk Factor Surveillance System; CEA calculations.

Figure 4-13
Increases in Measures of Access to Care vs. Decline in Uninsured Rate, by State, 2013–2015

Panel A: Share with a Personal Doctor



Panel B: Share with Checkup in Last 12 Months



Note: Sample limited to non-elderly adults. Percentage points denoted p.p.
Source: Behavioral Risk Factor Surveillance System; CEA calculations.

for confidence that expanded insurance coverage will translate into better health. The Oregon Health Insurance Experiment documented significant improvements in self-reported health status and mental health due to expanded Medicaid coverage (Finkelstein et al. 2012; Baicker et al. 2013). Studies of Massachusetts health reform concluded that the coverage expansion drove improvements in self-reported physical and mental health, as well as reductions in mortality (Van der Wees, Zaslavsky, and Ayanian 2013; Sommers, Long, and Baicker 2014), and a study of state Medicaid expansions targeting low-income adults during the early 2000s reached similar conclusions (Sommers, Baicker, and Epstein 2012). Studies of prior expansions of Medicaid and CHIP coverage targeting low- and moderate-income children have documented that health benefits of expanded coverage can be long-lasting, with adults who had access to coverage in childhood experiencing lower risk of death and hospitalization many years later (Wherry et al., 2015; Brown, Kowalski, and Lurie 2015; Wherry and Meyer 2016).

Early evidence on the effects of the ACA appears quite consistent with the results documented for earlier coverage expansions. Barbaresco, Courtemanche, and Qi (2015) report improvements in self-reported health status among young adults following implementation of the ACA's provision allowing young adults to remain on a parent's plan. Looking at the main ACA coverage provisions that took effect in 2014, Sommers et al. (2015) find that the share of non-elderly adults reporting that they are in fair or poor health has fallen as coverage has expanded, as has the percentage of days that respondents report having their activities limited by health problems. Research has also found evidence that gains in self-reported health status have been larger in states that have expanded their Medicaid programs (Sommers et al. 2016; Simon, Soni, and Cawley 2016).

While direct estimates of the law's effects on physical health outcomes are not yet available, largely because these data become available with longer lags, these effects are likely to be quite important. Consider, for example, one particularly important health outcome: mortality. As discussed in detail in CEA (2015), there is considerable evidence that prior coverage expansions targeting populations similar to those targeted in the ACA generated substantial reductions in mortality rates. The most relevant existing estimate of the effect of insurance coverage on mortality comes from work by Sommers, Long, and Baicker (2014) on Massachusetts health reform. By comparing experiences in Massachusetts to those in neighboring states, they estimate that one death was avoided annually for every 830 people who gained health insurance. In conjunction with the estimate cited earlier in this chapter that 20 million adult have gained coverage because of the ACA as of early 2016,

Box 4-3: Interpreting Results from the Oregon Health Insurance Experiment

The Oregon Health Insurance Experiment (OHIE) is an important recent contribution to the literature on the effects of health insurance coverage (Finkelstein et al. 2012; Baicker et al. 2013). The OHIE arose from the state of Oregon's decision in early 2008 to reopen enrollment under a pre-ACA Medicaid expansion that targeted low-income adults. Because the State could not accommodate all applicants, it allocated the opportunity to enroll in Medicaid by lottery. This decision by the State created a unique research opportunity because the only systematic difference between lottery winners and lottery losers was whether they could access Medicaid coverage. As a result, the OHIE researchers were able to estimate the effect of Medicaid coverage on a range of outcomes by comparing lottery winners to lottery losers and have confidence that those estimates represented the causal effect of Medicaid.

As discussed in the main text, the OHIE found that Medicaid coverage generated substantial benefits for those who enrolled, including greater access to health care services, improved financial security, better mental health, and better self-reported health status. The OHIE did not, however, find statistically significant evidence that Medicaid improved several objective measures of physical health, including the risk of high blood pressure, high cholesterol, uncontrolled blood sugar, and death.

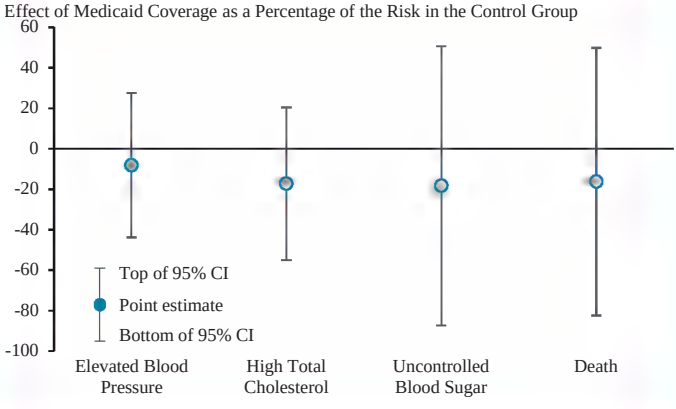
The OHIE's failure to find *statistically* significant evidence that Medicaid improves physical health has sometimes been interpreted as evidence that Medicaid has no *clinically* significant effect on physical health (for example, Roy 2013; Cannon 2014). But this conclusion is incorrect. The OHIE's sample size was limited, so its estimates of how Medicaid affected physical health were quite imprecise. As a result, while the OHIE did not find statistically significant evidence of improvements in physical health, the study also could not rule out the possibility that Medicaid caused very large improvements in physical health. For this reason, the correct interpretation of the OHIE results is that they provide little insight into how Medicaid affects the objective measures of physical health examined in the OHIE, whether positively or negatively (Frakt 2013a; Frakt 2013b; Mulligan 2013; Richardson, Carroll, and Frakt 2013).

To make this point concrete, Figure 4-vi plots the OHIE estimates of the effect of Medicaid on four adverse health outcomes, death, and one outcome from each of the three physical health domains examined in Baicker et al. (2013), as well as the associated 95 percent confidence intervals. For scale, both the point estimates and confidence intervals are shown as a percentage of the risk of each outcome in the control group; the estimates reported in Figure 4-vi can therefore be interpreted

as the proportional reduction in the risk of each outcome attributable to Medicaid coverage. For none of these four health outcomes can the OHIE rule out a proportional reduction in risk of more than two-fifths. For three of the outcomes, the OHIE evidence cannot rule out a risk reduction of more than a half, and for uncontrolled blood sugar and death, the OHIE evidence cannot rule out nearly complete elimination of the outcomes. Effects of this size would be clinically important and quite valuable to individuals, indicating that the OHIE simply cannot resolve the question of whether Medicaid has important effects on physical health.

Furthermore, Figure 4-vi demonstrates that the OHIE point estimates suggest that Medicaid reduced the risk of these adverse health outcomes by between 8 and 18 percent in proportional terms, depending upon the outcome. These estimates are broadly consistent with the improvements that Medicaid coverage would have been expected to achieve in light of the prior literature on the efficacy of treatment for these conditions (Frakt 2013a; Frakt 2013b; Mulligan 2013; Richardson, Carroll, and Frakt 2013). Thus, while the OHIE estimates provide little direct evidence on the effects of Medicaid on physical health of any kind, they certainly do not suggest that Medicaid generates markedly smaller improvements in physical health than would have been expected based on the pre-OHIE evidence base.

Figure 4-vi
Estimated Proprtional Reduction in the Risk of Adverse Health Outcomes Due to Medicaid



Note: Uncontrolled blood sugar refers to glycated hemoglobin greater than 6.5 percent.
Source: Finkelstein et al. (2012); Baicker et al. (2013); CEA calculations.

Fortunately, the OHIE is not the only source of evidence on how health insurance affects health outcomes. Many prior studies have used "quasi-experiments" stemming from prior coverage expansions or quirks in program design to study how health insurance affects physical health outcomes. Quasi-experimental studies are more vulnerable to systematic biases than studies using randomized research designs, but they can often draw on much larger samples and, thus, deliver much more precise estimates. As discussed in the main text, well-designed studies of this type have concluded that health insurance improves physical health in a number of ways, including by reducing the risk of death.

this estimate implies that around 24,000 deaths are being avoided annually because of the ACA.

Greater Financial Security

Another function of health insurance is to protect against the medical costs associated with serious illness. As discussed above, one benefit of that protection is that it allows sick individuals to obtain needed medical care. An additional important benefit, however, is that it helps ensure that families do not experience financial hardship due to illness, ranging from having to cut back spending on other needs, to taking on debt, to failing to pay other bills and thereby impairing their ability to get a loan in the future. [14]

Research examining prior coverage expansions convincingly established that expanding health insurance coverage substantially improves financial security. The Oregon Health Insurance Experiment found that having Medicaid coverage virtually eliminated the risk of facing catastrophic out-of-pocket medical costs (defined as medical costs in excess of 30 percent of income) and sharply reduced the share of individuals reporting trouble paying bills due to medical expenses (Baicker et al. 2013). Mazumder and Miller (2016) examine the effects of Massachusetts health reform and document reductions in the amount of debt past due, the amount of debt in third-party collection, and the risk of bankruptcy, as well as improvements in credit scores. Similarly, Gross and Notowidigdo (2011) document substantial reductions in bankruptcy risk due to Medicaid expansions during the 1990s and early 2000s, and Finkelstein and McKnight (2008) demonstrate

[14] Medical costs are not the only financial consequence of serious illness. Dobkin et al. (2016) document that non-elderly individuals experience large earnings losses after serious health shocks, with the result that even insured individuals are at risk of financial hardship under these circumstances. A progressive tax code and the safety net, which have been strengthened by the ACA's reforms to help low- and moderate-income families afford health insurance coverage, play an important role in cushioning households against these types of shocks.

that the introduction of Medicare led to large reductions in exposure to high out-of-pocket medical costs among individuals over the age of 65.

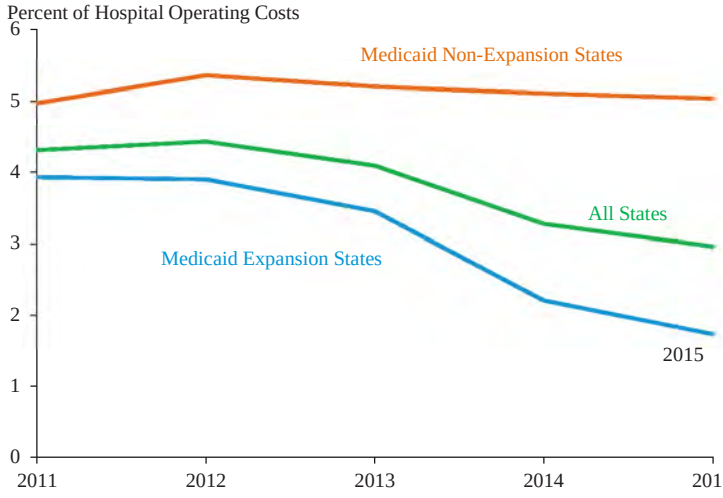
Recent research indicates that the ACA's major coverage provisions are having similar beneficial effects on financial security. Research using survey data show that the share of families reporting problems paying medical bills has fallen substantially since 2013, with particularly large reductions for low- and moderate-income adults (Shartzer, Long, and Anderson 2016). Studies using data from consumer credit reports to compare states that have and have not expanded Medicaid found similar improvements in financial security, including reductions in the amount of debt sent to a collection agency and improvements in credit scores (Dussault, Pinkovskiy, and Zafar 2016; Hu et al. 2016). The magnitude of these improvements is substantial; Hu et al. (2016) estimate that state Medicaid expansions reduce the amount of debt sent to collection by between $600 and $1,000 per person gaining coverage under expansion.

Lower Uncompensated Care Costs

While the most salient benefits of expanded insurance coverage accrue to the newly insured, expanding insurance coverage also has implications for other participants in the health care system. Uninsured individuals still receive some medical care, and when they do so, they are often unable to pay for that care; Coughlin et al. (2014) estimated that health care providers delivered roughly $1,000 in uncompensated care per uninsured person in 2013, costs that must then be borne either by the health care provider itself or by some other entity. Correspondingly, recent research has emphasized that one important consequence of expanding insurance coverage is to reduce the amount of uncompensated care that health care providers deliver (Garthwaite, Gross, and Notowidigdo 2015; Finkelstein, Hendren, and Luttmer 2015).

Recent trends provide strong evidence that the expansion in insurance coverage driven by the Affordable Care Act is, as expected, driving substantial reductions in uncompensated care. Figure 4-14 uses data from hospitals' cost reports to the Centers for Medicare and Medicaid Services to examine trends in uncompensated care. Nationwide, these data show that uncompensated care fell by more than a quarter as a share of hospital expenses from 2013 to 2015. Had uncompensated care as a share of hospital expenses remained at its 2013 level, hospitals would have delivered an additional $10.4 billion of uncompensated care in 2015. The reductions in uncompensated care since 2013 have been concentrated in Medicaid expansion states, likely both because expansion states have seen larger coverage gains and because the low-income uninsured individuals targeted by Medicaid expansion were

Figure 4-14
Uncompensated Care as a Share of Hospital Costs, 2011–2015



Note: State Medicaid expansion status is as of July 1, 2015. Data for 2015 are incomplete.
Source: Centers for Medicare and Medicaid Services, Hospital Cost Reports; CEA calculations.

particularly likely to receive uncompensated care. In Medicaid expansion states, uncompensated care as a share of hospital operating costs has fallen by around half since 2013.

More detailed research using these hospital cost report data has provided additional evidence that the Affordable Care Act's coverage provisions, particularly Medicaid expansion, have driven substantial reductions in uncompensated care. Dranove, Garthwaite, and Ody (2016) and Blavin (2016) document similar aggregate trends in uncompensated care, including differences in trends between expansion and non-expansion states. Dranove, Garthwaite, and Ody (2016) also look at hospital-level trends in uncompensated care, finding that reductions in uncompensated care are larger for hospitals located in areas that had larger numbers of individuals likely to become eligible for Medicaid under Medicaid expansion.

Reduced Economic Disparities

The ACA's coverage expansions have also substantially reduced economic inequality, as discussed in greater detail in Chapter 3. Most directly, the law has sharply narrowed differences in uninsured rates across population groups. As illustrated in Figure 4-15 below, the coverage gains from 2010 through 2015 have been broadly shared, with the uninsured rate falling across all income, age, and race and ethnicity groups. Gains have also been seen in both urban areas, defined here as counties included in a metropolitan

statistical area (MSA), and rural areas, defined as counties outside an MSA. However, the population groups that had the highest risk of being uninsured in 2010 have seen the largest gains; in particular, gains have been larger for younger adults than for older adults, larger for lower-income individuals than higher-income individuals, and larger for racial and ethnic minorities than for Whites.

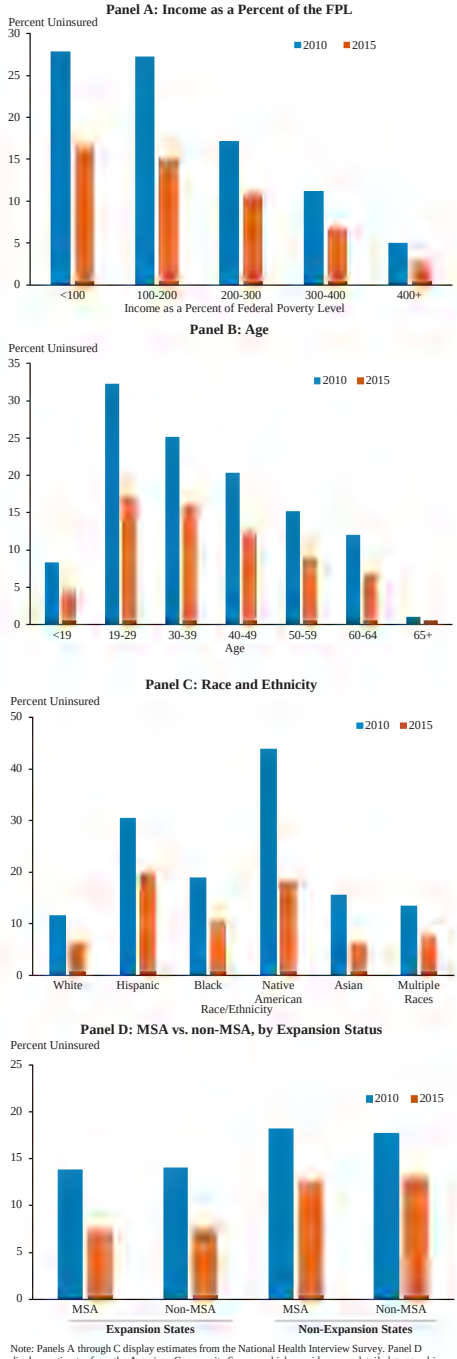
The ACA has also helped to reduce income inequality. As discussed in detail above, the ACA achieved its coverage expansion in part by providing financial assistance to low- and moderate-income individuals who obtain coverage through Medicaid and the Marketplaces. That financial assistance has greatly boosted income for these households. Those coverage expansions were, in turn, financed in part through tax increases on higher-income Americans. These and other ACA coverage provisions, together with other tax policies enacted during the Obama Administration, are making the income distribution in the United States considerably more equal, as illustrated in Figure 4-16. Because of these policies, the share of after-tax income received by the bottom fifth of income distribution will rise by 0.6 percentage point (18 percent), while the share of income received by the top 1 percent will fall by 1.2 percentage points (7 percent).

Continued Labor Market Recovery

Many critics of the Affordable Care Act argued that its coverage expansions would seriously harm the labor market. While critics of the law were not always explicit about how these harms would arise, some analysts argued that the law's provisions providing low- and moderate-income people with affordable coverage options would reduce individuals' incentive to work, leading some people to leave the labor force or reduce their work hours (such as Mulligan 2014a; Mulligan 2014b). These analysts also argued that the ACA's requirement that large employers offer health insurance coverage to their full-time employees or pay a penalty would cause some employers to shift workers from full-time status to part-time status.

Other analysts noted that the law's coverage expansions had the potential to drive important positive changes in individuals' labor supply decisions. Economists have long argued that the lack of good coverage options for those who do not get coverage through the workplace can lead to "job lock," in which workers remain in a job that offers insurance coverage, despite the fact that their time and talents could be better employed elsewhere (for example, Madrian 1994). The pre-ACA research literature provided some empirical support for this view. Some research has suggested broader insurance coverage increases worker mobility and facilitates appropriate risk-taking in the labor market (for example, Farooq and Kugler

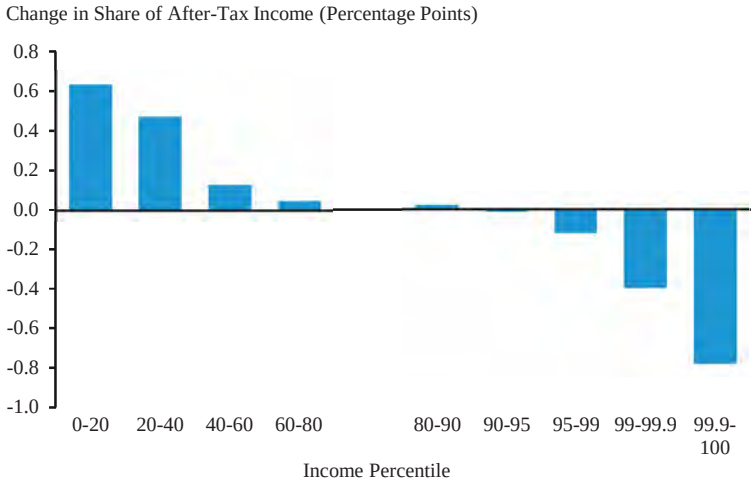
Figure 4-15
Uninsured Rate by Population Group, 2010 and 2015



Note: Panels A through C display estimates from the National Health Interview Survey. Panel D displays estimates from the American Community Survey, which provides more detailed geographic breakdowns.
Source: National Health Interview Survey; American Community Survey; CEA calculations.

Figure 4-16

Change in Share of After-Tax Income by Income Percentile: Changes in Tax Policy Since 2009 and ACA Coverage Provisions, 2017



Source: U.S. Treasury, Office of Tax Analysis.

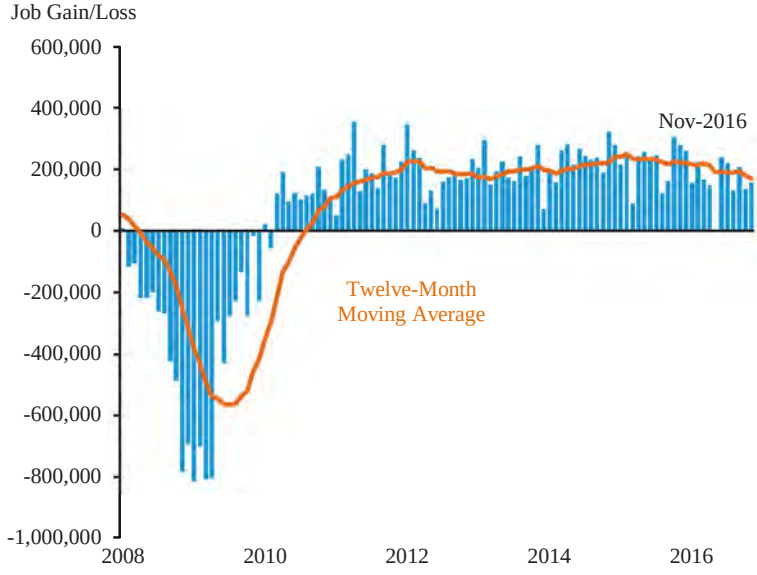
2016). Providing better coverage options outside the workplace may also facilitate entrepreneurship (Fairlie, Kapur, and Gates 2011; DeCicca 2010); enable workers to invest in additional years of education (Dillender 2014); or give workers additional flexibility in structuring their work lives, such as by retiring when it makes sense for them or reducing their work hours in order to have more time to care for a family member (for example, Heim and Lin 2016).

Fully understanding how the ACA's coverage expansions have affected the labor market will require additional research, but it is already quite clear that predictions of large reductions in total employment and large increases in part-time employment have not come to pass. Implementation of the ACA has occurred alongside the steady recovery of the labor market from the Great Recession, as illustrated in Figure 4-17. The private sector started adding jobs in March 2010, the month the ACA became law, and businesses have added a cumulative 15.6 million jobs since that time. Private-sector employment has actually increased somewhat more quickly since the ACA's main coverage provisions took effect at the beginning of 2014 (around 209,000 jobs per month) than over the rest of the employment expansion (around 181,000 jobs per month).

This time series evidence, particularly the fact that private-sector job growth has actually been slightly faster after the ACA's main coverage provisions took effect than before they took effect, is sufficient to demonstrate

Figure 4-17

Monthly Gain in Private-Sector Payroll Employment, 2008–2016



Source: Bureau of Labor Statistics, Current Employment Statistics; CEA Calculations.

that the ACA has not had the extreme negative effects on employment that many critics predicted. However, more rigorous evidence on the ACA's effects on labor markets can be obtained by comparing labor market performance between states where the ACA's coverage provisions were likely to have had larger or smaller impacts. One crude indicator of the scope of the effects of the ACA's coverage provisions is simply the state's uninsured rate in 2013; consistent with this, it is a strong predictor of the magnitude of a state's coverage gains since 2013, as demonstrated in Figure 4-8. Comparing states with higher and lower uninsured rates in 2013 can therefore provide insight into the effect of the ACA's coverage provisions on the labor market. Another useful indicator is whether the state has expanded Medicaid, which provides insight into the labor market effects of Medicaid expansion in particular.

Figure 4-18 plots each state's uninsured rate in 2013 against the change from 2013 to 2015 in the share of working-age individuals who are

currently employed. [15] Contrary to what would have been expected if the ACA's coverage provisions had reduced employment, there is essentially no correlation between a state's uninsured rate in 2013 and its employment gains from 2013 to 2015. Similarly, states that expanded their Medicaid programs actually saw slightly larger employment gains than those that did not expand Medicaid (an increase in the working-age employment-population of 1.5 percentage points in expansion states versus 1.3 percentage points in non-expansion states). Several recent studies using related approaches have similarly found no evidence that the ACA's coverage provision have reduced employment (Pinkovskiy 2015; Kaestner, Gangopadhyaya, and Fleming 2015; Leung and Mas 2016; Gooptu et al. 2016).

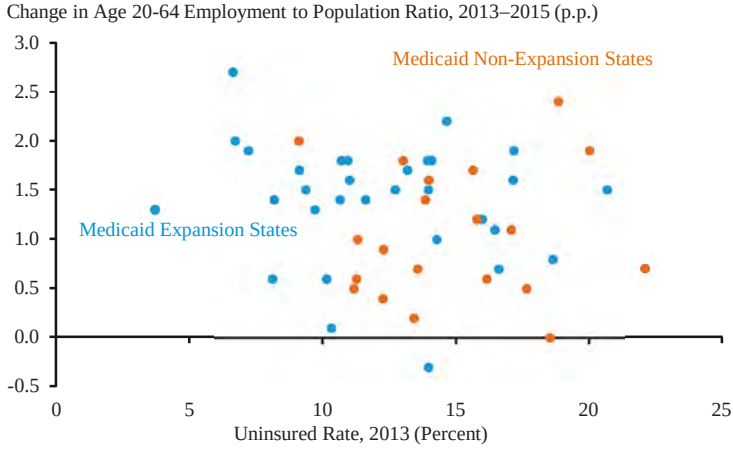
There is also no evidence that the ACA has driven the large-scale shift to part-time work predicted by critics of the law. As with overall employment, time series evidence is sufficient to dismiss the strong claims made by many of the ACA's critics. As illustrated in Figure 4-19, since the ACA became law in March 2010, the number of workers employed full time has increased by 13.0 million, while the number of workers employed part-time has been essentially flat. This was true during the years leading up to the implementation of the ACA's major coverage provisions in 2014, and it continued to be true thereafter, contrary to claims that the ACA would usher in a major shift to part-time work.

More rigorous cross-state comparisons also provide little evidence that implementation of the ACA's coverage provisions has meaningfully reduced workers' hours. Figure 4-20 plots each state's uninsured rate in 2013 against the change in average weekly hours among workers ages 16 to 64. Contrary to what would have been expected if the ACA's coverage provisions had caused many workers to shift to part-time work or caused firms to curtail hours, there is essentially no correlation between a state's uninsured rate in 2013 and the change in average hours worked from 2013 to 2015. Similarly, average hours worked has increased by about 0.2 hours per week in both Medicaid expansion and non-expansion states, inconsistent with the view that Medicaid expansion has put substantial downward pressure on worker hours. Outside estimates using a range of methodologies similarly conclude that there is little evidence that the law has driven a major

[15] An alternative, simpler approach would be to compare labor market outcomes across states seeing larger and smaller declines in their uninsured rates. Comparisons of this type also support the conclusion that the ACA has not negatively affected the labor market. However, this approach has the disadvantage that improvements in labor market outcomes, whatever their cause, are likely to drive reductions in the uninsured rate since many people who gain jobs gain coverage at work. This could generate a spurious positive relationship between coverage gains and employment gains. The approach taken in Figure 4-18 and Figure 4-20 avoids this problem.

Figure 4-18

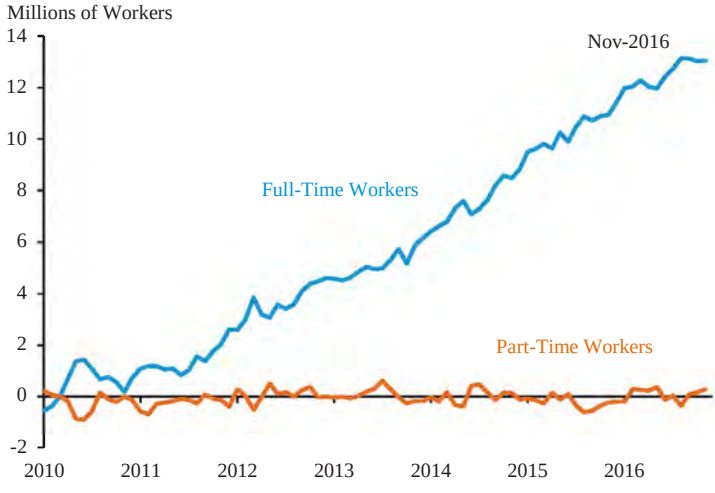
Change in Working-Age Employment to Population Ratio vs. Uninsured Rate in 2013, by State, 2013–2015



Note: Medicaid expansion status is as of July 1, 2015. Percentage points denoted p.p.
Source: American Community Survey; CEA calculations.

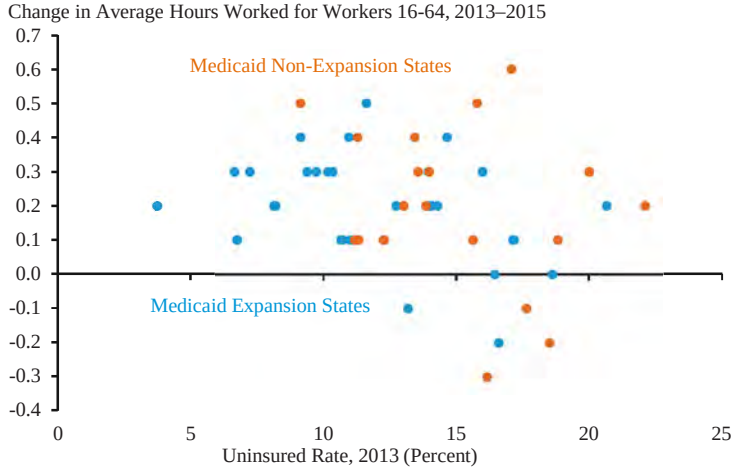
Figure 4-19

Change in Number of Full-Time and Part-Time Workers Since March 2010, 2010–2016



Source: Current Population Survey; CEA calculations.

Figure 4-20
Change in Average Weekly Hours vs. Uninsured Rate in 2013, by State, 2013–2015



Note: Medicaid expansion status is as of July 1, 2015.

shift toward part-time work, though some studies have found evidence of small effects (Even and Macpherson 2015; Mathur, Slavov, and Strain 2016; Moriya, Selden, and Simon 2016; Dillender, Heinrich, and Houseman 2016).

Long-Term Labor Market Benefits

The discussion above—like many discussions of the labor market effects of the ACA's coverage expansions—focuses on how the ACA might directly affect the incentives of workers and firms in the short run. However, there are also mechanisms through which the ACA's coverage provisions could have longer-run positive effects on labor market outcomes.

Most directly, by making workers healthier, the ACA may boost their employment and earnings prospects. Indeed, as discussed above, evidence from prior coverage expansions, together with early evidence on the effects of the ACA, demonstrates that insurance coverage improves both mental and physical health. Furthermore, a variety of evidence indicates that better health improves both individuals' ability to work and their productivity on the job, which in turn leads to higher employment rates and higher earnings. Indeed, looking across individuals, healthier people have far higher employment rates and earnings, as depicted in Figure 4-21. Moreover, research has documented that adverse health shocks cause sharp reductions in employment and earnings, strongly implying that at least some of

this cross-sectional relationship between health status and labor market outcomes reflects the effect of health status on labor market outcomes, rather than the effect of labor market outcomes on health status (Fadlon and Nielsen 2015; Dobkin et al. 2016).

There is particularly compelling evidence that coverage gains for children improve educational attainment and earnings. Identifying such effects is challenging because they are likely to appear only gradually over time. However, a pair of recent studies has examined earlier expansions in insurance coverage for children through Medicaid and CHIP, using the fact that different states expanded coverage at different times and to different extents. Because some of these coverage expansions are now decades old, the authors have been able to study their effects on long-term labor market outcomes.

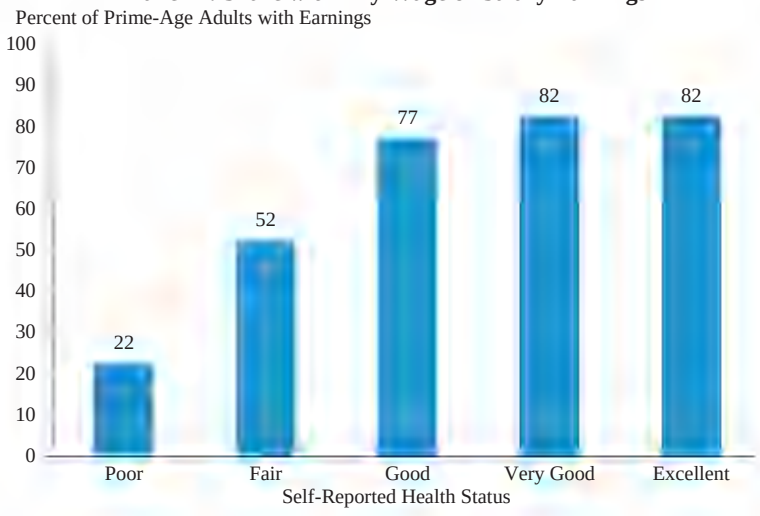
These studies find important long-term labor market benefits from expanded insurance coverage. Cohodes et al. (2015) find that having Medicaid or CHIP coverage in childhood increases the likelihood of completing high school and college. Brown, Kowalski, and Lurie (2015) find that female children with greater access to Medicaid or CHIP coverage in childhood have higher educational attainment and higher earnings in early adulthood. They also find evidence that both boys and girls with greater access to Medicaid or CHIP in childhood pay more in income and payroll taxes in their young adult years, potentially offsetting a substantial fraction of the cost of providing coverage to children. These results provide direct evidence that the increases in children's insurance coverage that have occurred under this Administration will generate important long-term labor market benefits and suggest that expanded coverage for adults could generate similar benefits.

The ACA has also strengthened the U.S. system of automatic stabilizers, programs that automatically expand during hard times and contract during good ones, which will help to reduce the severity of future recessions. The ACA's coverage expansions help ensure that families facing job or income losses during a recession retain access to affordable health insurance options. Retaining access to affordable health insurance options safeguards families' ability to access health care and cushions their budgets, enabling these families to better smooth their consumption of health care and other necessities.

While these direct improvements in families' economic security in the face of recession are valuable on their own, they also have important macroeconomic benefits. By boosting consumption at the household level during recessions, the ACA will increase aggregate demand for goods and services at times when it would otherwise be impaired, increasing overall economic output and helping to mitigate the severity of the recession itself. Moreover,

Figure 4-21
Employment Outcomes for Prime Age Adults, by Health Status, 2015

Panel A: Share with Any Wage or Salary Earnings



Panel B: Average Earnings, People With Earnings

Source: Current Population Survey; CEA calculations.

recent discussions of macroeconomic policy have suggested that changes in the U.S. economy have increased the likelihood that monetary policy will be constrained by the inability to cut nominal interest rates below the zero bound in future recessions, increasing the importance of a strong system of automatic stabilizers (Furman 2016).

Reforming the Health Care Delivery System

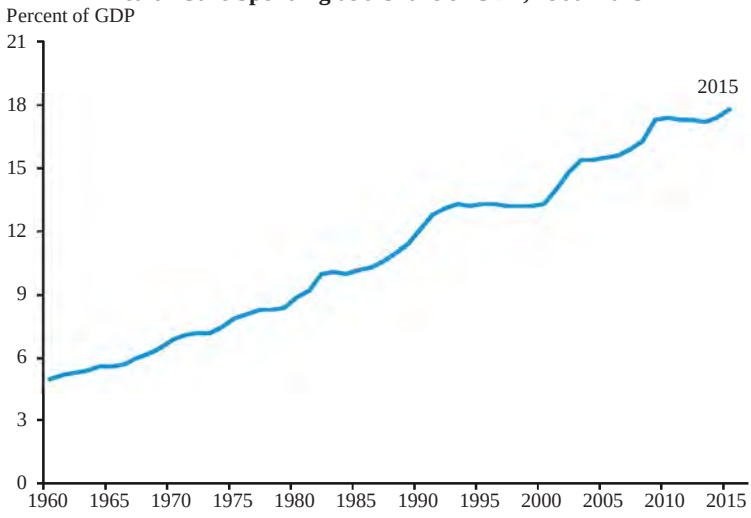
The United States has historically devoted a large fraction of its economic resources to delivering health care. In 2009, the year President Obama took office, the United States spent 17.3 percent of GDP—$2.5 trillion—on health care. That fraction had risen rapidly over time, having increased from 13.2 percent a decade earlier and just 5.0 percent in 1960, as illustrated in Figure 4-22. Much of that spending on health care created substantial value. Indeed, economic research has emphasized that much of the long-term rise in health care spending results from the steady advance of medical technology and that the resulting improvements in length and quality of life have historically been more than sufficient to justify the increase in spending (Newhouse 1992; Cutler 2004). Nevertheless, evidence also demonstrated that the U.S. health care delivery system suffered from serious inefficiencies that drove up spending and undermined patients' health. In light of the magnitude of the resources devoted to the health care system and the great value of better health, this evidence suggested that reform could bring large gains.

This section of the chapter reviews the progress that has been made under this Administration in reforming the health care delivery system. The section begins by summarizing the evidence that the health care delivery system has historically fallen short of its potential, and then describes the reforms implemented under this Administration to address these shortcomings. Next, the section documents the slow growth in health care costs and improvements in health care quality that have occurred as these reforms have taken effect, and presents evidence that the reforms have, in fact, played an important role in driving the positive trends of recent years. The section closes by discussing the benefits that an improved health care delivery system will have for the United States economy in the years to come.

Health Care Costs and Quality Before the Affordable Care Act

A range of evidence indicates that the U.S. health care delivery system has historically fallen short of its potential. One commonly cited piece of evidence was how health care spending and outcomes in the United States compared with those of its peer countries. The United States has historically been an extreme outlier in the share of GDP it devotes to health care,

Figure 4-22
Health Care Spending as a Share of GDP, 1960–2015



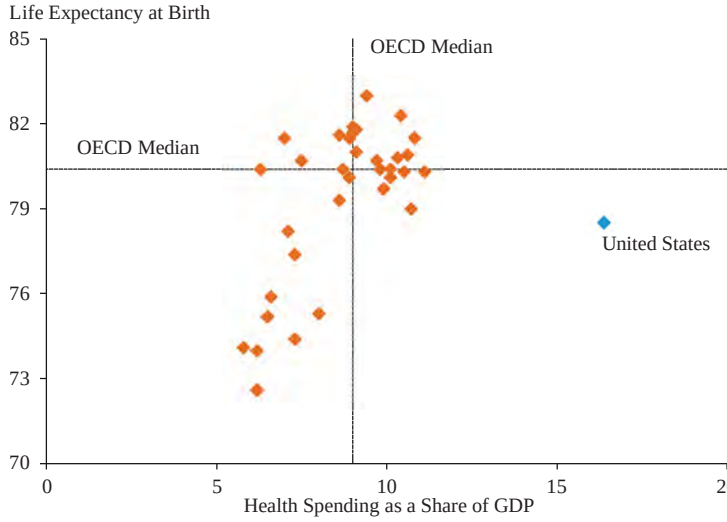
Source: National Health Expenditure Accounts; National Income and Product Accounts; CEA calculations.

as illustrated in Figure 4-23. In 2009, the share of GDP that the United States devoted to health care was more than 80 percent higher than that of the median member of the Organisation for Economic Co-operation and Development (OECD) and nearly 50 percent higher than that of the next highest OECD member. Due in part to challenges in obtaining comparable data for the United States and other OECD countries, the reasons that spending was so much higher in the United States are not fully understood. However, research has generally concluded that the United States paid higher prices for health care services—potentially reflecting the greater market power held by providers and insurers in the United States' system—and made greater use of costly, but not necessarily effective, medical technologies and treatments (Anderson et al. 2003; Garber and Skinner 2008).[16]

The United States' much-higher spending could have been justified if the additional spending translated into better health care outcomes. In fact, life expectancy was almost two years shorter in the United States than in the median OECD country, and cross-county comparisons of various measures of the quality of care, such as the risk of hospital-acquired infections, found that the outcomes achieved in the United States were, at best, unremarkable

[16] These two drivers of higher health care spending in the United States may, to some degree, be related if providers' ability to charge higher prices facilitates investment in costly medical technologies.

Figure 4-23
Life Expectancy at Birth vs. Health Spending, 2009



Source: OECD; CEA calculations.

(Drösler, Romano, and Wei 2009). In principle, this pattern could arise if factors outside the health care delivery system, such as the United States' high obesity rate and uniquely large share of people without health insurance, masked the large returns generated by the United States' higher health care spending. While these factors may have played some role in explaining the United States' poor performance, the sheer magnitude of the difference in spending between the United States and its OECD peers made it unlikely that this was a full explanation (Garber and Skinner 2008).

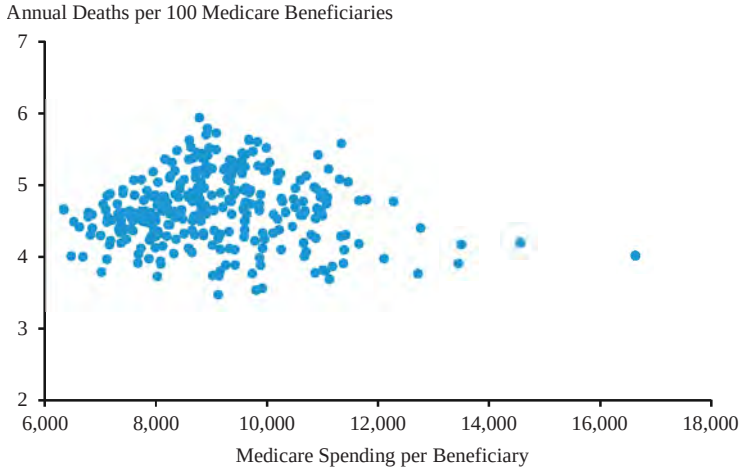
Patterns of health care spending and quality performance within the United States provided additional evidence that the United States health care delivery system suffered from serious inefficiencies. Research documented that the amount Medicare spent per enrollee varied widely in the United States, largely reflecting substantial differences in the quantity of care provided in different parts of the country (Fisher et al. 2003a). Other research has documented a similarly large variation in spending among people covered through private insurance, with those in private insurance also seeing wide variation in the *prices* paid for care in different markets in addition to the quantity of care provided (Chernew et al. 2010; Philipson et al. 2010; Cooper et al. 2015). As with cross-county comparisons, however, there was little evidence that higher-spending areas achieved better health outcomes,

suggesting that the additional spending in high-spending areas was unnecessary (Fisher et al. 2003b). Moreover, this research found that there was wide variation in health outcomes among areas with similar levels of spending, suggesting that there might be major opportunities to improve patient outcomes, even while holding spending fixed. Figure 4-24 illustrates these empirical patterns using data on spending and outcomes among Medicare beneficiaries from the Dartmouth Atlas of Health Care.

One important advantage of comparing cost and quality among different areas within the United States, as opposed to across countries, is that much richer data are available. This greater data availability makes it easier for researchers to have confidence that confounding factors were not masking a positive relationship between spending and health outcomes. For example, one possible explanation for the patterns in Figure 4-24 is that people in some areas of the country were in worse health, which led those areas to spend more on health care, but masked any benefits of that additional spending for health care outcomes. However, the research cited above found that these patterns held after controlling for individual-level characteristics, casting doubt on whether this could explain the observed patterns. More recent research has examined people who move from one part of the country to another and similarly concluded that much of the variation in spending across areas reflects differences in how care is delivered in different areas, not differences in the characteristics or preferences of people in different places (Finkelstein, Gentzkow, and Williams 2016).

Aggregate data on patterns of care in the United States also suggested that the delivery system was falling short of what a well-functioning delivery system could be expected to achieve, driving up costs and leading to worse outcomes for patients. Research examining individual patient encounters with the health care system found that patients commonly failed to receive care that was recommended under clinical guidelines, while also commonly receiving care that was not recommended (McGlynn et al. 2003). Studies similarly found evidence that care was often poorly coordinated, with patients commonly receiving duplicate tests and different medical providers responsible for a patient's care often failing to communicate when a patient transitioned from one care setting to another (Commonwealth Fund 2008). Research also found that patients were often injured in avoidable ways when seeking medical care, suffering harms ranging from medication errors, to pressure sores, to infections (Institute of Medicine 1999). Others noted that patients were often readmitted to the hospital soon after discharge, despite evidence that these readmissions might be avoidable with better planning for post-discharge or other changes in medical practice (MedPAC 2007; Commonwealth Fund 2008).

Figure 4-24
Mortality Rate vs. Medicare Spending per Beneficiary, by Hospital Referral Region, 2009



Note: Spending and mortality adusted for age, sex, and race.
Source: Dartmouth Atlas of Health Care.

Reforms to the Health Care Delivery System Under the Obama Administration

In light of the compelling evidence that the health care delivery system has historically fallen short of its potential, this Administration has implemented a comprehensive set of reforms, largely using tools provided by the ACA, to make the health care delivery system more efficient and improve the quality of care. These reforms fall in three main categories: better aligning payments to medical providers and insurers in public programs with actual costs; improving the structure of Medicare's provider payment systems to ensure that those systems reward providers who deliver efficient, high-quality care, rather than simply a high quantity of care; and engaging private insurers in a similar process of payment reform. Each of these reforms, as well as its underlying economic logic, is discussed in detail below.

Aligning Public Program Payment Rates with Actual Costs

One way of reducing spending on health care is to ensure that the amounts Medicare and other public programs pay for health care services match the actual cost of delivering those services. Setting Medicare payment rates at an appropriate level has at least two major benefits. Most directly, reductions in Medicare payment rates reduce costs for the Federal

Government, which pays for the majority of care Medicare beneficiaries receive, as well as for beneficiaries themselves, who pay the remaining costs through premiums and cost sharing.[17]

Recent research implies that reductions in Medicare payment rates can also generate savings for individuals enrolled in private insurance plans by enabling private insurers to secure better rates from medical providers.[18] Clemens and Gottlieb (forthcoming) study a past reform in Medicare's payments to physicians that had different effects in different parts of the country. They find that when Medicare reduces its payment rate by one dollar, private insurers reduce their payment rates for the same services by $1.12, on average. White (2013) and White and Wu (2014) undertake a similar analysis focused on Medicare payment to hospitals using variation in how earlier Medicare payment reforms affected different hospitals. White (2013) finds that when Medicare reduces its payment rates by one dollar, private payers reduce their payment rates by $0.77. White and Wu (2014) find that for each dollar Medicare saves in response to such a reform, other payers realize savings of $0.55. These results run contrary to earlier conventional wisdom that Medicare payment reductions generate offsetting "cost shifts" to private payers that drive up the costs of private insurance.

The ACA made a range of changes designed to bring payment rates in public programs more closely in line with the actual cost of delivering services. Two of these were particularly important due to their large size. First, the ACA modified Medicare's formula for updating payment rates to certain medical providers to reflect an expectation that providers will improve their productivity to a similar extent as the rest of the economy over the long run. Previously, Medicare had updated payment rates for these providers based solely on changes in the costs of the inputs they use to deliver care, without accounting for improvements in productivity, an approach that caused payment rates to rise more quickly than the providers' actual cost of delivering health care services.

Second, the law addressed long-standing deficiencies in the system used to pay Medicare Advantage plans that led to those plans being paid far

[17] Many Medicare beneficiaries have supplemental coverage that pays for some or all of their cost sharing. In some cases, they purchase this coverage individually and in other cases they receive it from a former employer or a state Medicaid program. In these cases, cost-sharing is ultimately financed by the entity paying for the supplemental coverage. Similarly, some Medicare beneficiaries also have all or part of their premiums paid by another entity, typically a state Medicaid program or a former employer.

[18] The mechanism by which Medicare payment rates affect private payment rates remains unclear. Clemens and Gottlieb (forthcoming) suggest that reducing Medicare's payment rate may strengthen private payers' negotiating position, perhaps because it becomes less attractive for a provider to walk away from the negotiation or because Medicare's rates serve as a benchmark for judging whether contract terms are reasonable.

more to cover Medicare patients than it would have cost to cover the same patient in traditional Medicare (MedPAC 2009). To do so, the ACA phased in changes to the "benchmarks" used to determine payments to Medicare Advantage plans. These provisions have taken effect without adverse effects on the premiums or availability of Medicare Advantage plans, consistent with the view that pre-ACA payment rates were excessive. Access to Medicare Advantage plans remains essentially universal among Medicare beneficiaries, and the share of Medicare beneficiaries enrolled in a Medicare Advantage plan has risen from 24 percent in 2010 to a projected 32 percent in 2017, while average premiums are estimated to have fallen by 13 percent from 2010 through 2017 (CMS 2016b).

Reforming the Structure of Medicare's Payment Systems

A second approach to increasing the value produced by the health care delivery system is to improve the *structure* of the payment systems that public health care programs and private insurers use to pay medical providers. Historically, the U.S. health care system has been dominated by "fee-for-service" payment systems in which medical providers are paid separately for each individual service they deliver, like an office visit, a diagnostic test, or a hospital stay.

Fee-for-service payment undermines the efficiency and quality of patient care in three important ways. First, fee-for-service payment encourages providers to deliver more services than necessary since each additional service translates into additional revenue. Second, fee-for-service payment encourages providers to deliver the wrong mix of services. In a system with payment rates for thousands of different services, payment rates for some services will inevitably end up being set too high relative to the underlying cost of some services and too low for others, biasing care toward those services that happen to be particularly profitable, whether or not those services create the most value for patients. Third, fee-for-service payment fails to reward providers who improve health outcomes because payment is completely independent of the outcomes they achieve for their patients.[19]

The perverse short-run incentives created by fee-for-service payment may also distort the long-run trajectory of medical technology. Because of the shortcomings catalogued above, fee-for-service payment tends to encourage widespread use of resource-intensive new technologies, even if they generate modest health benefits, while often failing to ensure equally widespread use of less resource-intensive new technologies that generate

[19] While health care professionals have other reasons to deliver high-quality care, including their concern for their patients' well-being and their desire to attract and retain patients, the evidence summarized earlier demonstrates that this was not always sufficient to ensure that all patients received high-quality care.

large health benefits. When deciding what new technologies to develop, potential innovators and investors are likely to favor technologies that they expect to have a larger market, causing them to focus more on the former type of technology than the latter. Over time, this bias may lead to larger increases in health care spending and smaller improvements in health outcomes than would occur under a payment system that rewards efficient, high-quality care.

Largely using tools provided by the ACA, the Administration has implemented two types of reforms in the Medicare program designed to address the shortcomings of fee-for-service payment. The first was targeted improvements to existing fee-for-service payment systems to encourage more efficient, higher-quality care, which have the important advantage that they can be implemented quickly at scale. The second was setting in motion a longer-term shift away from fee-for-service payment and toward alternative payment models (APMs) that pay providers based on overall cost and quality of the care they deliver, rather than the numbers and types of services they provide. In addition, to facilitate continuous learning and progress along both of these tracks, the ACA created the Center for Medicare and Medicaid Innovation (CMMI) to develop and test innovative new payment models. Importantly, the Secretary of Health and Human Services has the authority to expand a payment model tested through CMMI nationwide if the model is determined to reduce spending without harming quality of care or to improve quality of care without increasing spending.

Targeted Reforms to Fee-For-Service Payment Systems

This Administration has implemented a range of targeted improvements to existing fee-for-service payment systems. One such improvement is greater use of "value-based" payment systems, which adjust providers' fee-for-service payment amounts upward or downward according to how they perform on measures of the quality or efficiency of care. For hospitals, the ACA introduced value-based payment incentives aimed at encouraging hospitals to reduce their hospital readmission rates and their hospital-acquired infection rates. The ACA also introduced broader value-based payment programs for physicians and hospitals that reward providers that perform well across a broad array of quality and efficiency measures. More recently, CMMI began testing a value-based payment system for home health care services, and the bipartisan Medicare Access and CHIP Reauthorization Act (MACRA) introduced a new value-based payment system for physician services that will consolidate existing value-based payment programs for physicians into a single program starting in 2017.

Another type of improvement is beginning to pay providers to deliver high-value services for which payment was not previously available. For

example, through CMMI, the Administration tested the Medicare Diabetes Prevention Program (MDPP), which provides coaching aimed at helping participants transition to a healthier lifestyle and lose weight. The evaluation of this initiative demonstrated that MDPP both reduced spending and improved quality of care for Medicare beneficiaries, and the Chief Actuary of the Centers for Medicare and Medicaid Services (CMS) has certified that expanding the initiative would not increase Medicare spending (RTI 2016; Spitalnic 2016; HHS 2016a). On this basis, CMS is now taking steps to begin paying providers to deliver MDPP services to eligible Medicare beneficiaries nationwide starting in 2018. The Administration has also used various pre-ACA authorities to begin covering other high-value services under Medicare in recent years, such as care management services for individuals with chronic diseases and care planning services for patients with cognitive impairments like Alzheimer's disease or dementia.

Development and Deployment of Alternative Payment Models

Most important for the long term, the Administration has also made substantial progress in deploying APMs that reorient payment to be based upon the overall cost and quality of the care providers deliver. The Administration has tested and deployed a range of different types of APMs in Medicare. Two particularly important types of APMs are bundled payment models and accountable care organization (ACO) payment models, each of which is discussed in greater detail below.

Under bundled payment models, sometimes called episode payment models, Medicare makes a single payment for all care involved in a clinical episode, rather than paying for each of those services separately.[20] Bundled payment models use a range of different approaches to define clinical episodes, but they generally start when a specified triggering event occurs and then continue for a follow-up period. For example, in a bundled payment model CMMI is currently testing for hip and knee replacement, the episode begins when the patient is admitted to the hospital for surgery and continues through 90 days after discharge. The bundled payment covers all the health care services the patient receives during that time, including the initial hospital admission, the surgeon's services, post-discharge home health services,

[20] Some bundled payment models literally make a single payment for the episode and rely on the providers involved in the patient's care to split that payment among themselves. However, most bundled payment models being tested by CMMI instead pay for care on a fee-for-service basis during the episode, and then "reconcile" these payments after the fact. If fee-for-service spending falls below the episode price, CMS makes a payment to the provider equal to the savings, while if the fee-for-service spending exceeds the episode price, the provider makes a corresponding payment to CMS. Either approach to bundled payment creates similar incentives.

and any other services associated with the patient's recovery, including those triggered by complications.

Making a single payment for this broad array of services associated with an episode allows providers to deliver the most appropriate combination of services to patients, without regard to how those individual services are compensated, creating opportunities to improve the efficiency and quality of care. Many bundled payment models further encourage quality improvement by providing a higher payment per episode to providers who perform well on specified measures of care quality. Medicare captures a portion of the savings generated by more efficient care by setting the bundled payment amount at a discount relative to the costs historically associated with each type of clinical episode.

CMMI is testing several different types of bundled payment models. Through the Bundled Payments for Care Improvement initiative, CMMI is testing bundled payments for 48 different clinical episodes, and this model has attracted nearly 1,500 participating provider organizations across the country as of the middle of 2016. Similarly, CMMI is testing bundled payment for the full scope of care provided to beneficiaries receiving chemotherapy through the Oncology Care Model, which has enrolled 194 oncology practices from markets across the country. CMMI has also begun tests of bundled payment models that include all providers in randomly selected metropolitan areas. Specifically, CMMI began this type of test of a bundled payment model for hip and knee replacement in 67 metropolitan statistical areas across the country in early 2016 and recently proposed a similar approach to testing bundled payment for additional orthopedic procedures and certain types of cardiac care.

Testing models on a geographic basis, as these new bundled payment models do, has two important advantages relative to other approaches. First, randomly selecting metropolitan areas to participate in the model ensures that participants will not differ systematically from non-participants, allowing the test to deliver particularly compelling evidence on how the model affects the efficiency and quality of care. Second, participation by all providers in the randomly-selected geographic areas allows the test to provide evidence on how the model would perform if it were expanded program-wide; evidence from tests that allow each individual provider to opt in or out of the model are much more challenging to generalize in this fashion. In light of these advantages, CBO recently noted that CMMI's ability to conduct geographically based tests is an important reason that CBO projects CMMI to generate substantial savings for the Medicare program (Hadley 2016).

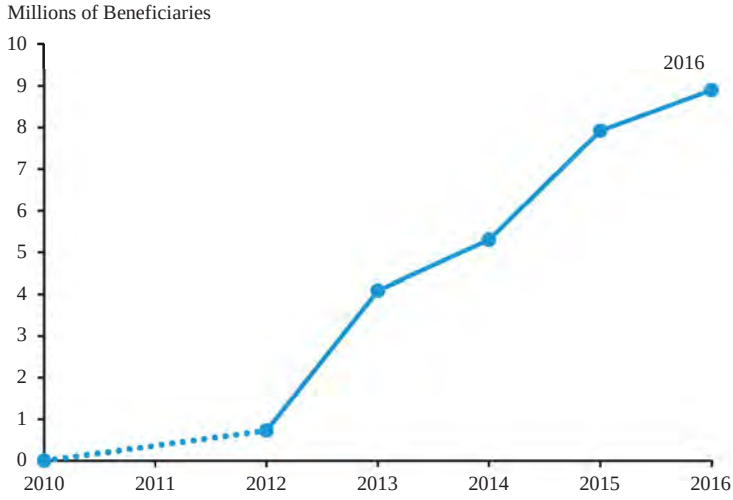
A second major category of APM deployed under this Administration are ACO models, which go a step further than episode payment models and

orient payment around the entirety of the care a patient receives during the year, rather than just the care delivered during a particular episode of care. Under an ACO model, a group of providers join together and agree to be held accountable for the overall cost and quality of the care their patients receive during a year. ACOs that reduce average per beneficiary spending below a "benchmark" level share a portion of the savings, giving providers a strong incentive to deliver care more efficiently. (Certain ACO models are "two-sided," meaning that providers also agree to repay a portion of any spending in excess of the benchmark.) ACOs that perform well on a suite of measures of the quality of the care they deliver are eligible for larger financial rewards, giving them a strong incentive to deliver high-quality care and a corresponding disincentive to limit access to necessary care.

ACOs are now widespread in the Medicare program. As of January 2016, 8.9 million traditional Medicare beneficiaries—nearly a quarter of the total—were receiving care through more than 470 ACOs, as illustrated in Figure 4-25. The substantial majority of these beneficiaries are aligned with ACOs operating under the Medicare Shared Savings Program, the permanent ACO program created under the ACA. A smaller number are participating in ACO models being tested by CMMI that aim to improve upon existing ACO models in a range of ways. These CMMI ACO models include: the Next Generation ACO; the Comprehensive ESRD Care Model, which aims to improve outcomes for patients with a particular high cost, high risk condition; and the ACO Investment Model, which supports the participation of small practices or practices in rural areas. Notably, an earlier CMMI ACO model—the Pioneer ACO model—became the first model to meet the criteria for expansion under the Secretary's expansion authority (L&M Policy Research 2015; Spitalnic 2015; HHS 2015). Features of the Pioneer ACO model have now been incorporated into the Medicare Shared Savings Program on a permanent basis.

Through CMMI, the Administration has also tested a range of other innovative payment approaches in addition to bundled payments and ACOs. For example, CMMI is testing medical home models that provide additional resources to primary care practices that agree to engage in a set of specified activities, including care management and care coordination activities, and to be held financially accountable for the cost and quality of the care their patients receive. CMMI began its first major test of medical homes through the Comprehensive Primary Care Initiative, which began operating in October 2012; currently, there are 442 participating practices in seven states. In early 2016, CMMI announced an improved medical home initiative, known as the Comprehensive Primary Care Plus model, which will begin operating in 16 states in January 2017. In collaboration with the

Figure 4-25
Medicare Beneficiaries Aligned to ACOs, 2010–2016



Note: Beneficiary counts are for January of the year shown.
Source: Centers for Medicare and Medicaid Services.

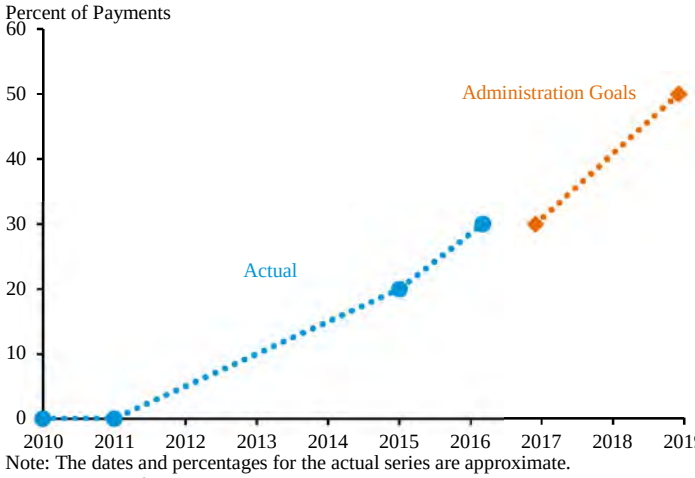
states of Maryland and Vermont, CMMI is also testing statewide all-payer initiatives aimed at making comprehensive changes in how providers in those states deliver care.

In light of the potential of APMs to improve the performance of the health care delivery system, the Administration set the goal of having 30 percent of traditional Medicare payments flowing through APMs by the end of 2016, up from essentially none before the ACA. As illustrated in Figure 4-26, CMS estimates that this goal was reached ahead of schedule in early 2016. The Administration has set the goal of having at least 50 percent of traditional Medicare payments flowing through APMs by the end of 2018.

Provisions included in the bipartisan MACRA will help accelerate the Administration's efforts to deploy APMs in Medicare. Under the law, physicians who provide a sufficiently large fraction of their care through "advanced" APMs will receive a bonus payment equal to 5 percent of their annual Medicare revenue. Advanced APMs are a category that includes most of CMS' most ambitious APMs, including the two-sided ACO models operating through the Medicare Shared Savings Program and CMMI, several of CMMI's bundled payment models, and the new Comprehensive Primary Care Plus medical home model. Additionally, CMS has committed

Figure 4-26

Percentage of Traditional Medicare Payments Tied to Alternative Payment Models, 2010–2019



Note: The dates and percentages for the actual series are approximate.
Source: Centers for Medicare and Medicaid Services.

to developing new models that qualify as advanced APMs as well to revising some existing models to meet the advanced APM criteria.

Engaging the Private Sector in Payment Reform

Reforming payment systems in Medicare is an important step, as Medicare accounts for around a quarter of all health care spending in the United States. However, more than half of Americans receive coverage through private insurers, which have also historically relied upon fee-for-service payment systems. Ensuring that all Americans receive efficient, high-quality care therefore requires improving private insurers' provider payment systems as well. In light of the substantial shortcomings of fee-for-service payment systems, it may seem puzzling that private insurers had not already done so. But insurers faced two major barriers: a serious collective action problem and poor incentives created by the tax treatment of employer-sponsored health insurance coverage.

A collective action problem exists because developing and deploying new payment models is a costly endeavor, requiring significant investments by both payers and providers, but, as described below, many of the benefits of investments made by any individual actor accrue to its competitors. As a result, each individual payer's return to investing in new payment methods

is far below the overall return to the health care sector, leading private payers to substantially underinvest in new payment approaches.

The benefits of one payer's investment in alternative approaches to provider payment spill over to other payers in two important ways. First, once new approaches to payment have been developed and providers have been induced to make the investments needed to deploy them, other payers can adopt those same payment structures at lower cost, but still realize the resulting benefits for the efficiency and quality of care. Largely for this reason, private payers have often elected to base their payment systems on Medicare's payment systems, at least in part (Ginsburg 2010). Private payers typically set payment rates for physicians by starting with the Medicare physician fee schedule rates and increasing them by a specified percentage. Consistent with this, recent research has documented that when Medicare changes the relative amount it pays for different types of physician services, private payers follow suit, at least on average (Clemens and Gottlieb forthcoming). For hospital services, there is far more diversity in the methods used, though Medicare's payment systems are a common starting point (Ginsburg 2010).

A second reason spillovers occur is that medical providers often apply a common "practice style" across all of their patients, so changes made in response to payment changes implemented by one payer often affect patients covered by other payers as well. For example, research examining the diffusion of managed care in the 1990s found that increases in the prevalence of managed care in an area led to changes in treatment patterns for patients in non-managed policies as well (Glied and Zivin 2002). Research has found similar effects for the Alternative Quality Contract (AQC), an ACO-like contract that Blue Cross Blue Shield of Massachusetts has been experimenting with since 2009. McWilliams, Landon, and Chernew (2013) report that patients who were treated by AQC-participating providers, but who were not covered by Blue Cross Blue Shield of Massachusetts, also benefited from lower costs and improved quality along some dimensions.

The Administration has taken several steps to overcome this collective action problem. The Administration's aggressive efforts to improve Medicare's payment systems, described in detail in the previous section, are one particularly important step. As discussed above, private payers often pattern their payment systems after Medicare's payment systems, so transforming payment in Medicare can facilitate improvements in private payment systems. The resulting trends in private payment approaches have been encouraging. For example, recent years have seen rapid growth in private ACO contracts alongside the growth in Medicare ACO contracts, and about 17 million—or roughly one in ten—private insurance enrollees were

covered under ACO contracts at the beginning of 2016, up from virtually none as recently as 2011 (Muhlestein and McClellan 2016). Looking across all types of APMs, a recent survey of private insurers estimated that approximately one in four claims dollars paid by private insurers flowed through an APM during calendar year 2015 (HCPLAN 2016).

The Administration has also taken a range of steps to directly overcome the collective action problem described above by facilitating collaboration across payers in developing innovative payment models. The Administration created the Health Care Payment Learning and Action Network in 2015, a forum in which providers and payers can share best practices on how to design and deploy new payment methods. Similarly, in partnership with the members of the Core Quality Measure Collaborative, a group that includes representatives of payers, providers, and consumers, CMS released agreed-upon quality measures for six major medical specialties as well as for ACO and medical home models in early 2016. CMMI has also directly included private payers in many of its model tests. For example, the medical home interventions being tested through the Comprehensive Primary Care initiatives is being implemented in parallel by CMS and other payers in each of the test markets, and the all-payer models now being tested in Maryland and Vermont involve multiple payers by definition.

These steps to facilitate collaboration across payers may have benefits in addition to resolving a collective action problem. Notably, these efforts have the potential to reduce the administrative costs to providers of participating in APMs. Reducing administrative costs is valuable in their own right, but may also facilitate more rapid diffusion of these models. Aligning incentives across payers may also make APMs more effective by ensuring that providers do not face conflicting incentives from different payers.

In addition to the collective action problem discussed above, the tax treatment of employer-sponsored health insurance coverage has been a second important barrier to the adoption of better payment methods in the private sector. In particular, employees pay income and payroll taxes on compensation provided in the form of wages and salaries, but not on compensation provided in the form of health care benefits. As discussed earlier in this chapter, this treatment means that the Federal Government provides an implicit subsidy of around 35 cents on the dollar to compensation provided in the form of health benefits that it does not provide to other forms of compensation.

As also discussed earlier in this chapter, this subsidy plays a useful role in helping make coverage affordable for many families, but it also distorts employers' incentives. Because the Federal Government subsidizes each additional dollar of health benefits, employers have a strong incentive to

provide excessively costly and inefficient health plans. This in turn undermines the business case for payers to make the plans they offer employers more efficient, including by adopting new approaches to provider payment developed in the public sector and making their own investments in better benefit designs and better approaches to provider payment.

The ACA addressed this problem by including an excise tax on high-cost employer-sponsored coverage. The tax, currently scheduled to take effect in 2020, will levy a 40-percent tax on employer plan costs in excess of about $29,000 for family coverage and about $10,700 for single coverage. Plans with higher costs due to factors such as the age-sex mix of their enrollment or the industry in which their enrollees work are eligible for higher thresholds. The tax applies only to the portion of plan costs in excess of the threshold; for example, a family plan with a cost of $29,100 in 2020 would pay just $40 in tax. For these very high-cost plans, this structure counteracts the perverse incentives to offer overly generous coverage that existed under pre-ACA law, while preserving strong incentives for employers to offer appropriate coverage. The Treasury Department estimates that 7 percent of enrollment in employer-sponsored coverage and around 1 percent of plan costs will be affected when the tax takes effect in 2020.

The most direct effects of the tax will be on enrollees in the high-cost plans affected by the tax. As their employers take steps to make their plans more efficient, workers at these firms will see lower premiums and correspondingly higher wages, which Congressional Budget Office and Joint Committee on Taxation estimates imply will be around $43 billion in 2026 alone.[21] However, the benefits of this reform are likely to be felt throughout the health care system, not just by enrollees in highly inefficient plans. Just as improvements in Medicare's payment systems generate spillover benefits for the rest of the health care system, payment innovations adopted by inefficient plans are likely to generate benefits for enrollees in many different types of coverage. Similarly, the excise tax on high-cost coverage will encourage plans and employers to engage in more aggressive price negotiation with medical providers. By weakening the bargaining position of providers relative to plans, the excise tax will help plans not directly affected by the tax secure lower prices for their enrollees (Baker, Bundorf, and Kessler 2015).

[21] This estimate was derived from an August 2016 estimate by the Congressional Budget Office (CBO) and Joint Committee on Taxation (JCT) that repealing the excise tax would increase the deficit by $20 billion in 2026 (CBO 2016a). CBO/JCT assume that roughly three-quarters of the fiscal effects of the tax arises from the increase in payroll and income tax revenue as workers' wages rise (CBO 2015a). Calculations based on tables published by the Urban-Brookings Tax Policy Center imply that the average marginal tax rate on labor income for individuals with employer coverage is around 35 percent (see Urban-Brookings Tax Policy Center Tables T13-0253 and T14-0091). Combining these estimates implies an increase in wage and salary income of $43 billion (=[$21 billion * 0.75]/0.35).

Additional Steps to Reform the Health Care Delivery System

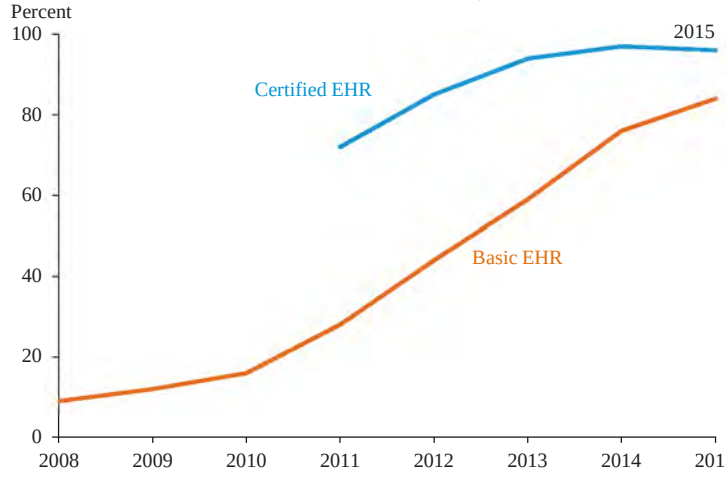
This Administration has also taken a range of other steps to reform the health care delivery system that complement the provider payment reforms discussed in the rest of this section. One such effort aimed to accelerate the deployment of health information technology (IT). Studies of health IT adoption have found positive impacts on the quality and efficiency of patient care (Buntin et al. 2011; Shekelle et al. 2015). For example, numerous studies provide evidence that computerized physician order entry systems, which can alert doctors to possible medication allergies or dosing errors, prevent adverse drug events (Jones et al. 2014; Shamliyan et al. 2008).

To spur greater use of health IT, the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 created financial incentives for Medicare and Medicaid providers to adopt and make "meaningful use" of electronic health records (EHR). More recently, MACRA updated the HITECH incentives for physicians to use health IT and integrated them into Medicare's core physician payment system. Providers participating in the value-based payment system for physicians established under MACRA will be scored, in part, on their use of EHRs to improve the quality of patient care. MACRA also incorporates the use of certified EHRs (EHRs that meet certain criteria for capturing and sharing patient data) into the determination of whether a payment model qualifies as an advanced APM and thereby qualifies participating physicians for the bonus payments described in the last section.

Recent years have seen substantial progress in deploying EHRs. As illustrated in Figure 4-27, 84 percent of non-Federal acute care hospitals had adopted a basic EHR (an EHR that can perform a certain set of core functions) as of 2015, up from just 16 percent in 2010. An even greater share of hospitals possessed at least a certified EHR system. EHR use has also become common among office-based physicians. In 2015, 78 percent of office-based physicians had an EHR and more than a third had used their EHR system to transmit patient health information to external providers (Jamoom and Yang 2016). Focusing on hospitals, Dranove et al. (2015) found evidence that the HITECH payment incentives had accelerated EHR adoption.

This Administration has also taken steps to improve the availability of information on how cost and quality performance vary across medical providers to help consumers, employers, and others make better-informed choices about where to obtain care. For example, the Qualified Entity program, which was created by the ACA and expanded by MACRA, allows organizations that agree to abide by rigorous privacy and security requirements to use Medicare claims data to create public reports comparing the performance of different medical providers. CMS has also improved and

Figure 4-27
Percent of Non-Federal Acute Care Hospitals with Electronic Health Records, 2008–2015



Source: American Hospital Association; Office of the National Coordinator for Health Information Technology.

expanded the websites it operates to deliver information on provider performance directly to consumers; these websites now include information on performance by hospitals, nursing homes, physicians, dialysis facilities, home health providers, and Medicare Advantage and Part D prescription drug plans. Additionally, CMS has begun releasing versions of Medicare's claims databases that have been stripped of beneficiary-identifying information as public use files. The availability of public use files can help researchers better understand patterns of care in the Medicare program in order to evaluate the effectiveness of ongoing delivery system reform efforts and develop new approaches to delivery system reform.

The ACA also created a streamlined process for implementing needed changes to Medicare's payment systems in the future. In detail, it established an Independent Payment Advisory Board (IPAB) of 15 voting members appointed by the President and confirmed by the Senate. If growth in Medicare spending per beneficiary is projected to exceed a target growth rate over a five-year period, IPAB is charged with recommending improvements in how Medicare pays providers to reduce Medicare spending growth; IPAB is not permitted to recommend changes to Medicare's benefit design, including premiums, deductibles, and coinsurance. The Secretary of Health and Human Services then implements IPAB's recommendations unless

legislation that overrides the recommendations is enacted. Over the long run, the target growth rate for IPAB is the growth rate of per capita GDP plus 1 percentage point. However, a more stringent target was set for years through 2017: the average of projected growth in the overall Consumer Price Index (CPI) and the CPI for medical care. Because of the exceptionally slow growth in Medicare spending since the ACA became law, which is discussed in greater detail in the next section, IPAB has not yet been called upon to make recommendations despite this stringent target.

Recent Trends in Health Care Costs and Quality

As the reforms described in the last section have taken effect, the United States has seen exceptionally slow growth in health care costs, as well as promising improvements in the quality of care patients receive. This progress has been seen in every part of the health care system, including both public insurance programs like Medicare and Medicaid and private coverage. While the factors driving these encouraging trends are not fully understood, there is clear evidence that the reforms introduced in the ACA, together with other actions taken by this Administration, are playing an important role. This section of the chapter provides a detailed description of recent trends in health care costs and quality, as well as what is known about the causes of these trends.

Recent Trends in Health Care Costs

Economists commonly focus on three distinct measures of health care costs: unit prices; per enrollee spending; and aggregate spending. Unit prices are the amounts paid for a single unit of a health care good or service, such as a physician visit, a hospital admission, or a dose of medicine. Lower unit prices, holding quality fixed, are unambiguously good for consumers because they allow consumers to purchase the same medical care for less money, leaving more money to purchase other valued goods and services.

Per enrollee spending refers to the average health care spending per person enrolled in insurance coverage and is determined by both the unit prices of health care and the average quantity of services used by enrollees. Per enrollee spending is what ultimately determines what consumers pay in the form of premiums and cost sharing. Slower growth in per enrollee spending that reflects slower growth in health care prices is unambiguously good for consumers, for the reasons described above. Slower growth in per enrollee spending that reflects slower growth in utilization of services will often benefit consumers as well, provided that slow growth is achieved without worsening the quality of care.

Aggregate spending refers to the total amount the country spends on health care and is influenced by both spending per individual enrolled in coverage and the number of individuals enrolled in coverage. Faster growth in aggregate spending can be a negative development if it reflects faster growth in per enrollee spending that is not justified by concomitant improvements in quality. However, it can also be a positive development if, for example, it reflects improvements in access to care due to expanded health insurance coverage. Aggregate spending is not directly relevant to consumers.

Recent trends in each of these measures are examined below.

Health Care Prices

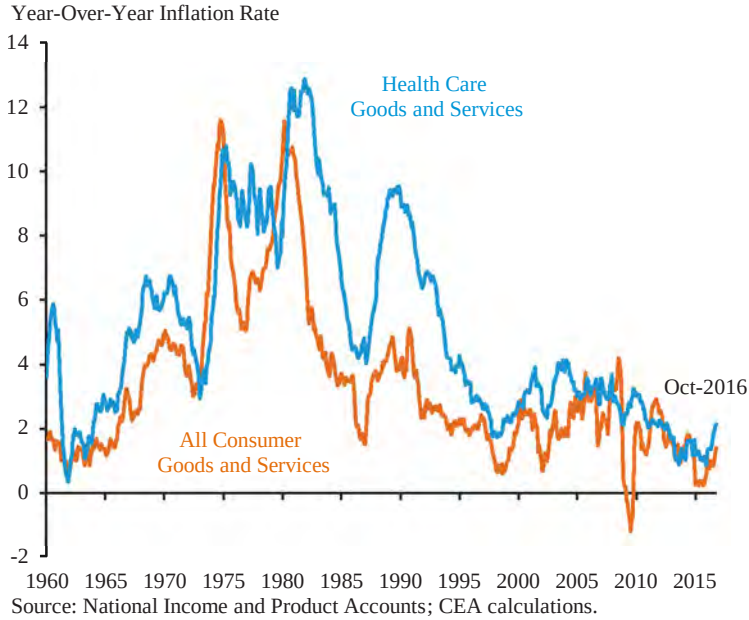
The period since the ACA became law has seen exceptionally slow growth in health care prices, as depicted in Figure 4-28. From March 2010 through October 2016, prices of health care goods and services have risen at an annual rate of 1.7 percent, far below the 3.2-percent annual rate seen over the preceding decade and even farther below the 5.4-percent annual rate over the preceding 50 years.[22] In fact, the rate of health care price inflation since the ACA became law has been slower than over any prior period of comparable length since these data began in 1959.

The slow growth in health care prices in recent years is not merely a reflection of slow inflation throughout the economy. Rather, the rate of increase in health care prices has been unusually low *relative* to the rate of increase in prices overall. Indeed, as depicted in Figure 4-29, the rate of increase in health care prices has exceeded the rate of overall inflation by just 0.2 percentage point since the ACA became law, whereas the rate of increase in health care prices exceeded overall inflation by 1 percentage point or more in both the recent and longer-term past.

Health care prices have grown slowly in both of the two largest categories of health care spending: hospital and skilled nursing facility (SNF) services and outpatient services. Real prices for outpatient services have actually *fallen* during the post-ACA period, while real prices for hospital and SNF services have barely risen. The one important exception to this pattern

[22] The price index for health care goods and services reported here was derived from Personal Consumption (PCE) Expenditures data produced by the Bureau of Economic Analysis. Price indices for the outpatient services, hospital and nursing home services, pharmaceutical products, other medical products, therapeutic appliances and equipment, and net health insurance categories were combined to construct a Fisher index for the aggregate. The Bureau of Labor Statistics also reports data on health care prices as part of the Consumer Price Index (CPI). This chapter relies on the PCE price indices because they endeavor to measure trends in health care prices throughout the economy, whereas the CPI encompasses a more limited set of transactions. Both series, however, show broadly similar trends in health care prices.

Figure 4-28
Health Care Price Inflation vs. Overall Inflation, 1960–2016



Source: National Income and Product Accounts; CEA calculations.

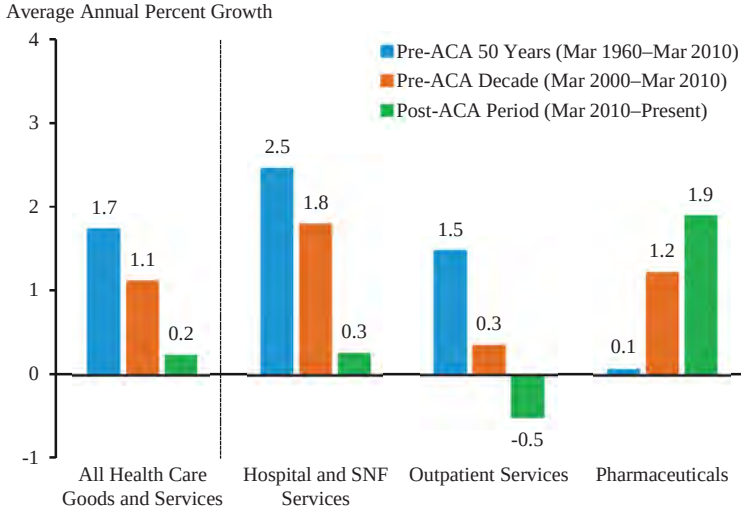
is pharmaceutical prices, which have grown somewhat faster post-ACA than they have historically.

For most categories of services, data limitations make it challenging to separately examine the prices paid by private insurance, Medicare, and Medicaid. One important exception, however, is services provided by general medical and surgical hospitals, which deliver the overwhelming majority of hospital services and account for around a third of total health care spending. As depicted in Figure 4-30, growth in prices paid to these hospitals has been sharply lower during the post-ACA period for all three payer categories, with a particularly large slowdown for services provided to Medicare beneficiaries.

Per Enrollee Health Care Spending

The period since the ACA became law has also seen exceptionally slow growth in overall per enrollee health care spending, as illustrated in Figure

Figure 4-29
Trends in Real Health Care Prices, by Service, 1960–2016



Source: National Income and Product Accounts; CEA calculations.

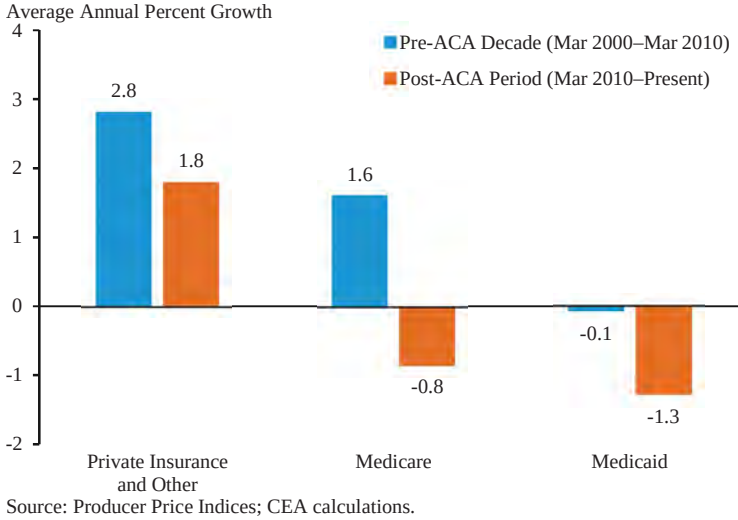
4-31.[23] Real per enrollee spending in private insurance has risen at an average rate of just 1.5 percent per year during the post-ACA period, well below the pace recorded over either the five-year period that immediately preceded the ACA or the five-year period before that. Medicare spending has followed a similar pattern, with real Medicare spending per enrollee actually falling at an average annual rate of 0.3 percent per year during the post-ACA period. (Per enrollee spending growth in Medicaid has also fallen during the post-ACA period, although these trends are more complicated to interpret due to significant compositional changes in the types of individuals enrolled in Medicaid during both the pre-ACA and post-ACA periods.)

Per enrollee spending growth has slowed markedly across all major service categories, including hospital services, physician services, and prescription drugs, as illustrated in Figure 4-32. Notably, where comparable data are available, the decline in real per enrollee spending growth exceeds the decline in the growth of real health care prices described previously, indicating that much of the decline in per enrollee spending growth reflects slower growth in the utilization of health care services. For example, the

[23] The spending amounts attributed to each insurance type in the National Health Expenditure Accounts reflect only the payments made by the insurer. They do not include amounts borne by enrollees such as deductibles, coinsurance, or copayments. Including these amounts would not change the main conclusions reached here.

Figure 4-30

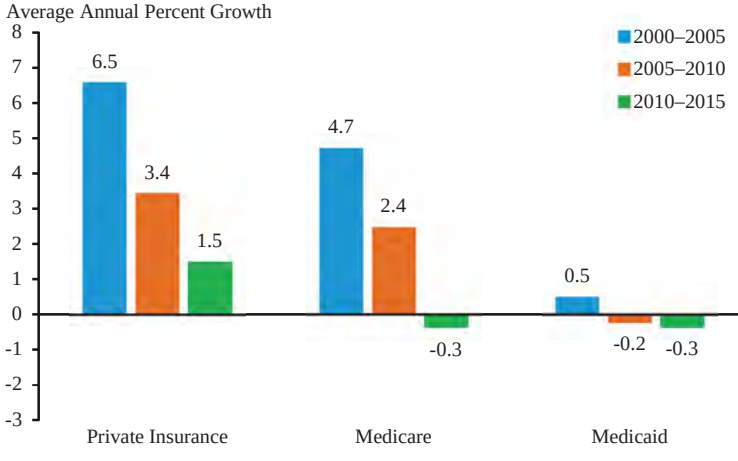
Trends in Real Prices for General Medical and Surgical Hospitals, by Payer, 2000–2016



Source: Producer Price Indices; CEA calculations.

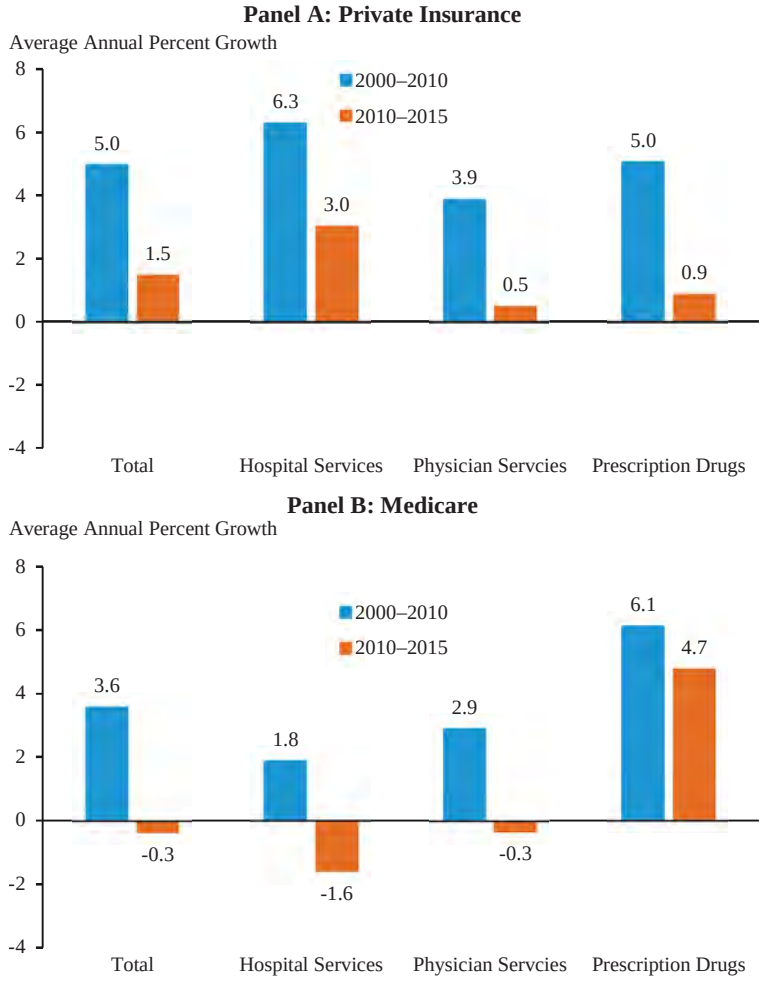
Figure 4-31

Real Per Enrollee Spending Growth, By Payer, 2000–2015



Note: Medicare growth rate for 2005–2010 was calculated using the growth rate of non-drug Medicare spending in place of the growth rate of total Medicare spending for 2006 to exclude effects of the creation of Medicare Part D. Inflation adjustments use the GDP price index.
Source: National Health Expenditure Accounts; National Income and Product Accounts; CEA calculations.

Figure 4-32
Real Per Enrollee Health Care Spending by Service and Payer, 2000–2015



Note: To exclude effects of the creation of Medicare Part D, the average growth rate of Medicare spending for 2000–2010 was calculated using the growth rate of non-drug Medicare spending in place of the growth rate of total Medicare spending for 2006. Similarly, the average growth for Medicare prescription drug spending reflects 2006–2010 rather than 2000–2010.
Source: National Health Expenditure Accounts; National Income and Product Accounts; CEA calculations.

average growth rate of real per enrollee private insurance spending on hospital services has been 3.3 percentage points lower in the post-ACA period than over the pre-ACA decade, whereas the growth rate of the prices private insurers pay for hospital care has declined by only 0.8 percentage point over the same period.[24] Similarly, real per enrollee Medicare spending on hospital services has fallen by 3.4 percentage points from the pre-ACA decade to the post-ACA period, while the growth rate of the real prices Medicare pays for hospital services has declined by only 2.5 percentage points.

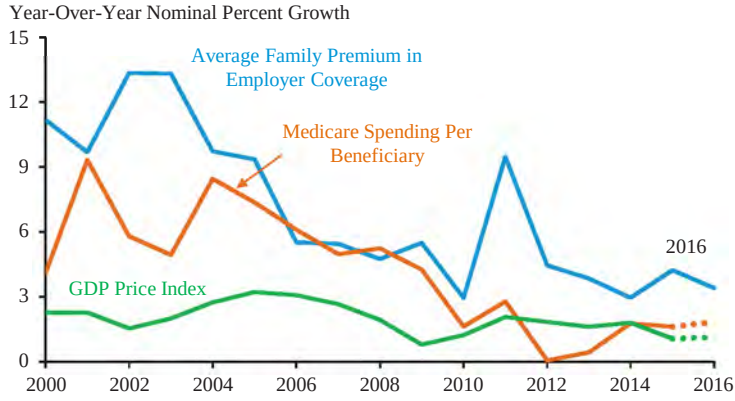
Figures 4-31 and 4-32 extend only through 2015 because they rely upon data from the National Health Expenditure Accounts, which only report annual data. However, timely indicators of per enrollee health care spending indicate that spending growth has remained low into 2016, as illustrated in Figure 4-33. CEA analysis of data on Medicare spending published by the Treasury Department indicates that growth in Medicare spending per beneficiary for the first 10 months of 2016 was roughly in line with 2015 and well below longer-term historical experience. Similarly, data from the annual Employer Health Benefits Survey conducted by the Kaiser Family Foundation and Health Research and Educational Trust's (KFF/HRET) indicate that growth in employer premiums remained near its post-2010 lows in 2016.

Trends in employer coverage merit particularly detailed attention since well more than half of non-elderly Americans get coverage through an employer. As illustrated in Figure 4-34, slow growth in underlying medical costs has translated into slow growth in the premiums of employer plans, with real premium growth dropping from an average annual rate of 5.6 percent in the pre-ACA period to an average annual rate of 3.1 percent since the ACA became law. Notably, growth in the portion of the premium paid directly by the worker has fallen by more than growth in the total premium. While economists generally believe that the total premium is the more relevant measure of the overall premium burden because workers ultimately pay for the employer's contribution to premiums indirectly through lower wages, workers' direct contributions may be particularly salient to individuals.

In principle, trends in premiums could be a misleading indicator of the overall trend in the health costs for individuals with employer coverage if the share of spending that enrollees bear in the form of out-of-pocket costs like coinsurance, copayments, and deductibles is changing over time. As

[24] This estimate of the slowdown in growth of real hospital prices differs modestly from what is reported in Figure 4-28. This is because, to align with the estimates reported in Figure 4-31, this calculation reflects the 2010–2015 period rather than the March 2010–March 2016 time period and uses the GDP price index, rather than the PCE price index, to adjust for inflation.

Figure 4-33
Nominal Per Enrollee Health Care Spending Growth, 2000–2016



Note: Medicare estimates through 2015 are from the National Health Expenditure Accounts; the Medicare growth rate for 2006 reflects only non-drug spending to exclude effects of the creation of Medicare Part D. The Medicare estimate for 2016 reflects CEA analysis of Treasury data and covers the first ten months of the year. GDP price index for 2016 is a CBO projection.
Source: Kaiser Family Foundation/Health Research and Educational Trust Employer Health Benefits Survey; National Health Expenditure Accounts; Monthly & Daily Treasury Statements; National Income and Product Accounts; CEA calculations.

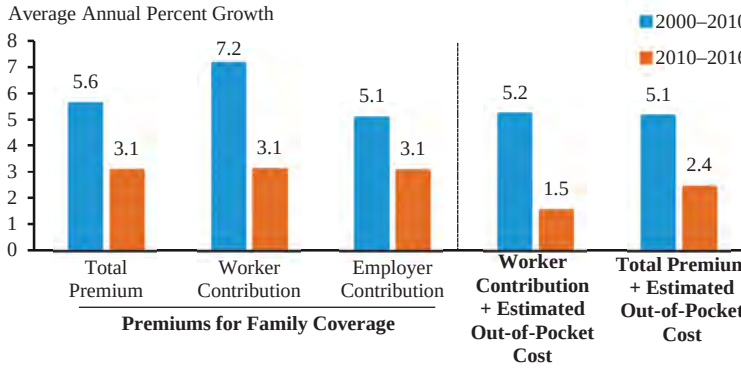
discussed in greater detail in the next subsection of this chapter, there is no evidence that out-of-pocket spending obligations have risen more quickly during the post-ACA period than the preceding years. Indeed, the rightmost columns of Figure 4-34 combine the KFF/HRET data on premiums with data on the out-of-pocket share in employer coverage from the Medical Expenditure Panel Survey's Household Component. If anything, accounting for out-of-pocket costs makes the decline in cost growth for individuals enrolled in employer coverage look slightly larger. While the extent to which incorporating data on out-of-pocket costs magnifies the slowdown in cost growth in employer coverage is somewhat sensitive to which data source is used to measure out-of-pocket costs, the core finding appears relatively robust.

Aggregate Health Care Spending

Driven by the very slow growth in per enrollee health care spending documented above, the years immediately after 2010 saw exceptionally slow growth in aggregate national health expenditures, with 2011, 2012, and 2013 seeing the slowest growth rates in real per capita national health expenditures on record, as shown in Figure 4-35. Growth in aggregate national health expenditures increased in 2014 and 2015, driven in large part by the historic expansion in health insurance coverage that began in 2014.

Figure 4-34

Growth in Real Costs for Employer-Based Family Coverage, 2000–2016



Note: Out-of-pocket costs were estimated by first using the Medical Expenditure Panel Survey to estimate the out-of-pocket share in employer coverage for 2000–2014 and then applying that amount to the premium for each year to infer out-of-pocket spending. The out-of-pocket share for 2015 and 2016 was assumed to match 2014. Inflation adjustments use the GDP price index. GDP price index for 2016 is a CBO projection.
Source: Kaiser Family Foundation/Health Research and Educational Trust Employer Health Benefits Survey; Medical Expenditure Panel Survey, Household Component; CEA calculations.

Figure 4-35

Growth in Real Per Capita National Health Expenditures, 1961–2015

Note: Inflation adjustment uses the GDP price index.
Source: National Health Expenditure Accounts; National Income and Product Accounts; CEA calculations.

Indeed, Holahan and McMorrow (2015) estimate that the expansion in insurance coverage added between 1.4 percentage points and 2.1 percentage points to the growth of national health expenditures in 2014. This implies that, absent the expansion in coverage, 2014 would have been another year of historically slow growth in aggregate health care spending, falling somewhere between the slowest and third-slowest year on record. The coverage gains that occurred during 2015 were almost as large as those occurring during 2014, and some of the upward pressure on spending growth from coverage gains during 2014 may have appeared during 2015, so expanding coverage likely placed a similar degree of upward pressure on aggregate spending growth in 2015. Without this upward pressure, real per capita spending growth would have been around 2 percent in 2015, also near the bottom of historical experience.

Furthermore, as noted earlier, faster growth in aggregate health care spending due to expanding coverage is not a cause for concern. Faster aggregate spending growth is the expected consequence of the major improvements in access to care that have occurred as coverage has expanded and does not indicate that costs are rising more quickly for individuals who are already covered. Moreover, faster growth in aggregate spending due to expanding coverage will be temporary, continuing only until insurance coverage stabilizes at its new higher level. Consistent with that expectation, more timely data on health care spending from the Bureau of Economic Analysis suggest that aggregate health care spending growth has begun to moderate in recent months as the pace of coverage gains has slowed.

Understanding the Recent Slow Growth in Health Care Costs

An important question is what has caused the very slow growth in health care costs under the ACA. Broader economic and demographic trends do not provide a satisfactory explanation for recent trends. The Great Recession cannot explain the slow growth in Medicare spending, nor can it explain why spending growth in the private sector remains so low years after the end of the recession. Similarly, demographic changes can explain only a small portion of the slowdown in per enrollee health care spending and actually make the slowdown in aggregate health care spending growth look slightly larger.

This evidence implies that recent trends in health care spending primarily reflect developments internal to the health care sector. Changes in the cost sharing obligations borne by individuals do not appear to explain recent trends, suggesting that the main factor has been changes in the health care delivery system. Within the delivery system, there are likely a number of factors playing a role, but the ACA's changes to provider payment have

made a large, readily quantifiable contribution, and there is reason to believe that the ACA's effects on recent trends may go beyond what can be easily quantified today.

Each of these factors is discussed in greater detail below.

The Great Recession and Its Aftermath

Some analysts have pointed to the economic disruptions caused by the Great Recession as a possible explanation for the slow growth in health care costs under the ACA. However, this explanation does not fit the available data. Most fundamentally, the Great Recession does not appear to be able to explain any meaningful portion of the slow growth in Medicare spending in recent years. In addition, while it appears that the Great Recession did dampen private sector spending growth in the years during and immediately after the downturn, it is doubtful that the recession and its aftermath can explain why spending growth has remained low all the way through the present, more than seven years after the recession's end.

The fact that health care spending growth has grown slowly in Medicare, not just private insurance, is the clearest evidence that recent health care spending trends reflect much more than just the Great Recession and its aftermath. Medicare beneficiaries are generally not employed and only around a fifth live in families that get more than half of their income from earnings, so they are relatively insulated from developments in the labor market. Likewise, only around a quarter of Medicare beneficiaries have asset income in excess of $1,000 annually, suggesting that the typical beneficiary is relatively insulated from financial market developments as well.[25]

Empirical evidence strongly supports the view that the Great Recession had little effect on trends in Medicare spending. Historically, weaker macroeconomic performance has not been associated with lower growth in Medicare spending per beneficiary, either at the national level or when comparing across states experiencing stronger and weaker macroeconomic performance at a given point in time (Levine and Buntin 2013; Chandra, Holmes, and Skinner 2013; Sheiner 2014). Similarly, Dranove, Garthwaite, and Ody (2015) directly compare Medicare spending growth in areas of the country that experienced larger and smaller reductions in employment during the Great Recession. They conclude that the recession had only small effects on Medicare spending growth.

It is more plausible that the Great Recession could have affected health care spending among people under age 65. Non-elderly Americans generally depend on the labor market for their livelihoods, and those who have health insurance overwhelmingly receive coverage through an employer, as

[25] These estimates reflect CEA analysis of the Current Population Survey Annual Social and Economic Supplement data covering 2015.

illustrated in Figure 4-3. As a result, there many mechanisms through which the Great Recession could have affected the health care spending of people under age 65.

Most directly, an economic downturn could cause some individuals to become uninsured. For example, reduced employment could reduce access to employer coverage, and increased financial stress could cause families to conclude that premiums are unaffordable. Alternatively, financial pressure could cause employers to stop offering coverage or charge higher premiums. The uninsured rate among non-elderly adults did indeed increase sharply during and immediately after the Great Recession, as depicted in Figure 4-5. Because the uninsured are much less likely to access health care, as discussed earlier in this chapter, this development likely exerted downward pressure on aggregate health care spending growth during this period. However, the uninsured rate for non-elderly individuals peaked by 2010, so increases in the number of uninsured cannot explain why health care spending growth has remained low since that time. Furthermore, reductions in the number of people with coverage through an employer cannot explain why per enrollee health care spending, not just aggregate health care spending, has grown so slowly.

There are, however, mechanisms by which an economic downturn might affect spending by individuals who remain insured. Financial stress could cause individuals to de-prioritize spending on health care or cause employers to modify the coverage they offer in ways that reduce health care spending, such as by increasing cost sharing. Whatever the mechanism, there is empirical evidence that the Great Recession reduced the growth of per enrollee health care spending in employer coverage in its immediate aftermath. Ryu et al. (2013) find that the recession increased cost sharing in employer coverage and estimate that those increases subtracted around 1 percentage point per year from the growth of per enrollee health care spending in employer coverage in both 2010 and 2011, with smaller reductions in earlier years. Similarly, Dranove, Garthwaite, and Ody (2014) compare growth in per enrollee spending in employer coverage in metropolitan statistical areas that experienced larger and smaller reductions in employment during the Great Recession. They conclude that the Great Recession subtracted an average of 1.8 percentage points per year from growth in per enrollee spending in employer coverage in 2010 and 2011.

While this evidence demonstrates that the Great Recession exerted downward pressure on growth in private insurance spending in the years around 2010, it is doubtful that it can explain why per enrollee spending growth in private coverage has remained low through the present, as was illustrated in Figure 4-33. Research comparing health care spending growth

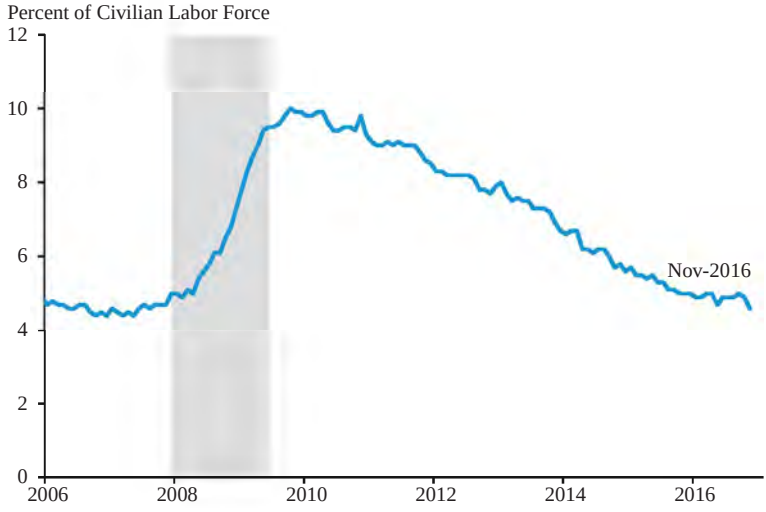
in states experiencing weaker and stronger economic performance at a given point in time has generally concluded that, to the extent economic downturns affect health care spending growth at all, those effects fade almost completely within a few years (Chandra, Holmes, and Skinner 2013; Sheiner 2014). Because the labor market reached its trough by early 2010 and has recovered steadily since then, as illustrated in Figure 4-36, this evidence would suggest that the recession can play only a limited role in explaining why private health care spending growth has been so slow during the post-ACA period, particularly over the last few years.

One potential shortcoming of using cross-state comparisons to estimate the relationship between macroeconomic conditions and private health insurance spending is that these types of analyses cannot capture effects of economic downturns that operate at the national level, rather than state or local level. It is possible that these types of national effects might persist for a longer period of time. In an effort to capture these national effects, some researchers have examined the correlation between economic growth and growth in private health insurance spending at the national level over time.

Taken at face value, results from these "time series" analyses suggest that economic growth has large effects on private health insurance spending that emerge with a four- or five-year lag (Chandra, Holmes, and Skinner 2013; Sheiner 2014). However, analyses of this type have important methodological weaknesses. Unlike analyses that compare outcomes across different geographic areas at the same point in time, time series analyses cannot control for unobserved factors that might cause health care spending to change over time. As a result, these approaches are at much greater risk of mistaking changes in private health insurance spending growth that *coincided with* an economic downturn for change in private health insurance spending growth that were *caused by* an economic downturn.

Moreover, it is unclear whether the results from these analyses are economically plausible. In particular, the most plausible way an economic downturn could generate long-lasting effects on health care spending growth is by changing the development and diffusion of medical technology. However, as noted by Sheiner (2014), four to five years may be too soon for a downturn to have meaningful effects on the path of medical technology, given the long duration of the research and development process. Furthermore, if economic downturns change the path of medical technology in the medium term, that should affect spending growth in Medicare in addition to private insurance. However, there is little evidence that economic downturns affect spending growth in Medicare at any time horizon.

Figure 4-36
Unemployment Rate, 2006–2016



Note: Shading denotes recession.
Source: Bureau of Labor Statistics.

Demographic Changes

Demographic changes are another factor outside the health care system that could affect health care spending trends. As illustrated in Figure 4-37, the United States population is currently aging. Because age is an important determinant of health care spending, differences in how the age distribution is changing at different points in time can cause differences in health care spending growth over time.

Figure 4-38 reports estimates of how health care spending would have changed in recent years based solely on changes in the age and sex

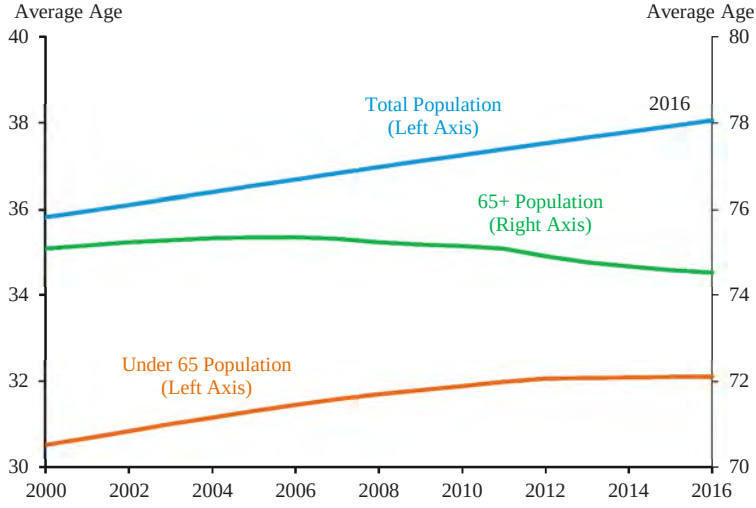
distribution, holding fixed both spending and coverage patterns.[26] Consistent with the steady increase in the average age of the full population depicted in Figure 4-37, demographic changes have consistently added to aggregate health care spending growth in recent years. Over the decade preceding the ACA, these demographic factors added an average of 0.5 percentage point per year to growth of per capita health care spending in the full population. Those effects have been slightly larger in the years following passage of the ACA, averaging around 0.6 percentage point per year from 2010 through 2016. Thus, at the level of the population as a whole, demographic changes cannot explain why growth has slowed.

On the other hand, demographic changes can explain a small portion of the slowdown in the growth of per enrollee spending in private insurance and Medicare. As illustrated in Figure 4-37, the aging of the baby boomers drove a steady increase in the average age of the under 65 population during the decade that preceded the ACA, which essentially stopped when the first cohort of baby boomers reached age 65 in 2012. At that time, demographic factors abruptly began placing less upward pressure on per enrollee spending growth in private insurance, as illustrated in Figure 4-38. Whereas demographic changes added an average of 0.6 percentage point per year to private spending growth from 2000 through 2010, they have added an average of just 0.2 percentage point per year since 2010. Thus, demographics can explain a non-zero, but small portion of the decline in private health insurance spending growth.

Demographic changes have had a related effect in Medicare. As the early cohorts of baby boomers have turned 65, the average age among

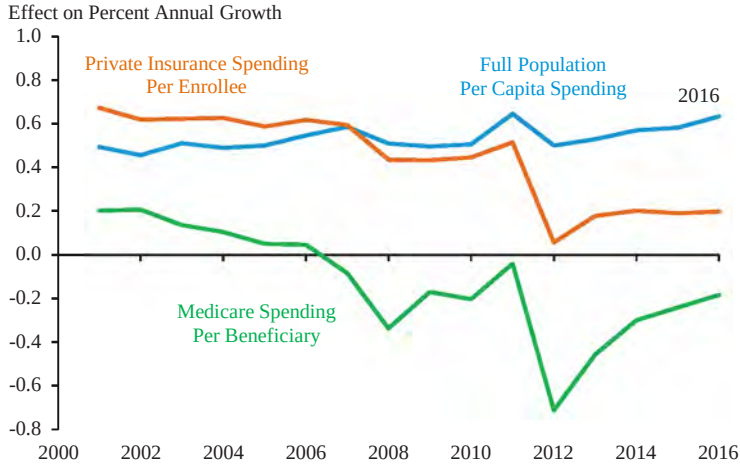
[26] The first step in producing these estimates was to allocate the population across private coverage, public coverage, and uninsurance in each year, holding the age-specific propensity to be enrolled in each type of coverage fixed, but allowing population demographics to change over time. Age-specific enrollment propensities for private insurance, public coverage, and uninsurance were set at the 2000-2015 average for each age, as estimated using the National Health Interview Survey for those years. Data on the population by age and sex in each year were obtained from various Census Bureau population estimates and projections. The second step was to obtain data on spending by age and coverage type. Yamamoto (2013) reports data on relative spending by single year of age for commercial coverage and traditional Medicare coverage. Because Yamamoto (2013) reports relative spending by age within commercial and traditional Medicare coverage, additional information is required to put the commercial and traditional Medicare spending curves on the same absolute scale. To do so, CEA relied upon an estimate from Wallace and Song (2016) that spending falls by 34 percent, on average, for individuals converting from commercial coverage to traditional Medicare at age 65. The commercial age curve was used for all individuals with private coverage, while the traditional Medicare age curve was used for all Medicare enrollees. For individuals under age 65 with public coverage, spending was assumed to reflect the commercial age curve scaled down by 20 percent. For individuals under age 65 who were uninsured, spending was assumed to reflect the commercial age curve scaled down by 50 percent. The results are not particularly sensitive to the approach used for these groups.

Figure 4-37
Average Age in Population, 2000–2016



Note: Age was top-coded at 100 years in the data used to calculate these averages.
Source: Census Bureau; CEA calculations.

Figure 4-38
Effects of Changes in the Age Distribution on Health Care Spending Growth, by Payer, 2001–2016



Source: Census Bureau; Yamamoto (2013); Wallace and Song (2016); National Health Interview Survey; CEA calculations.

individuals among individuals 65 and older has declined, placing significant downward pressure on growth in Medicare spending per beneficiary. As reported in Figure 4-38, after having had little net effect on per beneficiary Medicare spending growth over the decade preceding the ACA, demographic changes have subtracted around 0.3 percentage point per year during the post-ACA period. As with the effects reported above, this effect is not trivial but still relatively small in relation to the overall slowdown in the growth of Medicare spending.

Changes in Enrollee Cost Sharing

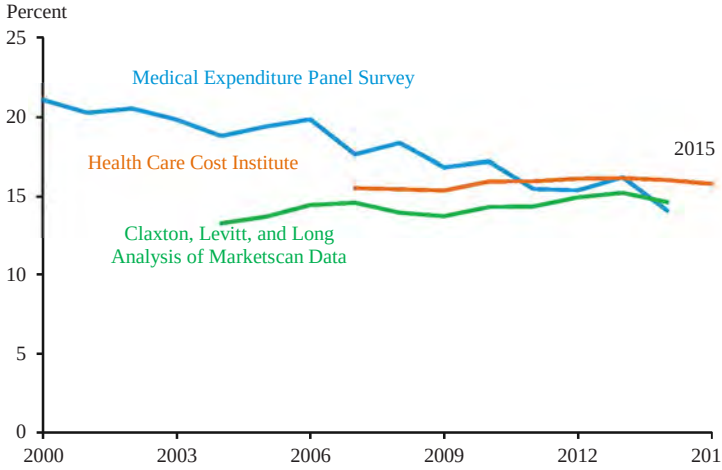
Changes in cost sharing obligations, such as coinsurance, copayments, and deductibles, are another possible explanation for the slower growth in health care spending since the ACA became law. It is well-established that higher cost sharing causes individuals to use less care (for example, Newhouse et al. 1993), so if cost sharing obligations had grown more rapidly during the post-ACA period than during the pre-ACA period, this could account for slower growth in health spending after the ACA's passage. In fact, there is no evidence that this has occurred.

Focusing first on individuals who get coverage through an employer, Figure 4-39 plots out-of-pocket spending as a share of total spending in employer coverage over time derived from three different data sets: the Household Component of the Medical Expenditure Panel Survey (MEPS) and two different databases of health insurance claims.[27] The MEPS estimates suggest that the out-of-pocket share has been declining steadily since at least 2000 with, if anything, a faster pace of decline after 2010 than before 2010. The estimates from the two claims databases suggest that the out-of-pocket share has been relatively flat, with small increases in the out-of-pocket share in the years before 2010 and little net change after 2010. Thus, there is no evidence that cost sharing obligations have grown more quickly after 2010 and, therefore, no evidence that faster growth in cost sharing can explain slower growth in health care spending. If anything, these data suggest that cost sharing trends may have worked slightly *against* the slowdown in health care spending growth observed in recent years.[28]

[27] Each of these data series has strengths and weaknesses. The MEPS is nationally representative, whereas the claims databases are not. On the other hand, the claims databases offer larger sample sizes. They also offer more accurate information on each individual transaction since they contain the actual transaction records.

[28] This conclusion is even stronger if consumers' decisions on whether to access care depend on the *dollar amounts* they pay when they access care rather than the *share of total spending they pay*. The absolute dollar amount of cost sharing has grown more slowly in the post-ACA period than the pre-ACA period due to the combination of sharply lower overall spending growth and the relatively steady trend in the out-of-pocket share.

Figure 4-39
Out-of-Pocket Share in Employer Coverage, 2000–2015

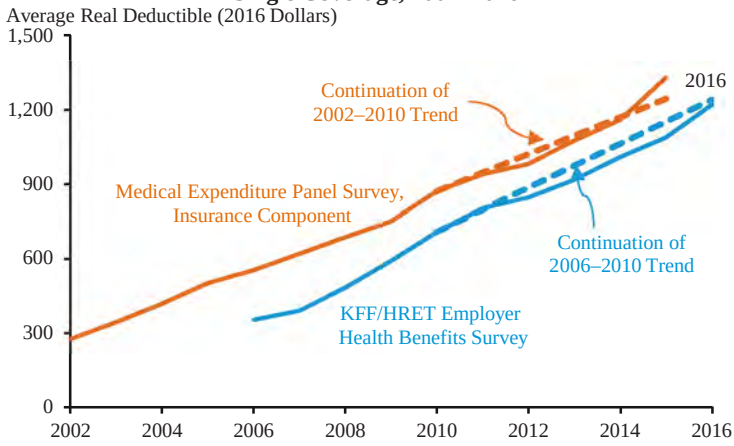


Note: Different vintages of the HCCI series were combined by starting with the most recent series and extrapolating backwards based on percentage point changes.
Source: Medical Expenditure Panel Survey, Household Component; Health Care Cost Institute and Herrera et al. (2013); Claxton, Levitt, and Long (2016); CEA calculations.

The overall out-of-pocket share, reported in Figure 4-39, is the best metric for evaluating trends in cost sharing in employer coverage because it captures all types of cost sharing, including copayments, coinsurance, and deductibles. Focusing on individual categories of cost sharing can provide a misleading picture of the overall trend in out-of-pocket costs since different components can grow at different rates. Notably, enrollees' copayments and coinsurance obligations have grown quite slowly in recent years, while deductible spending has grown much more quickly (Claxton, Levitt, and Long 2016). This is likely in part because deductibles have simply supplanted these other types of cost sharing and in part because of the ACA's reforms requiring insurance plans to cover preventive services without cost sharing and to limit enrollees annual out-of-pocket spending, which were discussed earlier in this report.

Despite the limitations of doing so, public discussions have sometimes focused narrowly on trends in deductibles to the exclusion of other out-of-pocket costs. Even looking solely at deductibles, however, provides little support for the view that recent years' slow growth in health care spending can be explained in part by faster growth in cost sharing. Average deductibles in employer coverage have indeed risen steadily in recent years, as illustrated in Figure 4-40. However, the pace of this increase since 2010 has been similar to the increase prior to 2010, meaning it can do little to explain why growth

Figure 4-40
Average Real Deductible in Employer-Based Single Coverage, 2002–2016



Note: Inflation adjustments use the GDP price index, including a CBO projection for 2016.
Source: Medical Expenditure Panel Survey, Insurance Component; Kaiser Family Foundation/Health Research and Educational Trust (KFF/HRET) Employer Health Benefits Survey; National Income and Product Accounts; CEA calculations.

in overall health spending has been slower during the post-ACA period than it was prior to the ACA.

There is also little evidence that changes in cost sharing are an important explanation for the slow cost growth in types of coverage other than employer coverage. The largest change in Medicare's benefit design in recent years was the creation of Medicare Part D in 2006. Creation of Medicare Part D did drive temporarily faster growth in drug spending by Medicare beneficiaries; however, the estimates of trends in per beneficiary Medicare spending that were presented in Figures 4-31 through 4-33 already adjusted for the large increase in drug spending associated with the creation of Medicare Part D. With respect to Medicaid and CHIP, systematic data on cost sharing obligations are not available, but both programs have historically included negligible beneficiary cost sharing, and there is no reason to believe that this has changed in recent years. Thus, it is doubtful that changes in cost sharing play a meaningful role in explaining slower spending growth in those programs in recent years.

Non-ACA Trends in the Health Care Delivery System

The inability of factors affecting the demand for medical care—including economic and demographic trends, as well as changes in cost sharing—to explain the slow growth in health care spending under the ACA

suggests that changes in the health care delivery system have played the predominant role in recent years' slow health care spending growth. The next section discusses the important role that the ACA's changes in medical provider payment have played in slowing health care spending growth, but the fact that health care spending had started slowing prior to the ACA's passage, as documented in Figure 4-31, suggests that the ACA is not the only reason that health care spending growth has been slower during the post-ACA period than in the past. A pair of such factors is discussed below.

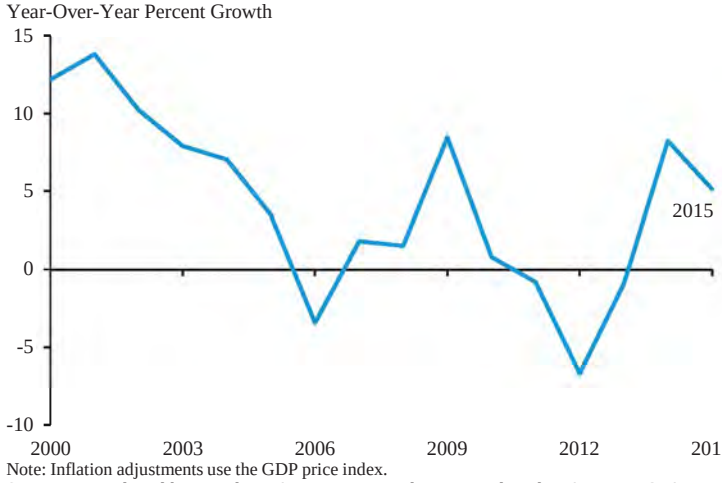
The slower growth under the ACA relative to the preceding decade may, in part, reflect the removal of factors that put upward pressure on spending growth during years preceding the ACA, particularly during the early 2000s. The late 1990s and early 2000s saw a number of states pass laws that restricted the ability of private insurers to use a range of so-called "managed care" strategies, strategies that appear to have contributed to slower health care spending growth during the 1990s (Cutler, McClellan, and Newhouse 2000; Glied 2000). Recent economic research examining these state laws has concluded that they put substantial, but temporary upward pressure on health care spending in the years after they took effect (Pinkovskiy 2014). This may partially explain why health care spending growth under the ACA has been so much slower than the first half of the 2000s, though it cannot explain why spending growth has been slower under the ACA than during the second half of the 2000s.

Another possible explanation for why health care spending has grown more slowly in recent years is that the pace at which new medical technologies are being introduced has slowed. As noted earlier in this section, economists generally believe that the development of resource-intensive new medical technologies has been the main driver of the rapid growth in health care spending over the long term (Newhouse 1992; Cutler 2004). If these types of technologies are arriving at a slower pace than in the past, then that could explain why health care spending has grown at a slower pace.

The trajectory of medical technology likely can account for much of the recent swings in prescription drug spending growth. As illustrated in Figure 4-41, per enrollee prescription drug spending in private insurance grew very slowly in the years both immediately before and after passage of the ACA after having grown quite rapidly in the early 2000s.[29] Slow growth during this period appears to have resulted from a slew of patent expirations for blockbuster drugs that allowed less expensive generic versions of these

[29] Figure 4-41 focuses on private insurance because Medicare generally did not cover prescription drugs before 2006 and because, as noted previously, trends in per enrollee Medicaid spending are more difficult to interpret due to changes in the composition of program enrollment.

Figure 4-41
Real Per-Enrollee Prescription Drug Spending in Private Insurance, 2000–2015



Note: Inflation adjustments use the GDP price index.
Source: National Health Expenditure Accounts; National Income and Product Accounts; CEA caluclations.

drugs to enter the market, combined with a dearth of new drug introductions (Aitken, Berndt, and Cutler 2009; IMS 2013). This period of slow growth ended as a wave of costly new medications entered the market starting in 2014 (IMS 2016). Figure 4-41 and more-timely data from the Bureau of Economic Analysis suggest that prescription drug spending growth has begun to slow again as the effect of these new drug introductions on prescription drug spending has waned.

However, prescription drugs account for only a sixth of overall health care spending (ASPE 2016c),[30] and it is far from clear that changes in the trajectory of medical technology can account for the reductions in growth of other categories of health care spending that was documented in Figure 4-32. Chandra, Holmes, and Skinner (2013) document slower growth in utilization of certain surgical procedures in the years prior to the ACA and highlight similar evidence from Lee and Levy (2012) for certain imaging services, which they argue implies that a slower pace of technological change

[30] The estimate that prescription drugs account for one-sixth of total health care spending cited here incorporates both prescription drugs sold directly to consumers and prescription drugs purchased and administered by a physician or other medical provider. The other data presented in this chapter only incorporate spending on prescription drugs sold to consumers because non-retail spending on prescription drugs is not included in the prescription drug category of the National Health Expenditure Accounts.

began restraining health care spending growth in the years prior to the ACA's passage. But this evidence primarily reflects changes in how existing medical technologies were being used, not the pace at which new technologies are being introduced, so it is unclear that these data should be taken to reflect a change in the trajectory of medical technology, as opposed to some other change in medical practice that may have a wide variety of potential causes.

ACA Reforms to Provider Payment

As discussed above, the ACA is not the only factor that explains why health care spending has grown so much more slowly in the years since the ACA became law than in the preceding years. However, there is also clear evidence that payment reforms introduced in the ACA, plus the "spillover" effects of those reforms on the private sector, have exerted substantial, quantifiable downward pressure on health care spending growth since 2010. Furthermore, there is reason to believe that the ACA's efforts to change the structure of provider payment have had additional effects that go beyond what can be readily quantified.

The most direct effect of the ACA on health care spending growth has been from the ACA's provisions to better align the rates Medicare pays to medical providers and private insurers with the actual cost of services; these provisions were described in detail earlier in this chapter. CBO estimates imply that these provisions have reduced the annual growth rate of Medicare spending by 1.3 percentage points from 2010 through 2016, generating a cumulative spending reduction of close to 8 percent in 2016.[31] These provisions of the ACA, therefore, can account for around a third of the reduction in per beneficiary Medicare spending growth relative to the pre-ACA decade that was reported in Figure 4-32. Notably, more than half of this reduction in spending growth—or around 0.8 percentage point per year—comes from ACA provisions that reduce annual updates to various categories of medical providers to reflect productivity growth. These provisions will continue to

[31] These calculations account for the ACA's reductions to annual updates in traditional fee-for-service payment rates, reductions in Medicare Advantage benchmarks, and reductions in Medicare Disproportionate Share Hospital payments, but not other Medicare provisions included in the ACA. The magnitude of the savings from these provisions were estimated using CBO's original score of the ACA (CBO 2010c); the percentage reductions reflect CBO's March 2009 baseline projections for Medicare, which were the baseline projections used in scoring the ACA (CBO 2009). These calculations use CBO's original score of the ACA rather than its subsequent estimates of ACA repeal because those subsequent scores assume that Medicare's payment rules would not return to exactly what they would have been without the ACA if the ACA were repealed (CBO 2012a; CBO 2015a). For comparability with the other estimates included in this chapter, the CBO estimates were converted to a calendar year basis by assuming that the applicable amounts for a calendar years were three-quarters of the amount for the corresponding fiscal year and one-quarter of the amount for the subsequent fiscal year.

reduce the growth rate of Medicare spending to a similar extent in the years to come.

In addition, recent research has concluded that reductions in Medicare's payment rates lead to corresponding reductions in the payment rates that private insurers are able to secure from medical providers, as discussed earlier in this chapter. If the magnitude of these spillover savings matches the prior literature, then the ACA's provisions reducing annual payment updates have reduced growth of private insurance spending by between 0.6 and 0.9 percentage point per year from 2010 through 2016, generating a cumulative reduction in private insurance spending of between 3 and 5 percent in 2016.[32] These spillover effects on private insurance can account for half or more of the reduction in the growth of the prices private insurers pay for hospital care that was reported in Figure 4-30; they can explain between an eighth and a fifth of the reduction in the growth of private insurance spending per enrollee relative to the pre-ACA decade that was reported in Figure 4-32. Moreover, because the underlying Medicare provisions permanently reduce the growth of Medicare payment rates, these spillover effects on growth in private insurance spending would be expected to continue indefinitely as well.

While assessing the aggregate effects of the ACA's provisions to deploy alternative payment models is more challenging, early evidence is encouraging. Research examining the first three years of the Medicare Shared Savings Program, Medicare's largest ACO program, has estimated that ACOs have reduced annual spending for aligned beneficiaries by 0 to 3 percent, with early evidence suggesting that ACOs start at the bottom of that range and move toward the top as they gain experience (McWilliams et al. 2016; McWilliams 2016). Research examining the first two years of CMMI's smaller Pioneer ACO model found savings of a broadly similar magnitude (Nyweide et al. 2015; McWilliams et al. 2015), while evidence from the first two years of CMMI's Bundled Payments for Care Improvement initiative, CMMI's largest bundled payment program, found savings of around 4 percent of episode spending among participating hospitals relative to non-participating hospitals (Dummit et al. 2016).

These results are encouraging, but they also suggest that APMs have generated only modest direct savings to the Medicare program to date. Importantly, the estimates reported above reflect the gross reduction in Medicare spending under the APMs, before accounting for performance

[32] The lower bound of this range reflects the White (2013) estimate that each dollar reduction in Medicare payment rates reduces private payment rates by $0.77, while the upper bound reflects the Clemens and Gottlieb (forthcoming) estimate that each dollar reduction in Medicare's payment rate reduces private payment rates by $1.12.

payments made to providers. These performance payments have offset much of the gross savings reported above, at least in the Medicare Shared Savings Program (McWilliams 2016). In addition, while APMs have spread rapidly in the Medicare program since 2010, they still account for a minority of Medicare payments, so the savings estimates reported above apply to only a portion of program spending.

While the direct savings to the Medicare program may be relatively modest so far, these initiatives may be generating more substantial savings in the rest of the health care system. As discussed earlier in this chapter, research has suggested that providers use a common "practice style" with all of their patients, causing payment interventions implemented by one payer to generate savings for other payers whose enrollees see the same providers. If that evidence applies in this case, then Medicare's APM initiatives are already generating meaningful savings for private payers. Notably, unlike the savings that APM participants generate for Medicare, spillover savings are not offset by performance payments to providers. For this reason, it is conceivable that Medicare's APM initiatives have generated larger net savings for private payers than for the Medicare program itself so far.

In addition, as noted earlier in this chapter, private payers appear to have been making efforts to deploy APMs in parallel with Medicare, and it is unlikely that these efforts would have occurred in the absence of efforts to deploy these models in Medicare. While there is little systematic evidence on how successful these private sector efforts have been at reducing costs, these savings could be substantial. Furthermore, as also noted earlier in this chapter, one long-term benefit of transitioning to APMs is fostering the development of technologies and treatment approaches that generate the most value for patients, rather than the technologies and treatment approaches that are most profitable under fee-for-service payment. While changes of this type are likely to take years or even decades to reach their full effect, if even small shifts in this direction have already occurred, it would have large implications for total health care spending because these types of shifts would affect all providers, not just those participating in APMs.

Finally, whatever has happened so far, there are several reasons to believe that the savings generated by Medicare's APM initiatives will grow over time. First, as noted above, ACOs in the Medicare Shared Savings Program appear to achieve greater gross savings as they gain experience; similarly, research examining an earlier private ACO-like contract found that savings grew steadily as providers gained experience with the contract (Song et al. 2014). Second, the Administration has been making continual improvements in its APMs, such as by improving the methodologies used to align beneficiaries to ACOs and to set ACOs' spending benchmarks. These

improvements will strengthen ACOs' ability to achieve savings and their incentives to do so. Third, program rules for many APMs are structured so that the performance payments earned for any given level of gross savings will shrink over time, generating larger net savings to Medicare even if gross savings remain constant. Fourth, as discussed previously, a larger share of Medicare dollars are expected to flow through APMs in the coming years.

Recent Trends in Health Care Quality

The reforms implemented under this Administration were designed to improve the quality of care, not just reduce health care costs. Reducing costs in ways that worsen the quality of care will often reduce the total value generated by the health care sector. By contrast, reducing costs while maintaining or improving the quality of care, which the evidence presented at the beginning of this section of this chapter suggested is often possible, has the potential to greatly increase the total value generated by the health care sector.

In practice, studying trends in health care quality is inherently more challenging than studying trends in health care costs. The essential information about health care costs can be captured in a few key pieces of data—the types of service used, the prices paid for those services, and the resulting total spending—and these same basic measures are applicable across all health care settings. By contrast, health care quality has many important dimensions, including a range of different aspects of patients' experiences while receiving care and myriad health outcomes. Furthermore, the most relevant dimensions vary widely from one setting to another. As a result, indicators of health care quality are unavoidably less comprehensive than indicators of health care costs. In addition, whereas health care costs are measured in dollars and so can be readily aggregated and compared across domains, different dimensions of health care quality are measured in widely varying units, which makes aggregation effectively impossible.

For both of these reasons, all-encompassing indicators of health care quality like those that exist for health care costs do not exist. However, quality measures that capture particular important dimensions of care do exist, and a few of these are discussed below. These measures indicate that recent years' slow growth in health care costs has been accompanied by important improvements in health care quality, implying that ongoing changes in health care delivery system are not just reducing health care spending, but also increasing the total value that the health care system creates. Notably, these improvements in the quality of care appear to be attributable, at least in part, to reforms introduced by the ACA.

Declines in the Rate of Hospital-Acquired Conditions

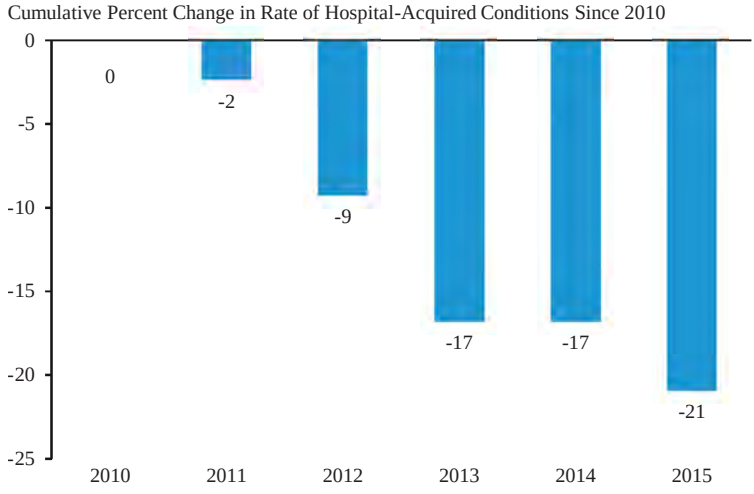
One of the most comprehensive ongoing efforts to monitor health care quality on a system-wide basis is the Agency for Healthcare Research and Quality's (AHRQ) work to track the incidence of 28 different hospital-acquired conditions, including pressure ulcers, several types of infections, and complications due to medication errors, on a nationwide basis (AHRQ 2015; HHS 2016b). The AHRQ data series combines data from a variety of sources, including reviews of medical charts, administrative hospital discharge records, and hospital reports to the Centers for Disease Control and Prevention.

The AHRQ data indicate that the rate of hospital-acquired conditions has fallen significantly since this data series began in 2010, as illustrated in Figure 4-42. The rate of hospital-acquired conditions stood at 145 per 1,000 discharges in 2010 and had fallen to 115 per 1,000 discharges in 2015, a decline of 21 percent. Using prior research on the relationship between these hospital-acquired conditions and mortality, AHRQ estimates that the reduction in the rate of hospital-acquired conditions since 2010 corresponds to approximately 125,000 avoided deaths cumulatively from 2010 through 2015. AHRQ similarly estimates that these reductions in hospital-acquired conditions have generated cost savings of around $28 billion cumulatively from 2010 through 2015.

The factors that are driving the reduction in hospital-acquired conditions have been less thoroughly studied than the factors driving recent years' slow growth in health care costs, but there is reason to believe that the ACA has played an important role here as well. Two of the value-based purchasing reforms implemented under the ACA—the Hospital Value-Based Purchasing Program and the Hospital-Acquired Condition Reduction Program—tie hospitals' Medicare payment rates to a range of quality measures, including rates of hospital-acquired conditions. The first year of incentive payments under these programs were based on performance during 2011 and 2013, respectively, and hospitals may also have begun adjusting their behavior even earlier. In addition, drawing on funding from CMMI, the Administration created the Partnership for Patients initiative, which set up mechanisms to help hospitals identify and share best practices for improving the quality of patient care. Hospital industry participants have reported that the Partnership was highly effective in achieving its goals (AHA/HRET 2014). The Partnership was recently incorporated on a permanent basis into CMS' Quality Improvement Network-Quality Improvement Organization program.

Figure 4-42

Cumulative Percent Change in Rate of Hospital-Acquired Conditions Since 2010, 2010–2015



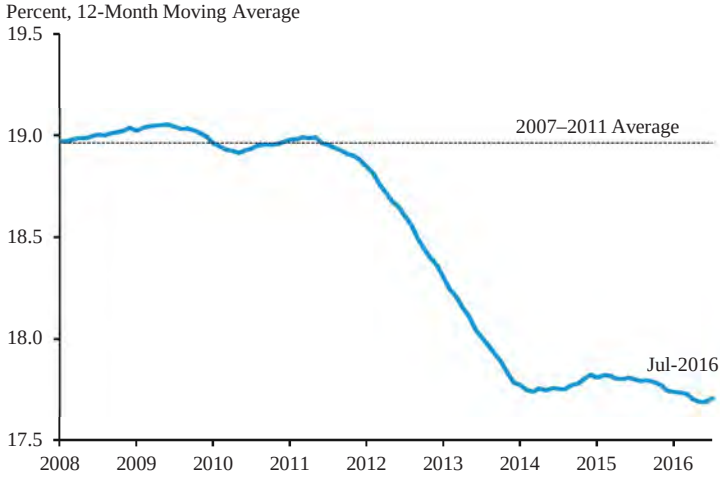
Source: Agency for Healthcare Research and Quality; CEA calculations.

Declines in the Rate of Hospital Readmissions

Another valuable indicator of health care quality is the rate of hospital readmissions, instances in which a patient returns to the hospital soon after discharge. Hospital readmissions often result from the occurrence of a serious complication after discharge, so hospital readmission rates are a useful indicator of the health outcomes patients achieve after leaving the hospital (Jencks, Williams, and Coleman 2009; Hines et al. 2014). Evidence suggests that many readmissions also reflect low-quality care during the initial hospital stay or poor planning for how a patient will receive care after discharge, which means that readmission rates are also a useful indicator of the quality of the care being provided during that initial stay (MedPAC 2007).

Hospital readmission rates have declined sharply in recent years. After several years of stability, the 30-day hospital readmission rate among Medicare patients began falling sharply starting in late 2011, as illustrated in Figure 4-43. This decline continued at a rapid pace through early 2014, with modest additional declines since then. The readmission rate for the 12 months that ended in July 2016 was 1.3 percentage points (7 percent) below the average rate recorded for 2007 through 2011. Cumulatively, the decline in hospital readmission rates from April 2010 through May 2015 corresponds to 565,000 avoided hospital readmissions (Zuckerman 2016).

Figure 4-43
Medicare 30-Day, All-Condition Hospital Readmission Rate, 2008–2016



Source: Centers for Medicare and Medicaid Services; CEA calculations.

The ACA appears to have played a major role in reducing hospital readmission rates. The ACA's Hospital Readmissions Reduction Program (HRRP) reduces payment rates for hospitals in which a relatively large fraction of patients return to the hospital soon after discharge. Notably, the decline depicted in Figure 4-43 began around the time that the rules governing the payment reductions under the HRRP were finalized in August 2011.[33] In addition, Zuckerman et al. (2016) also document that the reduction in readmission rates has been particularly large for the specific conditions targeted under the HRRP, which is also consistent with the hypothesis that the HRRP was the main driver of this decline. Alongside the changes in financial incentives created by the HRRP, the Partnership for Patients may also have helped reduce readmissions during this period by helping hospitals identify and adopt best practices for doing so.

Importantly, recent declines in hospital readmission rates reflect real reductions in patients' risk of returning to the hospital after discharge, not mere changes in how patients who return to the hospital are being classified, as some analysts have suggested (for example, Himmelstein and

[33] While the first payment reductions under this program did not occur until October 2012, hospitals' incentives to reduce readmissions began as soon as the rules were finalized (or earlier, to the extent that hospitals anticipated the structure of the payment rules) because payment reductions are based on performance in prior years.

Woolhandler 2015). These analysts argued that some hospitals had tried to circumvent the HRRP's payment reductions by re-classifying some inpatient readmissions as outpatient observation stays. As a result, they argued, the observed decline in hospital readmissions rates substantially overstated the actual decline in patients' risk of returning to the hospital after discharge.

However, Zuckerman et al. (2016) demonstrate that no such shift to observation status has occurred. Although there has been a decade-long trend toward greater use of outpatient observation stays among patients who return to the hospital, there was no change in this trend after introduction of the HRRP, contrary to what would have been expected if the HRRP had caused inpatient readmissions to be re-classified as observations stays. Similarly, the authors find no correlation between the decline in a hospital's readmission rate and the increase in the share of a hospital's patients who experience an observation stay following discharge, which is also inconsistent with the re-classification hypothesis.

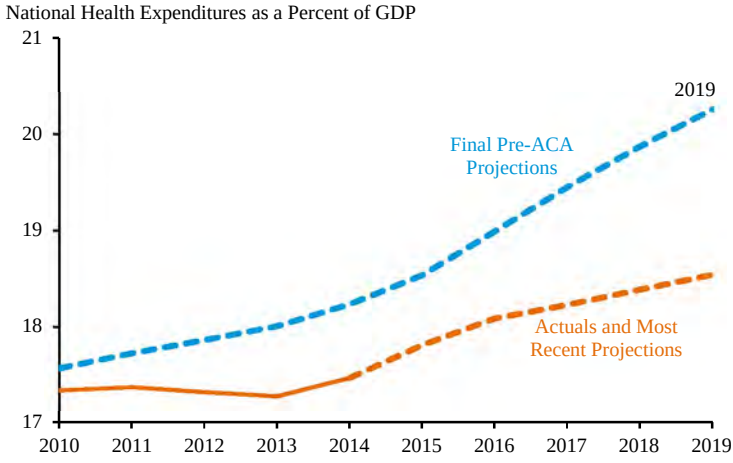
Quality Performance in Alternative Payment Models

Early evidence from evaluations of the APMs being deployed under the ACA also provides an encouraging picture of how these models will affect quality of care. The evaluation of the Medicare Shared Savings Program that was discussed in the last subsection found that ACOs improved quality of care along some dimensions, while not worsening it on others, at the same time as ACOs generated reductions in spending (McWilliams et al. 2016). Evaluations of the first two years of the Pioneer ACO model found broadly similar results: improvements on some measures of quality performance, with no evidence of adverse effects on others (McWilliams et al. 2015; Nyweide et al. 2015). Similarly, evidence from the first two years of CMMI's Bundled Payments for Care Improvement initiative, found that the savings achieved under that initiative came at no cost in terms of quality of care (Dummit et al. 2016). This evidence implies that APMs will be successful in improving the overall value of the care delivered, not just reducing spending.

Economic Benefits of a Better Health Care Delivery System

Recent progress in improving the health care delivery system is already having major economic benefits. Most visibly, slower growth in the cost of health care generates large savings that are then available for other valuable purposes, raising Americans' overall standard of living. Recent shifts in projections of aggregate national health expenditures illustrate the magnitude of these savings. Relative to the projections issued just before the ACA became law, national health expenditures are now projected to be 1.7 percentage points lower as a share of GDP in 2019 than projected

Figure 4-44
Projected National Health Expenditures, 2010–2019



Note: Pre-ACA projections have been adjusted to reflect a permanent repeal of the SGR following the methodology used by McMorrow and Holahan (2016). For consistency, actuals reflect the current estimates as of the most recent projections release.
Source: National Health Expenditures Accounts and Projections; CEA calculations.

just before the ACA became law, as illustrated in Figure 4-44, despite the fact that tens of millions more Americans are now projected to have health insurance.[34] Over the ACA's entire first decade, national health expenditures are now projected to be $2.6 trillion lower than projected before the ACA became law. The remainder of this subsection discusses the downstream consequences of lower health care costs, including increased employment in the short run, higher wages in both the short and long run, lower premiums and out-of-pocket costs, and an improved fiscal outlook for Federal and State governments.

While this subsection focuses primarily on the economic benefits of reductions in the cost of health care, it is important not to lose sight of the fact that improvements in the quality of care also have important economic benefits. Most importantly, higher-quality care ultimately allows people to live longer, healthier lives, which is immensely valuable in its own right. In addition, as noted in the discussion of the benefits of expanded insurance coverage in the first section of this chapter, better health also appears to improve the likelihood that individuals are able to work and increases their

[34] The pre-ACA projections have been adjusted to reflect a permanent repeal of the Sustainable Growth Rate physician payment formula following the methodology used by McMorrow and Holahan (2016).

productivity on the job. These benefits, while not as readily quantifiable as the benefits discussed below, are also important.

Higher Wages, Lower Premiums, and Lower Out-of-Pocket Costs for Workers

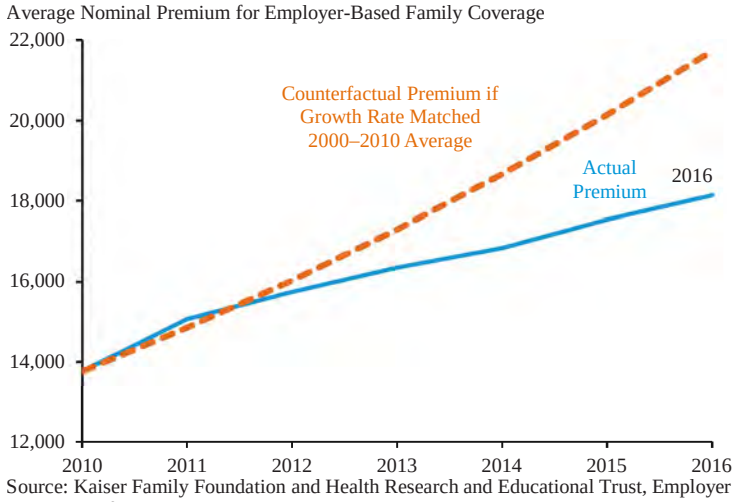
Roughly half of Americans see the benefits of a more efficient health care system in the form of lower costs for the coverage they get through an employer. Health care for individuals enrolled in employer coverage is financed through a combination of premiums and out-of-pocket costs, so when the underlying cost of health care falls, premiums and out-of-pocket costs fall as well. Reductions in out-of-pocket costs and the portion of premiums paid by employees accrue directly to workers. The remaining savings, which initially accrue to employers as lower premium contributions, ultimately benefits workers as well; economic theory and evidence demonstrate that reductions in the amounts employers pay toward premiums translate into higher wages in the long run (for example, Summers 1989; Baicker and Chandra 2006).

The slow growth in health costs under the ACA has generated substantial savings for workers. The average premium for employer-based family coverage was nearly $3,600 lower in 2016 than it would have been if nominal premium growth since 2010 had matched the average rate recorded over the 2000 through 2010 period, as estimated using data from the KFF/HRET Employer Health Benefits Survey and illustrated in Figure 4-45. Incorporating data on out-of-pocket costs makes these savings considerably larger. Combining these KFF/HRET data on premiums with data on out-of-pocket costs from the Household Component of the Medical Expenditure Panel Survey using the methodology described in Figure 4-34 implies that the average total spending associated with an employer-based family policy is $4,400 lower in 2016 than if trends had matched the preceding decade.[35]

As noted above, both economic theory and evidence imply that workers will receive the full amount of these savings in the long run. In practice, however, compensation packages take time to adjust, so it is conceivable that some of employers' savings on their portion of premiums have not fully translated into higher wages in the short run. To the extent that is the case, then slower growth in health care costs has had the effect of reducing employers' per-worker compensation costs in the short run, increasing their incentives to hire and potentially boosting overall employment. The empirical evidence on these effects is limited, but some studies have found evidence

[35] As depicted in Figure 4-39 and discussed in the main text, different data sources report somewhat different trends in the out-of-pocket share. However, this calculation is not very sensitive to which data source is used.

Figure 4-45
Average Nominal Premium for Employer-Based Family Coverage, 2010–2016



Source: Kaiser Family Foundation and Health Research and Educational Trust, Employer Health Benefits Survey; CEA calculations.

that slower growth in health care costs is associated with faster employment growth (Baicker and Chandra 2006; Sood, Ghosh, and Escarce 2009).

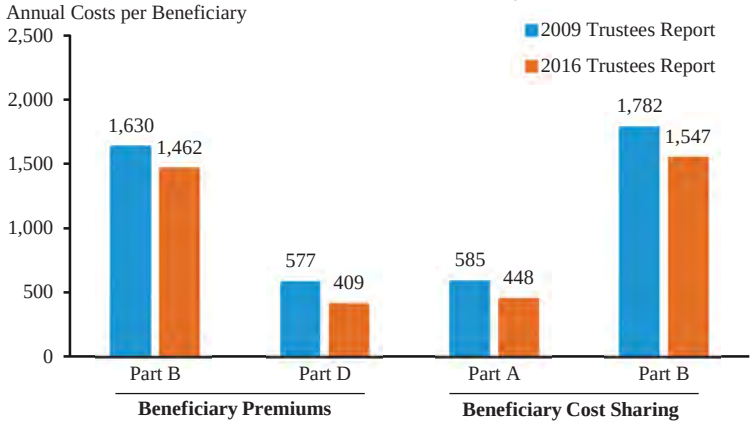
Lower Premiums and Out-of-Pocket Costs in Other Forms of Coverage

Slow growth in health care costs has also reduced premiums and out-of-pocket costs for people who get coverage outside the workplace. For example, due to recent years' slow health care cost growth, per beneficiary Medicare spending has come in well below earlier projections. As discussed in detail in the next section, this development is generating major savings for the Federal Government. However, this development is also reducing the premium and cost-sharing obligations borne by Medicare beneficiaries.

Focusing first on premiums, Medicare beneficiaries generally pay a premium to enroll in Medicare Part B, which covers outpatient services, and Medicare Part D, which coverage prescription medications.[36] The standard Medicare Part B premium is set to cover approximately 25 percent of program costs, while the base Medicare Part D premium is set to cover 25.5 percent of the cost of a standard plan design. Consequently, when per

[36] Very few beneficiaries pay a premium to enroll in Medicare Part A (which covers inpatient hospital services and certain other services) because almost all beneficiaries are entitled to coverage based on their prior work history.

Figure 4-46
Premiums and Cost Sharing for Medicare Beneficiaries Under 2009 and 2016 Trustees Projections



Note: Premium amounts reflect the standard Part B premium and the base Part D premium. The 2009 Trustees Projections were adjusted to reflect a scenario in which physician payment rates are held fixed in nominal terms, rather than being reduced sharply in accordance with the Sustainable Growth Rate formula then in law.
Source: Medicare Trustees; Centers for Medicare and Medicaid Services; CEA calculations.

beneficiary spending in those portions of the Medicare program falls, the Part B and Part D premiums fall roughly proportionally.

Indeed, 2016 premiums for both of these parts of Medicare are substantially below projections issued with the 2009 Trustees Report, the last report issued before the ACA became law, as illustrated in Figure 4-46. Whereas the standard monthly premium for Part B for 2016 was projected to be $135.80 per month under the policies then in place, the actual 2016 Part B premium was $121.80 per month, a reduction of 10 percent (Clemens, Lizonitz, and Murugesan 2009).[37,38] Similarly, the base Medicare Part D premium was projected to be $48.10 in the 2009 Trustees Report, but the actual

[37] This 2009 projection of the Part B premium cited here is from a scenario in which physician payment rates were assumed to remain fixed in nominal terms, rather than being cut sharply as prescribed under the Sustainable Growth Rate (SGR) formula then in law. Congress routinely blocked the SGR cuts, so this provides a more accurate picture of the spending trajectory under the policies in place in 2009. Projections for this alternative scenario are available in a supplemental memo published by the CMS Office of the Actuary alongside the 2009 Medicare Trustees Report (Clemens, Lizonitz, and Murugesan 2009).

[38] Most Medicare beneficiaries paid a lower Part B premium in 2016 because of the application of the Medicare program's "hold harmless" provision, which limits the Part B premium increases for certain beneficiaries when there is a low Social Security cost-of-living adjustment. The higher premium is used here because it is more reflective of underlying program costs. These estimates are therefore conservative.

2016 Part D premium was $34.10 per month, a reduction of 29 percent (Medicare Trustees 2009). For a typical beneficiary enrolled in both parts of the program, the annual premiums savings will total $336 in 2016.

Medicare beneficiaries are also responsible for cost sharing when they access services. Enrollees receiving Part A services through traditional Medicare pay fixed dollar cost sharing amounts when they use specified services; these dollar amounts are updated annually based on changes in provider payment rates under Part A. For Part B, traditional Medicare enrollees are responsible for a deductible, which is updated annually based on the overall trend in Part B costs, and, once the deductible is met, 20 percent coinsurance for most services. Because of the structure of these cost sharing obligations, they vary roughly in proportion to average per beneficiary spending in these parts of the program.

The rightmost columns of Figure 4-46 reports estimates of the average Part A and Part B cost sharing obligations incurred by individuals enrolled in traditional Medicare under projections issued with the 2009 Trustees Report and the most recent estimates for 2016.[39] Cost sharing obligations through Medicare Part A in 2016 are on track to be 23 percent lower than projected in 2009 and cost sharing obligations through Medicare Part B are on track to be 13 percent lower. Across both Parts A and B, the total estimated reduction in average cost-sharing obligations in 2016 is $372, bringing the combined reduction in premium and cost sharing obligations to $708.

The incidence of the cost sharing savings reported in Figure 4-46 will vary across beneficiaries depending on whether they have supplemental coverage in addition to their Medicare coverage that covers all or part of their cost sharing. Roughly a fifth of traditional Medicare beneficiaries have no supplemental coverage and will benefit directly from reduced cost sharing

[39] To create these estimates, projections of Medicare's average cost of providing Part A and Part B coverage through traditional Medicare in 2016 were obtained from the 2009 and 2016 Medicare Trustees Reports, as were projections of the Part B deductible (Medicare Trustees 2009; Medicare Trustees 2016). For 2009, the estimates were then adjusted to reflect a scenario in which physician payment rates remained fixed in nominal terms, rather than being cut sharply as prescribed under the Sustainable Growth Rate formula then in law; projections for this alternative scenario were published by the CMS Office of the Actuary along with the 2009 Medicare Trustees Report (Clemens, Lizonitz, and Murugesan 2009). Congress routinely blocked the SGR cuts, so this provides a more accurate picture of the spending trajectory under the policies in place in 2009. To estimate Part A cost sharing obligations, it was then assumed that beneficiary cost sharing constituted 8 percent of the total cost of Part A services. This percentage was estimated using information included in CMS' annual announcement of Part A cost sharing parameters; this approach slightly understates actual cost sharing obligations because it does not account for cost sharing for some small categories of services (CMS 2016c). To estimate Part B cost sharing liabilities, it was assumed that all beneficiaries use enough services to pay their full deductible and pay 20 percent coinsurance for all other services; this approach very slightly overstates actual cost sharing obligations.

(KFF 2016). Another fifth of traditional Medicare beneficiaries purchase individual Medigap coverage and so will see a portion of the cost sharing savings through lower cost sharing and a portion through lower premiums for their Medigap plan. Around three-fifths of traditional Medicare beneficiaries receive supplemental coverage through a State Medicaid program or a former employer. In these cases, a portion of the cost sharing savings may accrue to the sponsor of that supplemental coverage, although the extent to which that occurs will depend on each individual's particular circumstances.

Medicare beneficiaries will see savings in scenarios beyond those considered here. Beneficiaries enrolled in Part D of Medicare are seeing substantial additional cost sharing savings due to the combination of the ACA's provisions closing the coverage gap, which were discussed earlier in this chapter, and lower-than-expected prescription drugs costs. Those amounts are not included here because cost sharing obligations vary among Part D plans, which makes quantifying these savings more challenging. Similarly, this analysis does not examine cost sharing obligations for Medicare Advantage enrollees because the structure of cost sharing obligations in Medicare Advantage varies from plan to plan. In general, however, lower health care costs will tend to reduce cost sharing obligations for Medicare Advantage enrollees as well.

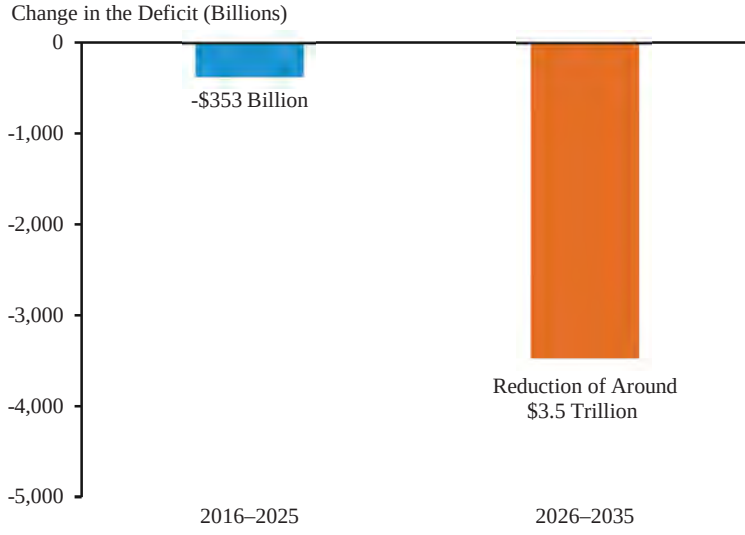
A Better Long-Term Fiscal Outlook

Federal and State governments finance a substantial fraction of health care spending in the United States, primarily through the Medicare and Medicaid programs, so reductions in health care costs also generate major savings in the public sector. Indeed, in large part because of the ACA's provisions reducing health care spending over the long term, the law has generated major improvements in the Federal Government's fiscal outlook, as depicted in Figure 4-47. CBO estimates imply that the ACA will reduce deficits by more than $300 billion over the 2016-25 period (CBO 2015a).[40] Those savings grow rapidly over time and average 1 percent of GDP—around $3.5 trillion—over the subsequent decade.

The slowdown in health care cost growth more broadly has led to additional large improvements in the fiscal outlook. Between August 2010 and August 2016, CBO reduced its projection of net Medicare spending

[40] CBO (2015a) estimates how *repealing* the ACA would affect the deficit. CBO notes that the deficit increase due to ACA repeal is not exactly equal to the deficit reduction due to the ACA's enactment. Most importantly, CBO assumes that, even if the ACA were repealed, reductions in Medicare payment rates that have already been implemented under the ACA would remain in place. CBO estimates that these payment rate reductions will generate savings of $160 billion over the 2016-2025 period. Thus, the estimates presented in Figure 4-47 likely understate the deficit reduction attributable to the ACA's enactment.

Figure 4-47
Deficit Reduction Due to the Affordable Care Act, 2016–2035



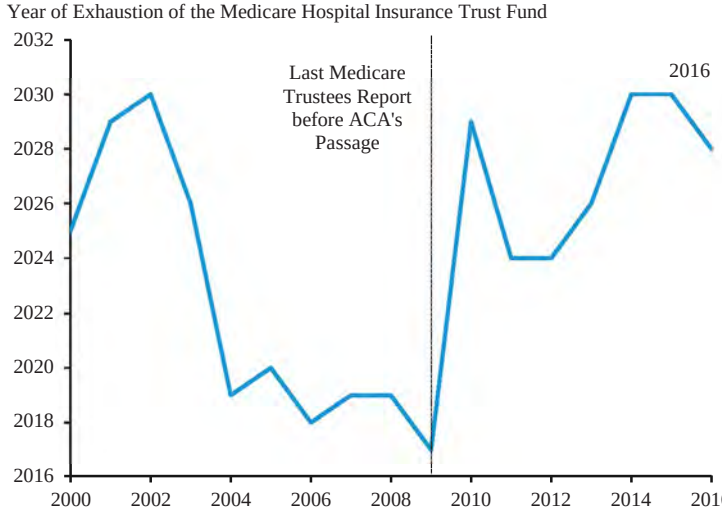
Note: CBO reports second-decade effects as a share of GDP. Amounts are converted to dollars using GDP projections from CBO's long-term budget projections.
Source: Congressional Budget Office; CEA calculations.

under current policy in 2020 by $125 billion or 15 percent (CBO 2010a; CBO 2016a).[41] CBO has indicated that the reductions in its projections of Medicare spending in recent years largely reflect the persistent slow growth in health care costs (Elmendorf 2013). That $125 billion reduction in projected spending constitutes 0.6 percent of CBO's current projection of 2020 GDP.

The combination of the deficit savings directly attributable to the ACA and the savings attributable to the broader slowdown in health care costs have greatly improved the United States fiscal outlook. In its most recent long-term budget projections, CBO estimated that the fiscal gap over the next 30 years—the amount of deficit reduction required to hold debt constant as a share of GDP over that period—was 1.7 percent of GDP (CBO 2016b). Without the ACA and the additional reductions in projected Medicare spending described above, the fiscal gap over this period would

[41] For the purposes of this comparison, CBO's August 2010 baseline projections were adjusted to reflect the continuation of routine fixes to the Sustainable Growth Rate formula used to set Medicare physician payment rates. This adjustment was based upon the nominal freeze scenario reported in CBO's April 2010 Sustainable Growth Rate menu (CBO 2010b).

Figure 4-48
Forecasted Year of Medicare Trust Fund Exhaustion, 2000–2016



Source: Medicare Trustees.

have been approximately 1.5 percent of GDP larger, nearly doubling the fiscal gap over that period.[42]

These improvements in the long-run fiscal outlook will have important benefits for the economy. Reductions in long-term deficits increase national saving, which increases capital accumulation and reduces foreign borrowing, and thereby increase national income and living standards over time. Alternatively, reduced spending on health care could obviate the need to take other steps that would damage overall economic performance and well-being, such as reducing spending on infrastructure, education, or scientific research or increasing taxes on low- and middle-income families.

[42] For this calculation, the ACA's effect on the deficit was estimated based on CBO's June 2015 estimate of ACA repeal (CBO 2015a). For 2016-2025, the year-by-year deficit effects reported in the CBO estimate were used directly. For subsequent years, the ACA was assumed to reduce the deficit by 1 percent of GDP, consistent with CBO's statement that ACA repeal would increase the deficit by around 1 percent of GDP on average over the decade starting in 2026; this assumption is conservative since the ACA's deficit reducing effects are likely to continue to grow beyond the second decade. The path of deficit savings associated with the reductions in projected Medicare spending from August 2010 to August 2016 reflects the difference in the year-by-year savings through 2020. Thereafter, these savings are assumed to grow at the rate projected for net Medicare spending in CBO's most recent long-term budget projections (CBO 2016b). All calculations reported here use the economic assumptions reported in those long-term budget projections.

The reforms included in the ACA and the broader slowdown in health care cost growth have also improved the fiscal outlook for the Medicare program. In 2009, the year before the ACA became law, Medicare's Trustees forecast that the trust fund the Medicare Hospital Insurance Trust Fund would be exhausted in 2017. As of the Medicare Trustees most recent report, that date has been pushed back 11 years, to 2028, as depicted in Figure 4-48.

Conclusion

The evidence presented in this chapter demonstrates that the United States has made historic progress in expanding health insurance coverage and reforming the health care delivery system and that those gains are due in large part to the ACA and other actions implemented under this Administration. Recent years' reforms have also succeeded in creating the tools needed to support further progress on both of these dimensions. As the President has noted, however, fully seizing that opportunity will require continued thoughtful implementation by the Executive Branch, targeted legislative improvements by Congress, and constructive engagement by states and localities (Obama 2016). Whether and how policymakers rise to that challenge will have profound implications for the health care system and, by extension, Americans' health and economic well-being in the years to come.

CHAPTER 5

INVESTING IN HIGHER EDUCATION

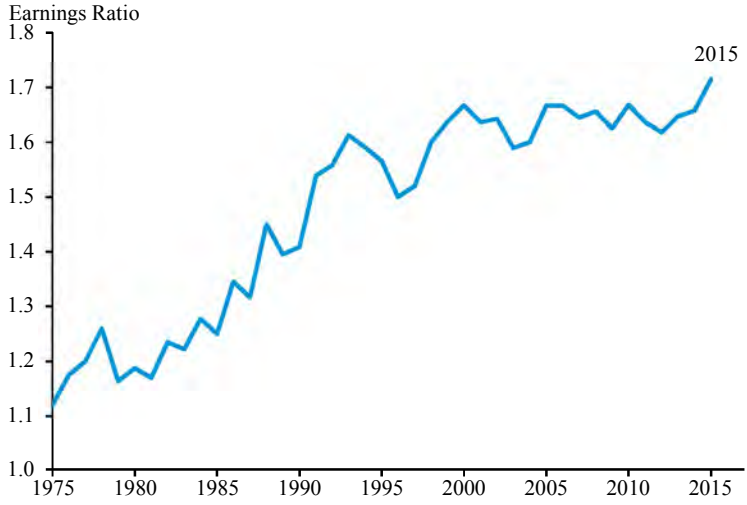
Introduction

The Obama Administration has been committed to ensuring that all students, regardless of their background, have access to a college education that prepares them for success in the workplace and in life. A high-quality education is often more than just the first step in one's career; it can be one of the most important investments young people can make in their futures. College graduates enjoy an earnings premium that is at a historical high, reflecting a trend over several decades of increasing demand for skilled workers (Figure 5-1). In 2015, the median full-time, full-year worker over age 25 with a bachelor's degree (but no higher degree) earned roughly 70 percent more than a worker with just a high school degree (CPS ASEC, CEA calculations). Moreover, people with a college degree are more likely to be employed—benefitting from both lower unemployment rates and higher rates of labor force participation.

But despite the high average returns to a college degree, Federal policy in higher education has had to confront several longer-term challenges. Research shows that college enrollments have not kept up with the rising demand for college-related skills in the workplace (Goldin and Katz 2008). This suggests that, on the whole, Americans are investing too little in higher education. At the same time, some students who attend college do not reap the high returns, especially when they attend low-quality programs or fail to complete a degree. The challenges of investing in higher education are particularly acute for students from disadvantaged backgrounds, who are less likely both to enroll in college and to complete a high-quality program. And as a growing number of students borrow to finance their education, too many struggle to manage their debt.

Figure 5-1

College Earnings Premium Over Time



Note: The earnings ratio compares the median full-time, full-year worker over age 25 with a bachelor's degree only to the same type of worker with just a high school degree. Prior to 1992, bachelor's degree is defined as four years of college.
Source: CPS ASEC

As President Obama took office, the challenges to ensuring broad access to a quality college education were intensified by the Great Recession. Rising unemployment lowered the implicit cost of forgoing earnings to attend college, and many sought to invest in higher education to improve their skills and job prospects. But at the same time, State budgets declined, exacerbating the trend of rising tuitions at public institutions and stretching funding capacity at low-cost community colleges. The changing market also fostered further expansion of the for-profit college sector, where many colleges offer low-quality programs.

Over the past eight years, the Obama Administration has met these challenges with a complementary set of evidence-based policies and reforms. These policies have been instrumental in helping students from all backgrounds finance investments in higher education and in helping to improve the quality of those investments. To help expand college opportunity, the President doubled investments in grant and scholarship aid through Pell Grants and tax credits. To help more students choose a college that provides a worthwhile investment, the Administration provided more comprehensive and accessible information about college costs and outcomes through the College Scorecard, simplified the Free Application for Federal Student Aid (FAFSA), and protected students from low-quality schools through a package of important consumer protection regulations including the landmark

Gainful Employment regulations. To help borrowers manage debt after college, income-driven repayment options like the President's Pay As You Earn (PAYE) plan have capped monthly student loan payments at as little as 10 percent of discretionary income to better align the timing of loan payments with the timing of earnings benefits.

The benefits of some of these policies are already evident today, while many more will be realized over the coming decades. For example, Council of Economic Advisers' (CEA) analysis finds that the Pell Grant expansions since 2008–09 enabled at least 250,000 students to access or complete a college degree during the 2014–15 award year, leading to an additional $20 billion in aggregate earnings (CEA 2016c). This represents a nearly 2:1 return on the investment. In addition, millions more will benefit from lower college costs and improved college quality in the future.

This chapter begins by surveying the evidence on the individual and societal returns to higher education, as well as the challenges to ensuring that all students have an opportunity to benefit from attending college regardless of their background. It then describes the many ways in which the Administration's policies have addressed these challenges, concluding with a discussion of next steps to build on this progress.

The Economic Rationale for Federal Policies and Reforms to Support Higher Education

A large body of evidence shows that, on average, college attendance yields high returns to individuals and, importantly, benefits society as well. Typically, the individual returns far exceed the costs of a degree, offering individuals a strong incentive to invest in higher education. Even in good economic times, however, individuals face many barriers that deter investment, and the potential benefits of higher education would often go unrealized in the absence of Federal policies. The barriers to finding, financing, and accessing high-quality education options are especially high for those from low-income families, first-generation college families, and other disadvantaged groups. As President Obama took office in 2009, the Great Recession intensified these challenges. Although more Americans than ever wished to enroll in college, they were stymied by financial hardship, rising tuitions, variation in program quality, lack of information to help them make good choices, and a Federal student aid system that had become so complex that many eligible students did not apply (Page and Scott-Clayton 2015). This setting called for a new set of policies and reforms to the existing system of Federal student aid.

Individual Returns to Higher Education

While research suggests that college graduates experience a wide range of non-monetary benefits such as greater health and happiness (Oreopoulos and Salvanes 2011), a primary benefit that motivates most students is the expected gain in future earnings (Eagan et al. 2014; Fishman 2015). Over a career, the median full-time, full-year worker over age 25 with a bachelor's degree earns nearly $1 million more than the same type of worker with just a high school diploma (CPS ASEC, CEA calculations). That worker with an associate degree earns about $330,000 more. The present values of these earnings premiums are also high, amounting to roughly $510,000 and $160,000 for bachelor's and associate degrees, respectively.[1] As shown in Figure 5-2 below, the present value of the additional lifetime earnings far exceeds the cost of tuition. Although tuition does not capture all of the costs of a college education—in particular, it does not capture the opportunity cost of forgone earnings while in school—even when those costs are included, the present value of added earnings typically exceeds the cumulative total cost of college by an order of magnitude (Avery and Turner 2012).

The earnings differentials shown in Figure 5-2 are caused, at least in part, by factors other than educational attainment. For example, students who attend college may have been more skilled or have better networks and, thus, would earn more regardless of their education. But a body of rigorous economic research supports the conclusion that higher education does indeed cause large increases in future earnings. Using a range of sophisticated techniques to compare individuals who differ in their educational achievement but who are otherwise similar in their earnings potential, researchers have estimated that individuals who attend college earn between 5 to 15 percent more on average per year of college than they would if they had not gone to college.[2]

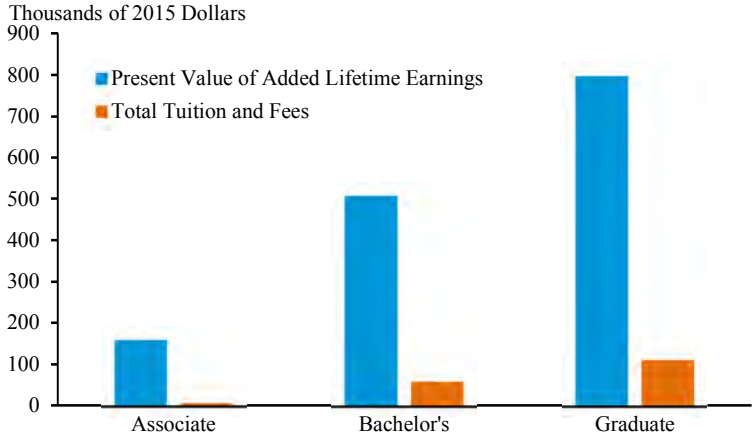
Importantly, some research also suggests that the returns to college have been just as high, if not higher, for "marginal students"—that is, students who are on the border of either attending or completing college versus not doing so. These students often come from low-income families and their decisions hinge on the perceived cost or accessibility of college. Early studies used variation in college proximity to identify the returns to college and found especially large returns to students for whom proximity was a decisive factor (Kane and Rouse 1993; Card 1995). A more recent study by

[1] The net present value calculation here and elsewhere in the chapter uses a discount rate of 3.76 percent, corresponding with the current interest rate on undergraduate loans.

[2] See, for example, Kane and Rouse 1993; Card 1995; Zimmerman 2014; Ost, Pan, and Webber 2016; Turner 2015; Bahr et al. 2015; Belfield, Liu and Trimble 2014; Dadgar and Trimble 2014; Jacobson, LaLonde, and Sullivan 2005; Jepsen, Troske and Coomes 2012; Stevens, Kurlaender, and Grosz 2015; Gill and Leigh 1997; Grubb 2002; Marcotte et al. 2005; Marcotte 2016.

Figure 5-2

Present Value of Added Lifetime Earnings vs. Total Tuition

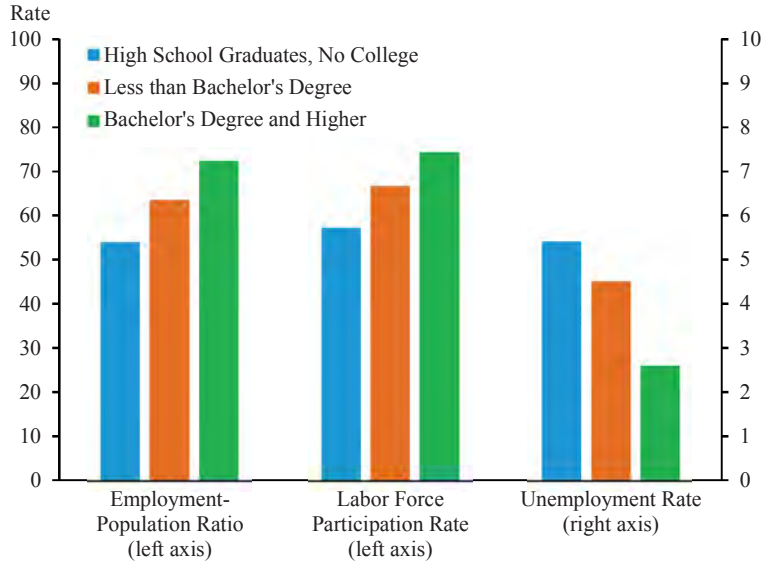


Note: Lifetime earnings are calculated by summing median annual earnings for full-time, full-year workers at every age between 25 and 64 by educational attainment, subtracting earnings for the same type of worker with only a high school degree, and converting to present value using a 3.76% discount rate. Tuition for associate (bachelor's) is the full-time tuition for two- (four-) year schools multiplied by two (four), and for graduate, it is the average graduate tuition multipled by three added to bachelor's tuition.
Source: CPS ASEC 2015 and 2016; NPSAS 2012; NCES 2015

Zimmerman (2014) compares students whose GPAs are either just above or just below the threshold for admission to Florida International University, a four-year school with the lowest admissions standards in the Florida State University System. This study finds that "marginal students" who are admitted to the school experience sizable earnings gains over those who just miss the cutoff and are thus unlikely to attend any four-year college, translating into meaningful returns net of costs and especially high returns for low-income students. Using a similar methodology, Ost, Pan, and Webber (2016) study the benefit of completing college among low-performing students whose GPAs are close to the cutoff for dismissal at 13 public universities in Ohio. They find substantial earnings benefits for those who just pass the cutoff and complete their degree. Turner (2015) similarly finds that women who attend college after receiving welfare benefits experience large and significant earnings gains if they complete credentials.

In addition to higher earnings, college graduates are also more likely to work than high school graduates. Data from the Bureau of Labor Statistics, summarized in Figure 5-3, show that college graduates with at least a bachelor's degree participate in the labor force at a higher rate than high school

Figure 5-3
Likelihood of Working by Educational Attainment, 2015



Note: Data are for the civilian population 25 years and over.
Source: Bureau of Labor Statistics

graduates (74 vs. 57 percent in 2015)[3] and also face a lower unemployment rate among those who participate (2.6 vs. 5.4 percent in 2015). As a result, people over the age of 25 with a bachelor's degree or higher are 30 percent more likely to be working than those with only a high school degree. A somewhat smaller but still sizeable employment premium is seen for those with some college but without a bachelor's degree.[4] Consistent with college premiums in both earnings and employment, Haskins, Isaacs, and Sawhill (2008) find that individuals with college degrees have increased odds of moving up the economic ladder to achieve a higher level of income compared with their parents.

Overall, higher education helps Americans become more productive in the labor market, building the skills our economy demands and establishing a stronger foundation for the economic prosperity and security of our families and communities. Although the large individual returns to college imply that individuals have strong incentives to invest in higher education, much of the potential benefit of higher education would go unrealized in the absence of Federal policies to support these investments due to positive

[3] See CEA's 2014 and 2016 reports on labor force participation for a more detailed discussion about educational attainment and labor force participation (CEA 2014, 2016e).
[4] This category includes both individuals who attended college but received no degree and those who received an associate degree.

externalities, credit constraints, and information failures and procedural complexities.

Positive Externalities

An individual's postsecondary education level has spillover benefits to others in society that the individual does not capture; that is, positive "externalities." Since individuals usually do not consider the societal benefits when deciding whether to attend college, such externalities are an important motive for Federal student aid.

These societal benefits, while hard to quantify, are numerous and potentially very large (Baum, Ma, and Payea 2013; Hill, Hoffman, and Rex 2005; OECD 2013). Higher individual earnings yield higher tax revenue and lower government expenditure on transfer programs. Further, research shows that increased educational attainment can lead to higher levels of volunteering and voting (Dee 2004), lower levels of criminal behavior (Lochner and Moretti 2004), and improved health (Cutler and Lleras-Muney 2006; McCrary and Royer 2011). Individual investments in education can benefit other members of society through reduced victimization, and lower health care and law enforcement costs. Other social contributions associated with higher education—such as teaching, inventions, or public service—also are not fully captured by the individual's wages. Finally, research shows that when individuals invest in their own college education, they can actually make *other* workers more productive. A study by Moretti (2004) finds that increasing the share of college graduates in a labor market leads to significant increases in the productivity and wages of others where those college graduates live and work. Indeed, research using international comparisons suggest that the cognitive skills or "knowledge capital" of a nation are essential to long-run prosperity and growth (Hanushek and Woessmann 2015).

Credit Constraints

While the social benefits of education provide a strong justification for Federal support, equally important is the fact that, even when the private returns to a college education are high, the private market is often unwilling to supply educational loans—especially to students from low-income families. A key reason for this market failure is that the knowledge, skills, and enhanced earnings potential that a student obtains from going to college cannot be offered as collateral to secure the loan. The lack of a physical asset makes educational loans very different from mortgages or automobile loans, which provide lenders with recourse in the form of foreclosure or repossession if the borrower is unable to repay. For this reason, the private market

alone would supply an inefficiently low amount of credit for the purpose of financing education.

From an individual's perspective, attending college makes financial sense whenever the present value of the benefits outweighs the present value of the costs, when both are discounted based on preferences for current outcomes versus future outcomes. But while the benefits of attending college are spread out over a long future, most of the costs—including both the direct cost of tuition and fees and the foregone earnings while in school—must be paid up front. While some students are able to finance their college educations through savings or help from their families, many need to borrow to make the investment.

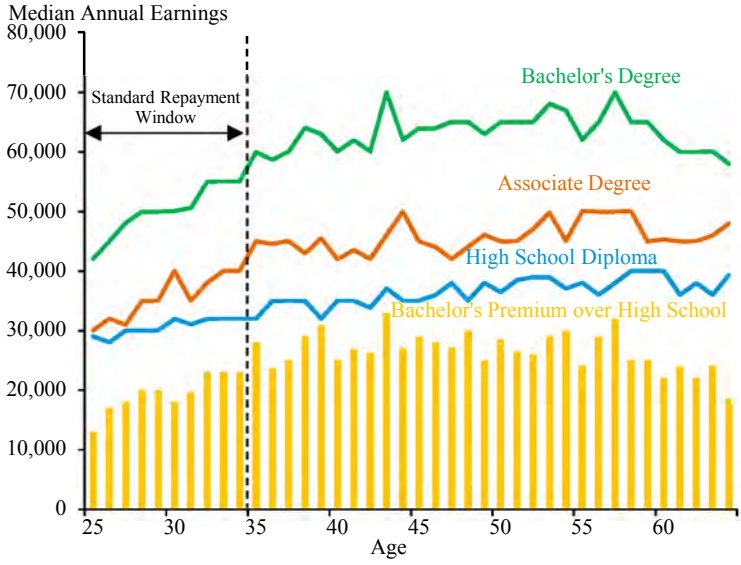
A major function of the Federal student loan system is to ease the credit constraints caused by imperfections in the private loan market, thereby ensuring broad access to affordable college loans and a means to invest in one's future earnings potential.[5] However, while the student loan system has helped to alleviate credit constraints at the time of college enrollment, the traditional standard repayment plan's 10-year repayment period, with equal payments due each month, does not account for income volatility or dynamics once the student has left school. As a result, this standard plan—in which students are enrolled by default—may adversely affect some students' investment decisions and hinder others from successfully managing their debt.

The constraint imposed by the 10-year repayment plan is illustrated in Figure 5-4, which shows the lifetime earnings trajectory of a typical bachelor's degree recipient working full-time and year-round from age 25 to retirement. As the Figure shows, there is a strong positive relationship between age and earnings. This relationship is especially strong for those with a bachelor's degree and it persists for at least 15 to 20 years after many students graduate from college. In short, a college investment pays off over several decades, and a 10-year repayment window forces borrowers to pay the costs at a time when only a small share of the benefits have been realized. Indeed, the discounted values for the earnings levels used in Figure 5-4 suggest that less than a third of the earnings gains over a 40-year career are realized during the standard repayment window.

[5] Although a private loan market exists, the loans typically require a co-signer and often do not come with the consumer protections that Federal loans have, including discharge in instances of death or permanent disability. Today the private market constitutes only a small share of student loans—in 2012, 6 percent of undergraduates used private loans to finance their education (NPSAS 2012, CEA tabulations). In the 2000s, private student loans accounted for a larger share of student loans; see CFPB (2012) for a detailed analysis about how and why the private market for student loans has changed over the last decade.

Figure 5-4

Earnings by Age and Educational Attainment



Note: Earnings are median annual earnings for full-time, full-year workers of the noted age.
Source: CPS ASEC 2015 and 2016

While many borrowers who work when they leave school earn enough to pay their student debt on the standard 10-year plan,[6] there is significant variation both in the size of student loans and in the returns to college. Further, because borrowers may face temporary unemployment or low earnings—especially at the start of their career (Abel and Deitz 2016)—some borrowers are needlessly constrained if they remain on the standard plan. Such considerations are especially pertinent to recent cohorts of students who graduated during or shortly after the Great Recession. Research shows that college graduates entering the labor market during a recession tend to experience sizeable negative income shocks, and that it can take years to recover (Kahn 2010; Oreopoulos, von Wachter, and Heisz 2012; Wozniak 2010). Young workers are often the ones affected more severely by recessions (Hoynes, Miller, and Schaller 2012; Forsythe 2016; Kroeger, Cooke, and Gould 2016). A short repayment window could therefore lead to poor loan outcomes for these students despite a longer-term ability to repay.

[6] CEA calculations using the CPS ASEC and NPSAS 2012 show that at age 25, the earnings premium seen by a typical bachelor's degree recipient working full-time and year-round is $16,000 a year, well above the $3,500 annual payment corresponding to a typical debt amount of about $27,000. Similarly, for an associate degree, the annual earnings premium of roughly $3,000 is above the annual payment of $1,500 associated with the typical amount of about $11,000 that students borrow for this type of degree.

The economics literature provides some evidence that credit constraints faced by students upon graduation can affect career choices. In particular, Rothstein and Rouse (2011) find that having more debt to repay reduces the probability that graduates choose lower-paid public interest jobs, especially jobs in education. Similarly, Luo and Mongey (2016) estimate that larger student debt burdens cause individuals to take higher-wage jobs at the expense of job satisfaction, likely due to credit constraints after graduating, and that this reduces their well-being.

Information Failures and Procedural Complexities

Yet another obstacle that prevents some individuals from making high-return investments in college is limited information about the associated benefits and costs, which leads to poor decisions and to underinvestment. Survey-based research yields mixed findings on whether students underestimate or overestimate the returns to college (Betts 1996; Wiswall and Zafar 2013; Baker et al. 2016) but suggests that students generally view their future earnings as uncertain (Dominitz and Manski 1996). Consistent with this view, one study estimates that only 60 percent of the variability in returns to schooling can be forecasted (Cunha, Heckman, and Navarro 2005).

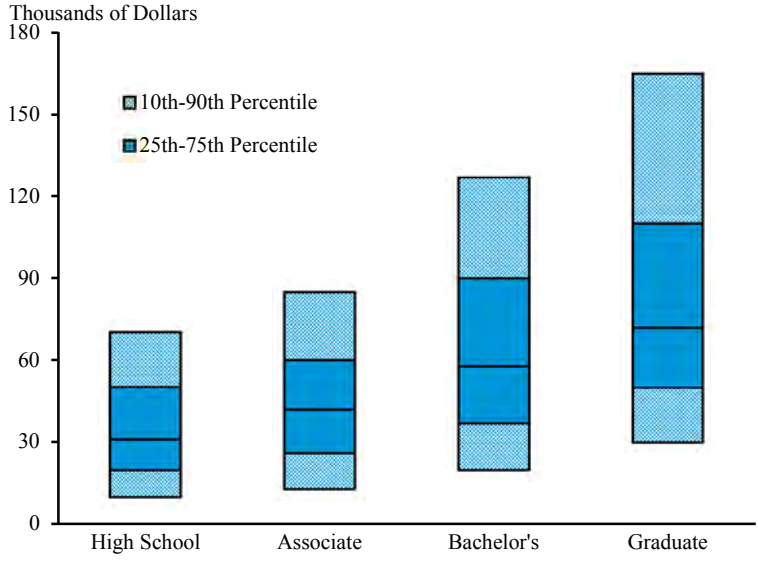
Underlying this uncertainty about the return to college is the fact that, while this return is high on average, it is also quite variable. This variation is illustrated in Figure 5-5, which shows the distribution of earnings by educational attainment. For example, while workers with a bachelor's degree are far more likely to have greater earnings than those with only a high school diploma, there is a fraction whose earnings are similar to the earnings of those with only a high school diploma. Ten percent of workers age 35 to 44 with a bachelor's degree had earnings under $20,000, compared with 25 percent of workers with only a high school diploma (CPS ASEC, CEA Calculations).

The variation in the returns to college is driven by a number of factors; however, one important determinant of both the variability and student uncertainty about these returns is the large variation in the quality of schools and programs of study—which can be hard for potential students to assess. A growing body of literature shows that college quality matters both for completion and for earnings,[7] with some pointing to relatively poor returns at for-profit institutions (Cellini and Turner 2016). Studies have also estimated highly variable returns by college major for bachelor's degree recipients (for example, Altonji, Blom, and Meghir 2012), and others have

[7] For example, see Bound, Lovenheim, and Turner (2010); Cohodes and Goodman (2014); Goodman, Hurwitz, and Smith (2015); Hoekstra (2009).

Figure 5-5

Variation in Earnings by Educational Attainment



Note: Data are for workers ages 35-44 with positive wage and salary income.
Source: CPS ASEC 2016, CEA calculations

found that students' forecast errors regarding earnings differences across majors can affect their major choice (Arcidiacono, Hotz, and Kang 2012).

The effects of poor information and large, difficult-to-forecast variation in earnings can be particularly detrimental since students cannot diversify their college enrollment selections. That is, students generally attend only one school at a time and focus on one or two programs. If they make a poor selection of college or major, it is costly to switch, as it can be difficult to transfer credits. This can potentially lock students into a low-quality program. For some students, the uncertainty of returns itself may prevent them from enrolling in the first place if they are sufficiently risk-averse (Heckman, Lochner, and Todd 2006). The combination of high variability and uncertainty with limited ability to diversify means that some students will realize small, or even negative returns, from college even if the expected return is high. The associated uncertainty may also cause risk-averse students to invest less than they otherwise would in their education.

Prospective students also lack good information about costs. Students often overestimate college costs—with low-income and first-generation prospective students overestimating the cost by as much as two or three times the actual amount (Avery and Kane 2004)—and parents overestimate costs as well (Grodsky and Jones 2007). Moreover, Hastings et al. (2015) find that

students who overestimate costs are less likely to enroll in, and complete, a degree program, confirming that misinformation about costs can be a barrier to investing in college.

When attempting to assess the costs of college, an important obstacle for many students is the complexity of the financial-aid system (Lavecchia, Liu, and Oreopoulos 2015). Behavioral economics show that onerous processes can impact choices, especially when the individuals making decisions are young (Thaler and Mullainathan 2008; Casey, Jones, and Somerville 2011), and can therefore prevent some students who would benefit from investing in college from doing so. In a study of Boston public school students, Avery and Kane (2004) find evidence that low-income students are discouraged by the procedural complexity of applying both financial aid and admission into college, even if they are qualified and enthusiastic about going to college. These findings are consistent with those of Dynarski and Scott-Clayton (2006), who use lessons from tax theory and behavioral economics to show that the complexity of the FAFSA is a serious obstacle to both the efficiency and equity in the distribution of student aid. Page and Scott-Clayton (2015) calculate that 30 percent of college students who would qualify for a Pell Grant fail to file the FAFSA, which is required to receive a Pell Grant.

The Role of Family Income

Overall, the evidence points to a number of factors—including social externalities, credit constraints, poor information, and complexity—that cause some individuals to invest too little in their educations or to otherwise make poor education investment choices. Importantly, these factors do not affect all students equally; they are all more likely to affect disadvantaged individuals. First, students from low-income families, with lower levels of savings, are more likely to be credit constrained and, thus, in need of student loans. Further, the costs of financial-aid complexity also fall most heavily on disadvantaged students, who may have fewer resources available to help them navigate the system (Dynarski and Scott-Clayton 2006). Similarly, research shows that low-income students are less likely to accurately estimate the costs and returns to college (Avery and Kane 2004; Grodsky and Jones 2007; Horn, Chen, and Chapman 2003; Hoxby and Turner 2015). In part, this may reflect the lack of detailed information in popular sources like *U.S. News and World Report* on many colleges disproportionately attended by low-income students. In addition to the barriers they face specific to higher education, low-income students are less likely to receive a PreK-12 education that prepares them for college, making college access and success an even greater challenge for these individuals. New research shows that,

Box 5-1: Anti-Poverty Efforts and Educational Attainment

Research suggests that this Administration's anti-poverty efforts will help expand college access and success, either directly through improving college outcomes or indirectly through improved childhood health and academic performance. Clear evidence supports the expansions of Medicaid and the Children's Health Insurance Program (CHIP), the Earned Income Tax Credit (EITC), and the Supplemental Nutrition Assistance Program (SNAP).

Medicaid/CHIP improves early childhood health and protects families facing health problems from financial hardship (Currie 2000; Kaestner 2009; Kaestner, Racine, and Joyce 2000; Dave et al. 2015; Finkelstein et al. 2012), both of which are positively associated with higher educational attainment (Case, Fertig, and Paxson 2005). Cohodes et al. (2016) find that a 10 percentage-point increase in Medicaid/CHIP eligibility for children increase college enrollment by 0.5 percent and increases the four-year college attainment rate by about 2.5 percent. Brown, Kowalski, and Lurie (2015) also find that female children with more years of Medicaid/CHIP eligibility are significantly more likely to attend college. In his first month in office, President Obama signed the Children's Health Insurance Program Reauthorization Act, which provided additional tools and enhanced financial support to help states cover more children through Medicaid and CHIP, and subsequent legislation has extended funding for CHIP through fiscal year (FY) 2017. In parallel, the Affordable Care Act's comprehensive coverage expansions through Medicaid and the Health Insurance Marketplaces are helping to ensure all children and their families have access to affordable, high-quality health insurance coverage.

The EITC reduces the amount of taxes that qualified working people with low to moderate income owe and provides refunds to many of these individuals. It has been shown to raise student test scores (Dahl and Lochner 2012) and future educational attainment. Research finds that raising the maximum EITC by $1,000 increases the probability of completing one or more years of college by age 19 by 1.4 percentage points (Maxfield 2013) and of completing a bachelor's degree among 18–23 year olds by 0.3 percentage point (Michelmore 2013). For families whose household income lies near the EITC eligibility cutoff, another study provides evidence that a $1,000 increase in credits received during the spring of their senior year of high school increases college enrollment the following fall by 0.5 percentage point (Manoli and Turner 2014). Through the American Recovery and Reinvestment Act (the Recovery Act), President Obama expanded the EITC for families with more than two children and for working couples, and he made these expansions

permanent in 2015; the refundable portion of the Child Tax Credit (CTC) was also expanded in parallel with these changes. Together, the EITC and CTC improvements reduce the extent or severity of poverty for about 8 million children each year.

Research has found that lower family food budgets are associated with greater discipline problems and lower test scores among school-age children (CEA 2015b). SNAP provides nutrition assistance to millions of eligible, low-income individuals and families and helps to combat these problems. A study by Almond, Hoynes, and Schanzenbach (2016) finds that early childhood access to the Food Stamp Program (as SNAP was previously known) led to higher rates of high school completion among children who grew up in disadvantaged households. By expanding SNAP benefits in the Recovery Act, President Obama prevented hundreds of thousands of families from experiencing food insecurity (Nord and Prell 2011), enabling more children to be well-nourished and prepared for school.

among individuals with similar ability, those from low socioeconomic backgrounds are less likely to complete college than their higher socioeconomic peers and, as a result, they tend not to realize their full potential in the labor market (Papageorge and Thom 2016).

In light of the evidence, many of the Administration's policies have been targeted at removing barriers to education for those who face the greatest challenges, and so represent the largest opportunities for improved efficiency and equity. The remainder of this chapter describes the set of evidence-based policies enacted and proposed by the Obama Administration to help correct market failures and to improve the investment decisions and outcomes of all students who wish to invest in higher education.

Key Accomplishments

Over the last eight years, the Obama Administration has made great strides to help students make more effective investments in higher education. These efforts have been guided by the available evidence and have addressed the challenges identified above by helping to offset the cost of college, reducing credit constraints and improving student debt outcomes, providing better information about the costs and benefits of colleges, simplifying the financial aid application process, and holding the most poorly performing colleges accountable. In addition, Administration efforts to improve PreK-12 outcomes have aimed to better prepare students for college and their

careers. Some of the effects of these policies are already evident today, while many more will be realized over the coming decades. Despite these important steps, more work remains to ensure that all interested students have the opportunity to pursue higher education, and that they can do so affordably.

Helping Students Pay for College

At the onset of the Great Recession, the college earnings premium was near a historical high and the number of Americans who wished to attend college was rising. But at the same time, falling tax revenues and State budget shortfalls led to sharp declines in State funding for public institutions, which in turn contributed to rising tuitions and fees (Figure 5-6; Mitchell, Palacios, and Leachman 2014). While the costs of college were increasingly shifted to students through higher tuition, rising unemployment and financial hardship also meant more families faced credit constraints and uncertainty as to whether a college investment was feasible. With large returns at stake, reducing the cost of college became an urgent priority and an early cornerstone of this Administration's higher education policy.

Investments in Grant and Tax Aid

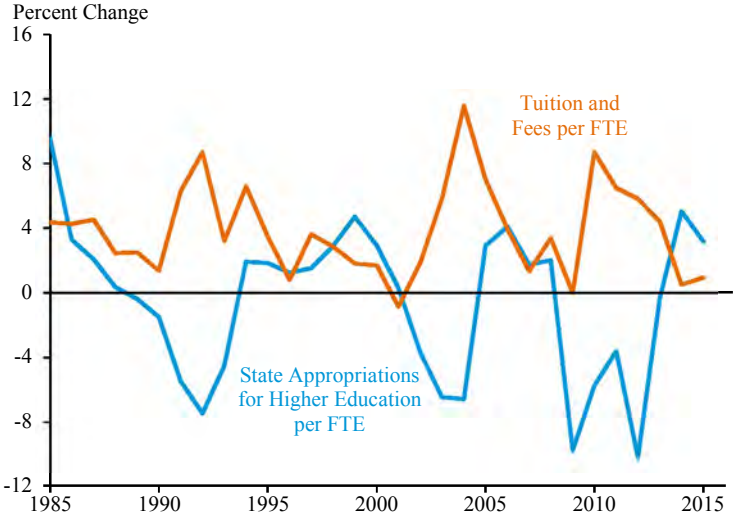
Since coming into office, President Obama has worked aggressively with Congress to increase the maximum Pell Grant award, the primary form of financial aid for many students. On average, Pell Grants reduced the cost of college by $3,700 for over 8 million students last year. Pell Grant funding increased by more than $12 billion from award year 2008–09 to 2014–15, a 67 percent increase, and the maximum Pell Grant award has increased by roughly $1,000 (Figure 5-7). Moreover, for the first time, Pell Grant funding has been tied to inflation to ensure the value of the aid does not fall over time.

A growing body of research confirms the potential for need-based grants to improve college access and success.[8] For example, Dynarski (2003) examines the elimination of the Social Security Student Benefit Program in 1982, and her estimates suggest that an offer of $1,000 in grant aid increases the probability of attending college by about 3.6 percentage points and appears to increase school completion. Abraham and Clark (2006) find similar impacts on college attendance in their study of the District of Columbia Tuition Assistance Grant Program instituted in 1999. A more recent study that examines the effects of a need-based program in Florida with a strict

[8] A few early studies focusing on the initial implementation of the Pell Grant find mixed results (Hansen 1983; Kane 1996; Seftor and Turner 2002; Bettinger 2004); however, the initial benefits of the program may have been limited by the newness of the program and the complexity of the eligibility rules and application process. These complexities have been reduced in recent years.

Figure 5-6

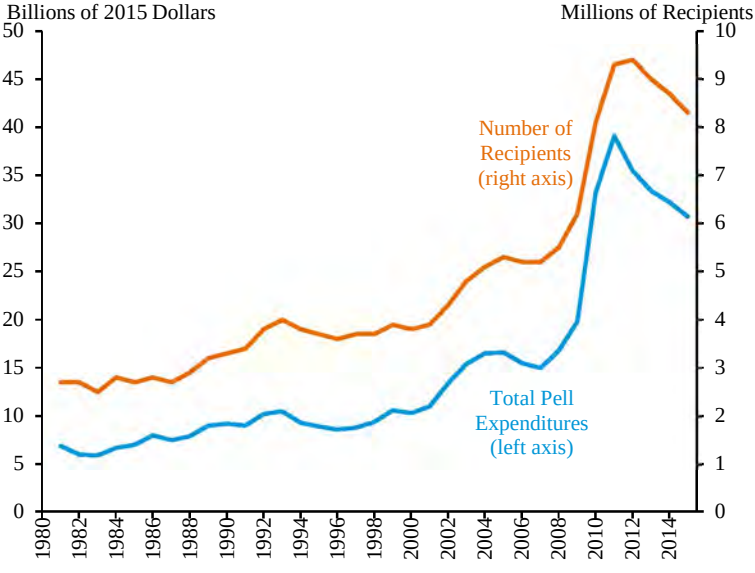
Annual Percent Change in State Funding for Higher Education and Public Tuition and Fees Over Time



Note: Figures are inflation adjusted.
Source: College Board (2015)

Figure 5-7

Pell Expenditures Over Time



Source: College Board (2016b)

eligibility cutoff likewise finds significant increases in four-year college enrollment and completion (Castleman and Long 2013).

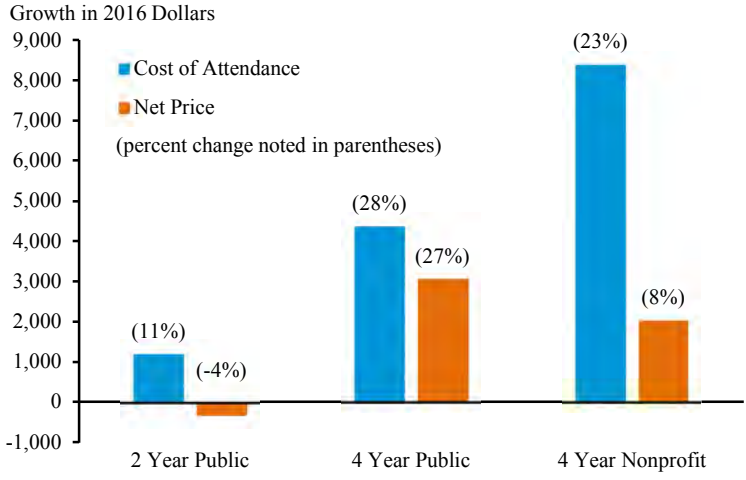
Using these studies to estimate the effects of this Administration's expansions of Pell Grants, CEA analysis finds that the Pell Grant expansions since the 2008–09 award year led at least 250,000 students to attend college or complete a college degree in 2014–15 who would have not otherwise done so. The increase in educational attainment among these students translates to an additional $20 billion in aggregate earnings, representing a nearly 2:1 return on the investment. However, the actual returns on the Administration's Pell Grant investments are likely even larger, as this estimate does not account for social externalities from increased educational attainment nor for other benefits to those receiving larger Pell Grants, including the opportunity to select from a broader range of options, spend more time on school instead of work, and finish sooner (see the Appendix of CEA 2016c for more details on this calculation).

The Administration has also reduced taxes for low- and middle-income families that attend college. Under the 2009 Recovery Act, the Administration established the American Opportunity Tax Credit (AOTC), which provides a maximum credit of $2,500 a year—or up to $10,000 over four years—to expand and replace the Hope higher education credit. Along with providing a more generous credit, the AOTC also is partially refundable and thus provides more benefits for low-income households that do not owe any income taxes. Before the AOTC, only 5 percent of credit and tuition deduction dollars went to filers with incomes under $25,000; by 2014, that share had risen to 23 percent (Dynarski and Scott-Clayton 2016; College Board 2016b). Although research shows that the AOTC has little impact on college enrollment (Hoxby and Bulman 2015; Bulman and Hoxby 2015), the credit lowers the costs of college for millions of students and their families; in 2016, the AOTC cut taxes by over $1,800 on average for nearly 10 million families. The bipartisan tax agreement that President Obama signed into law in 2015 made the AOTC permanent as part of a package that collectively provided about 24 million working and middle-class families a year each with a tax cut of about $1,000.

Due in part to the Administration's historic investments in grant and tax aid, the net price of college that students are responsible for paying grew far more slowly than the published cost of attendance between award years 2008–09 and 2016–17 (Figure 5-8). Although more work remains to make college more affordable, the impact of the Administration's Pell Grant and tax credit expansions have helped lower the cost of college for millions of students and their families.

Figure 5-8

Growth in the Cost of Attendance and Net Price between 2009 and 2017



Note: Years are academic years, and prices are for undergraduate students. Public costs are for in-state students. Cost of attendance includes tuition, fees, room, and board. Net price subtracts grant and tax aid from cost of attendance.
Source: College Board (2016a)

America's College Promise

Although investments in grant and tax aid have helped make college more affordable for many students, too many families still feel as if college is out of reach. To ensure that all responsible students are able to attend college, President Obama unveiled his America's College Promise (ACP) plan in January 2015 to make two years of community college free for hard-working students. Over 1,300 American community colleges provide over 40 percent of undergraduates with educations that deepen their knowledge, make them more informed citizens, and lead to a quality, affordable degree or credential that improves their opportunities in the labor market. If all states participate in the President's ACP plan, an estimated 9 million students could benefit from such an education, and a full-time community college student could save an average of $3,800 in tuition each year.

In fewer than two years since the President challenged more states and communities to make America's College Promise a reality for their students, at least 38 Promise programs—or free community college programs—have launched in states, cities, and community colleges in all corners of the United States (Figure 5-9), increasing the total estimated number of Promise programs to more than 150 across the country. Altogether these new programs are raising more than $150 million in new public and private investments

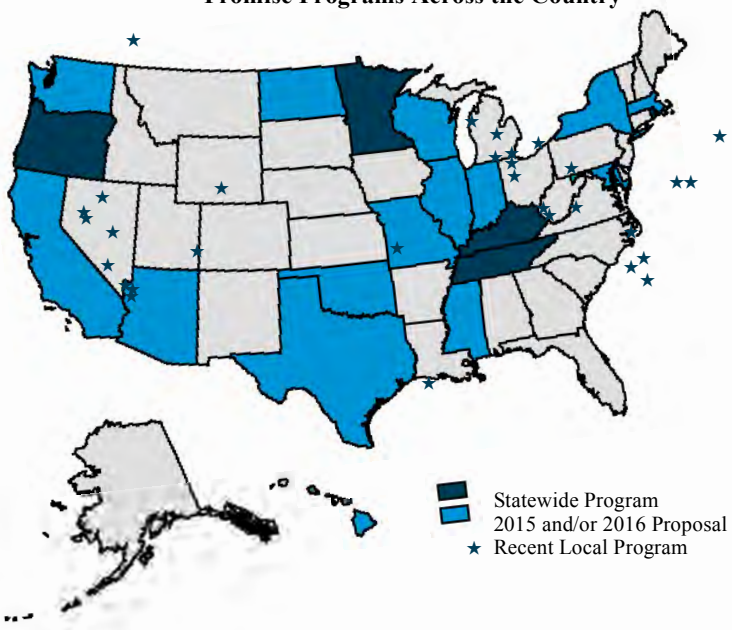
Box 5-2: Federal Investments in K-12 Education during the Recession

As the effects of the Great Recession set in, public universities were not alone in suffering the consequences of declining State revenues; almost all states found that their projected revenues were insufficient to achieve their education plans. As a result, since State and local governments provide about 90 percent of school funding, officials were preparing for significant funding cuts for K-12 teachers, principals, and support staff, in addition to higher education personnel. Such cuts would have severely disrupted educational services for many of America's students (EOP 2009).

In response to the fiscal crisis, the Recovery Act appropriated more than $60 million to State education agencies. In doing so, it shielded schools from the worst effects of their States' budgetary shortfalls (Evans, Schwab, and Wagner 2014). While funding alone is not a panacea for solving problems in K-12 education, research suggests it is a necessary component. If invested in the most productive inputs, it can contribute to improved educational outcomes, especially for students living in poverty (Jackson, Johnson, and Persico 2016; LaFortune, Rothstein, and Schanzenbach 2016). A key way in which increased Recovery Act funding helped improve outcomes was by keeping experienced teachers in the classroom and staving off increases in class sizes. It enabled states to save or create more than 400,000 jobs, most of which were for teachers, principals, and other school staff. Research finds that students in smaller classrooms in the early grades perform higher on standardized tests, earn higher wages, and are more likely to attend college than peers in larger classrooms (Chetty et al. 2011), and that the effects may be larger for minorities and low-income students (Krueger 1999). Due to the swift action of the Obama Administration, states were provided the resources to keep teachers in the classroom and ensure that students had the educational services necessary to succeed.

In addition, the Recovery Act was able to catalyze a wave of reform through targeted investments. The Race to the Top initiative, which offered incentives to states willing to spur systemic reform to improve teaching and learning in their schools, led nearly every state to raise the bar on expectations for student learning, and an independent analysis found that Race to the Top led to significant changes in education policy across the United States (Howell 2015). Other Administration programs, such as the Investing in Innovation Fund (i3), focused funding on evidence-based interventions that could be validated by high-quality evaluations and, if proven successful, could be scaled up.

Figure 5-9
Promise Programs Across the Country



Note: Map is as of October 2016.

in community colleges to serve at least 180,000 students; and the number of free community college programs continues to grow. Additionally, at the Federal level, both the House and the Senate have proposed legislation to expand Promise programs nationwide.

Free community college promotes college access not only by reducing financial barriers,[9] but also by eliminating barriers related to misinformation about college costs (Baum and Scott-Clayton 2015). By clearly messaging that a post-secondary education is within reach, Promise programs help students cross the first hurdle to applying and enrolling in college. Removing such barriers at community colleges is especially important, as community college students tend to be poorer than students attending four-year schools—over half of community college students have family incomes below 185 percent of the Federal poverty line—and are less likely to have parents who attended college to help them navigate the student aid application process (NPSAS 2012, CEA tabulations). Indeed, research shows that Promise programs have been highly effective, which is why the President proposed his vision for free community college in America's College Promise.

[9] Researchers have found that students facing lower community college prices are more likely to enroll in college (Denning 2016b; Martorell, McCall, and McFarlin 2014).

Evaluations of early local Promise programs show that these programs can significantly improve high school graduation, college enrollment, and college graduation rates. A number of research studies have examined the effects of Kalamazoo Promise, the first place-based Promise program. Initiated in 2005, Kalamazoo Promise offers full in-state college tuition to graduates of the Kalamazoo Public Schools in Michigan who have enrolled in the district for at least four years. Using variation in high school eligibility, length of enrollment in the school district, and/or the timing of the program's announcement and implementation, researchers have found that the program reduced suspensions in high school, improved high school credit completion, led to students sending their test scores to more selective in-state institutions, and substantially increased college enrollment and graduation (Andrews, DesJardins and Ranchhod 2010; Bartik and Lachowska 2013; Bartik, Hershbein, and Lachowska 2015; Miller-Adams 2009). Research suggests that the program has had a high rate of return, particularly for African American students (Bartik, Hershbein, and Lachowska 2016).

Carruthers and Fox (2016) likewise find large positive effects of another Promise program. Knox Achieves covered the gap between tuition and fees and grant aid from Federal, State, and institutional sources to first-year community college students making an immediate transition between high school and one of Tennessee's public community colleges or technology centers. Comparing outcomes before and after the program began between students in eligible districts and students in non-eligible districts, Carruthers and Fox find large impacts on high school graduation and college enrollment, with some shift from the four-year to two-year sector. The positive effects of high school graduation and college enrollment were strongest for lower-achieving and lower-income students. Given the success of Knox Achieves, 27 counties adopted the program to expand eligibility to nearly half of Tennessee's population in 2014, and the program became the model for the state-wide Tennessee Promise program rolled out in 2015, which guarantees free community college tuition and fees to high school seniors who sign up, apply for financial aid, and meet with a mentor. Analyses of Promise programs in New York, Pittsburgh, El Dorado, and New Haven also show sizeable effects on educational outcomes (Scrivener et al. 2015; Page and Iritri 2016; Ritter and Ash 2016; Gonzalez et al. 2014; Daugherty and Gonzelez 2016).

The economics literature suggests that program design matters, and some Promise initiatives may see less success. For example, LeGower and Walsh (2014) suggest that merit-based Promise programs may have more limited effects on college access as they disproportionately benefit wealthier and white households. An analysis of one program, which provides free

Box 5-3: Expansions of Early Education Programs

The Administration has been committed to helping students access a high-quality education at all levels of schooling, and the President's calls for universal preschool and a child care guarantee for working families with young children serve as critical complements to his other proposals. Gaps in educational achievement occur early in life and grow over time, so it is critical to ensure that all children receive the educational foundation to succeed in school and life. On nearly every measure of school readiness, from health to early human capital, children born into low-income households enter kindergarten at a substantial disadvantage relative to their higher-income peers. Indeed, disparities in physical and mental health, cognition, and socio-emotional and behavioral skills develop in children as young as 9 months (Halle et al. 2009). By the time children enter school around age 5, those in poor households are nearly four times more likely to score "very low" on assessments of math skills and over four times more likely to score "very low"' on reading skills than their peers in more well-off households (Isaacs 2012). This gap remains relatively constant through the beginning of high school, suggesting that achievement gaps in later years are established in the earliest years of childhood (CEA 2016a).

Research shows that enrollment in high-quality early childhood education accelerates cognitive and non-cognitive development during primary school years (see CEA 2016a for a review), and can lead to significantly better outcomes later in life—such as greater educational attainment and earnings and less involvement with the criminal justice system (for example, Heckman et al. 2010; Reynolds et al. 2011; Campbell et al. 2012). That is why, in addition to calling for preschool for all and high-quality care for all infants and toddlers, the Obama Administration has worked with Congress to increase investments in early childhood programs by over $6 billion from FY 2009 to FY 2016, including high-quality preschool, Head Start, early Head Start, child care subsidies, evidence-based home visiting, and programs for infants and toddlers with disabilities. Since 2009, 38 States and the District of Columbia have increased investments in preschool programs by more than $1.5 billion.

community college only to students with at least a 3.0 high school GPA who test out of remediation, found that these conditions limited eligibility to only about 15 percent of the city's high school graduates (Page and Scott-Clayton 2015; Fain 2014). Additionally, research finds that reducing the cost of lower-quality options can worsen outcomes for students, so attention to college quality in the context of lowering prices to students is essential (Peltzman 1973). A recent Department of Education report (2016a), the

America's College Promise Playbook, outlines the best evidence available to inform design features that localities creating Promise programs should consider. The report exemplifies the Administration's commitment to expanding quality free community college through Promise programs at the local, State, and National level.

Reducing Credit Constraints and Improving Student Debt Outcomes

While the Administration has worked aggressively to lower the cost of college, it has also taken important steps to ensure that students can access credit to finance their college educations. For a growing number of Americans, Federal student loans are an essential means to realizing the benefits of higher education. In fall 2013, over 20 million students enrolled in an institution eligible for Federal aid, and roughly half of these students used Federal student loans to help finance their education. Both economic theory and empirical evidence suggests that without access to Federal student loans, financially constrained students are less likely to attend college, more likely to work while in school, and less likely to complete a degree (Denning 2016a; Wiederspan 2015; Dunlop 2013; Sun and Yannelis 2016).

Key policies signed into law by the President have maintained the accessibility and affordability of student loans for borrowers. In 2010, President Obama signed student loan reform into law, which ended student loan subsidies for private financial institutions and banks and shifted over $60 billion in savings back to students. Before the reform, banks and other private financial institutions provided Federally guaranteed loans, meaning that these institutions provided the underlying loan principal and earned a profit when students paid back their loans but were compensated by the government when the students failed to repay. To remove this subsidy to financial institutions, the 2010 reform required that all new loans be financed directly by the Federal Government as Direct Loans, eliminating the middleman and saving money for taxpayers and students. In 2013, President Obama signed into law further reforms that lowered interest rates on student loans for nearly 11 million borrowers, saving them on average $1,000 over the life of their loan. To date, interest rates have remained low and currently stand at 3.76 percent for undergraduate borrowers.

As an increasing number of students have been borrowing to finance a college education, the volume of outstanding Federal debt has risen, standing at a high of $1.3 trillion dollars today. This rise in debt has made it especially important to ensure that loans serve students well and do not present a burden to borrowers once they leave college.

The evidence suggests that, on average, student loans continue to facilitate very high returns for college graduates, and most borrowers are able to make progress paying back their loans (CEA 2016d). In addition, though there has been an increase in the typical amount of debt that borrowers accumulate, most students accumulate only modest amounts of debt. Fifty-nine percent of borrowers owed less than $20,000 in debt in 2015, with undergraduate borrowers holding an average debt of $17,900. Large-volume debt remains more prevalent among graduate loans, for which loan limits are much higher, and among borrowers who completed their undergraduate degrees. Consistent with their greater educational attainment, borrowers with greater debt tend to have larger earnings and therefore tend to be well-equipped to pay back that debt (Figure 5-10; Looney and Yannelis 2015).

However, borrowers who attend low-quality schools or fail to complete their degrees face real challenges with repayment. In fact, the highest rates of student loan default occur among students with the smallest amounts of debt because these students are much less likely to have completed, having left school before paying for the full cost of a degree, as shown in Figure 5-11.[10]

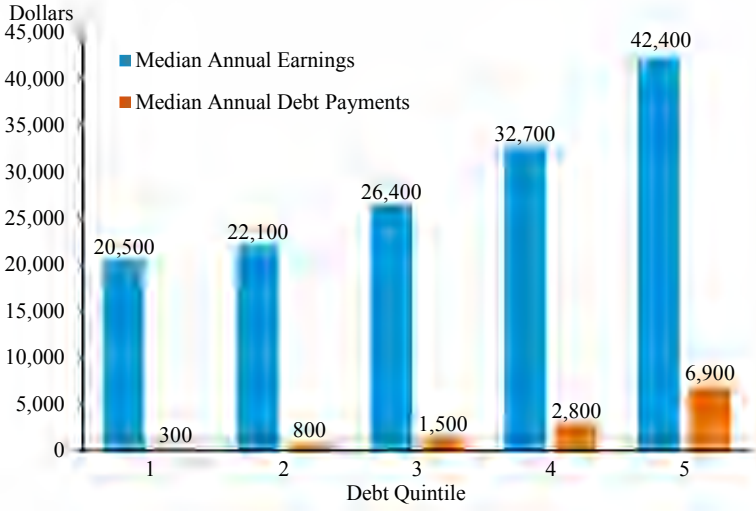
The Great Recession also created some acute challenges for student loan borrowers. During the recession, many borrowers went back to school to shelter from the collapsing labor market, but a disproportionate number of these students attended schools that had relatively low graduation rates and did not provide affordable pathways to good jobs. Along with this change in the quality of schools they attended, changes in the demographics of borrowers entering repayment and the challenges they faced when entering the labor market during a deep recession contributed to rising default rates during the recession and in the period that followed. Over the last few years, the number of students attending low-quality schools has declined, labor market conditions have improved, and default rates, as measured by the official three-year Cohort Default Rate, have gone down (Figure 5-12).

In response to rising default rates, the Administration has worked to ensure that students attend high-quality schools and that borrowers who have left school and entered repayment have affordable loan payments. The following section focuses on this Administration's efforts to expand flexible repayment plans, while later sections describe efforts to improve the quality of schools that borrowers attend. In addition, the Administration has focused on strengthening loan servicing to support Americans struggling with student loan debt. In 2015, the Administration released a Student Aid

[10] Loans of less than $10,000 accounted for nearly two-thirds of all defaults for the 2011 cohort three years after entering repayment. Loans of less than $5,000 accounted for 35 percent of all defaults.

Figure 5-10

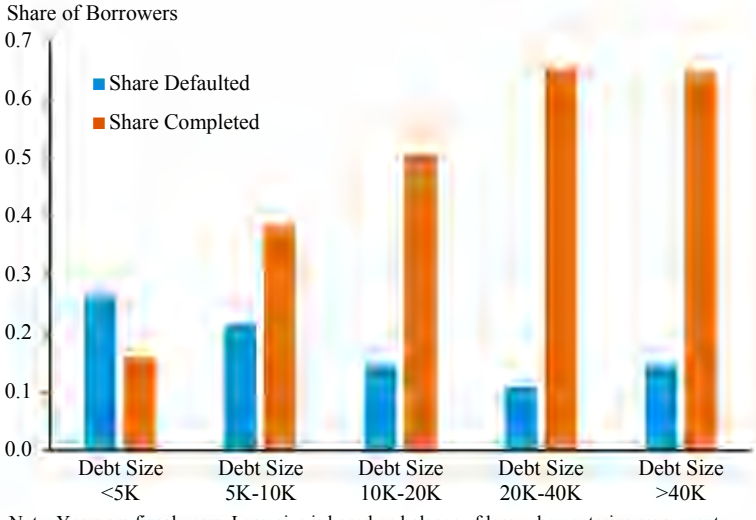
Median Annual Earnings by Debt Quintile



Note: Data are for the 2013 cohort, using the NSLDS 4 percent sample matched to de-identified tax records. Data are for both undergraduate and graduate borrowers. Debt-service figures assume a 10-year standard repayment plan and 3.76% interest.
Source: Looney and Yannelis (2015)

Figure 5-11

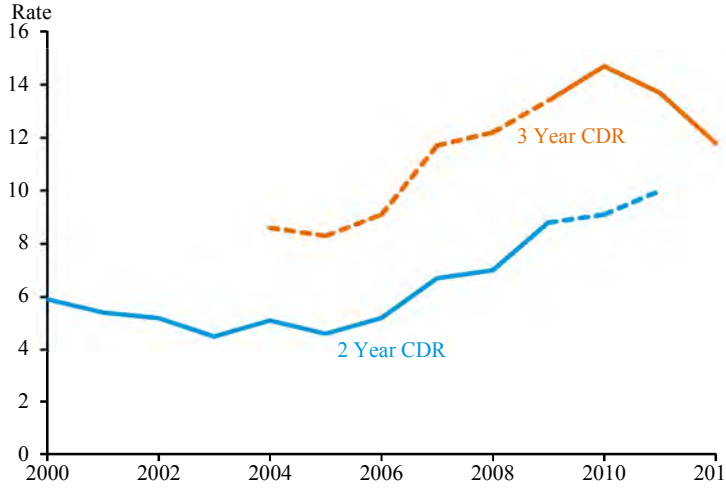
Share of Undergraduate Borrowers Who Default by Year 3 by Loan Size, 2011 Repayment Cohort



Note: Years are fiscal years. Loan size is based on balance of loan when entering repayment. Share completed refers to those who completed a credential.
Source: Department of Education

Figure 5-12

Cohort Default Rates Over Time



Note: Solid lines represent official rates while dashed lines are estimates by the Department of Education. Through the fiscal year 2008, official cohort default rates were measured after two years, after which they were measured after three years; during the transition period, estimates for both time periods were provided.
Source: Department of Education

Bill of Rights reflecting the President's vision that every borrower has the right to quality customer service, reliable information, and fair treatment, even if they struggle to repay their loans. And, in 2016, the White House announced new actions to help Americans with student loan debt understand their repayment options and to ensure they have access to high-quality customer service, strong consumer protections, and targeted support to repay their student debt successfully.

Providing More Flexible Repayment Plans

As described above, the constraint imposed by the standard 10-year student loan repayment plan (in which students are enrolled by default) can hinder debt management since it requires the same monthly payment at the beginning of a borrower's career, when earnings are lowest, as it does mid-career when earnings are higher. This can create repayment difficulties and dissuade students from investing in their education even when the investment has large net benefits over a lifetime. In response, the Administration has made payment plans more flexible and loan payments more manageable through the expansion of income-driven repayment plans. These plans increase flexibility in several ways. First, by expanding the period of repayment, they allow borrowers to spread their student loan payments over a longer period of time, while retaining the option of paying sooner with no

pre-payment penalty. Second, by tying payments to borrowers' incomes, income-driven repayment plans link the timing of repayment more closely to the time path of earnings gains from higher education, and they remove needless credit constraints in times when income is temporarily low. Finally, income-driven repayment plans can serve as a form of insurance against uncertain returns to college, helping to address some barriers associated with risk.

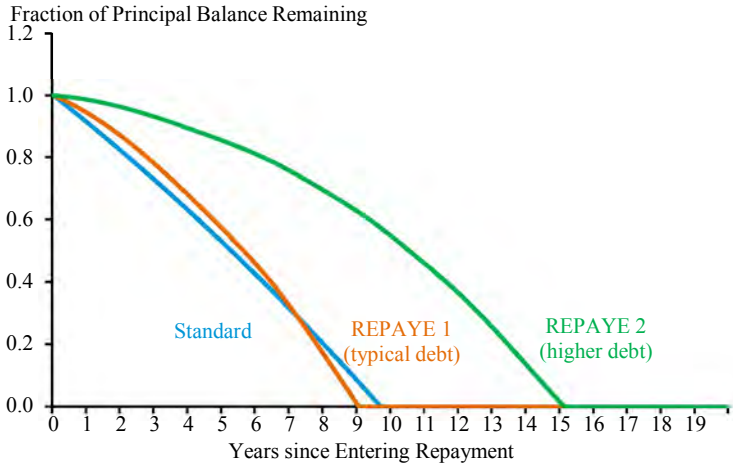
With the new repayment plans, borrowers will never have to pay more than 10 percent of their discretionary income to repay debt. The Administration initially expanded income-driven repayment by passing into law the Pay As You Earn (PAYE) plan in 2012, which reduced monthly payments to 10 percent of borrowers' discretionary income—lower than the 15 percent required under the original Income Based Repayment plan. Under PAYE, borrowers could also have their remaining loan balances forgiven after 20 years of qualifying payments, 5 years earlier than the original Income Based Repayment plan. PAYE extended more affordable loans to 1.6 million borrowers; however, many borrowers remained ineligible. That is why, in 2015, the Administration expanded PAYE with regulation creating the Revised Pay As You Earn (REPAYE) repayment plan that provides eligibility to all Direct Loan student borrowers, including any student with a consolidated loan (excluding PLUS loans to parents). With REPAYE, these borrowers can cap their monthly payments at 10 percent of their discretionary income, regardless of when they borrowed and, after making the appropriate number of qualifying payments, will have any outstanding balance forgiven. Under REPAYE, borrowers with only undergraduate loans can have their remaining loan balances forgiven after 20 years of qualifying payments; borrowers with any graduate school loans can have their remaining balances forgiven after 25 years of qualifying payments.

Figure 5-13 below illustrates how the theoretical repayment curve for the standard 10-year plan differs from REPAYE for a typical borrower graduating with a four-year degree.[11] Data from the Baccalaureate and Beyond study show that seniors graduating college in 2008 held a median debt of $17,125 and earned a median income of $31,000 upon leaving school. The Figure assumes an interest rate of 3.76 percent consistent with the 2016 student loan rate, real earnings growth consistent with trends in Figure 5-4, 2-percent inflation, and a single-person family (for ease of REPAYE calculations). The "Standard" line corresponds to the standard 10-year repayment plan with an initial income of $31,000 and an initial debt of $17,125, consistent with the Baccalaureate and Beyond data for all students who borrowed.

[11] It should be noted that a number of alternative repayment plans also exist, some of which have longer payment schedules.

Figure 5-13

Repayment Distribution by Repayment Plan



Note: Calculations assume a real interest rate of 3.76%, 2% inflation, income growth corresponding with Figure 5-4 describing earnings by age for full-time full-year workers, that borrowers are in single person families, and assumptions about income and debt from the 2008 Baccalaureate and Beyond Study. REPAYE 1 and 2 differ in their original principal debt amounts, with REPAYE 2 corresponding with a higher debt amount.
Source: CEA Calculations

The line labeled "REPAYE 1" uses the REPAYE formula with the same initial income and debt, while "REPAYE 2" uses the same initial income but an initial debt of $31,000 to show how repayment patterns differ by debt amounts. The Standard plan line is relatively flat, reflecting the constant rate at which the principal balance is paid off under this plan. In contrast, both REPAYE lines show that principal repayment is initially slow and accelerates over time. In some cases, such as in "REPAYE 1," borrowers may pay off their debt faster under REPAYE than the Standard plan if their wages are sufficiently high. Further, a comparison of the two REPAYE lines shows that the larger the debt is in comparison to income (or the smaller income is in comparison to debt), the less the REPAYE repayment curve will look like the Standard curve.

Continuing to expand enrollment in income-driven repayment plans for students who would benefit remained a key priority for this Administration. As of the third quarter of FY 2016, about 5.5 million (more than 1 in 5) borrowers with Federally managed debt were enrolled in income-driven repayment plans. The share of borrowers with Federally managed debt who are enrolled in income-driven repayment has more than quadrupled from 5 percent in the first quarter of FY 2012 to 23 percent in the third quarter of FY 2016 (Figure 5-14). To help borrowers access this debt management tool, the Administration has improved loan servicer contract

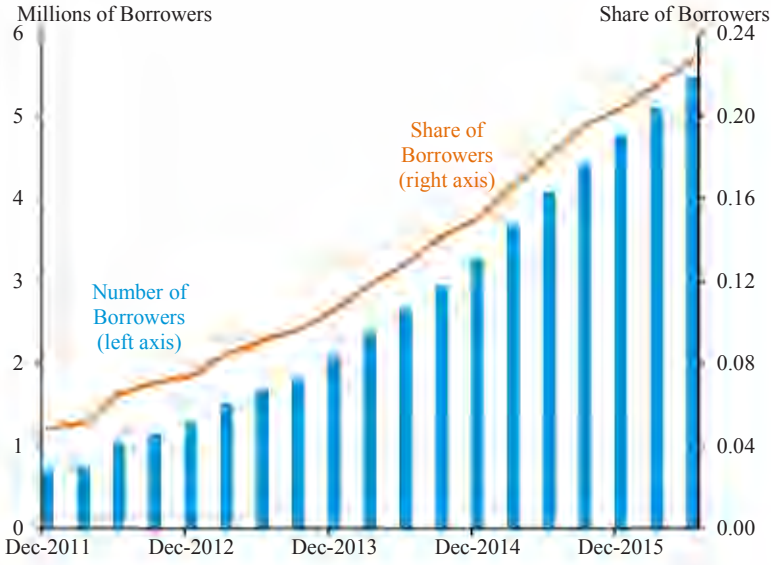
requirements, pushed efforts associated with the President's Student Aid Bill of Rights, put forward a student debt challenge to gather commitments from external stakeholders, and increased and improved targeted outreach to key borrower segments who would benefit from PAYE or REPAYE. Although barriers related to recertifying income and interfacing with the income-driven repayment enrollment tools online persist, the Administration continued to explore options for how to address these remaining shortcomings.

Recent data suggest that income-driven repayment plans appear to be drawing in many of those borrowers who may most benefit (Figure 5-15). In general, the data show that income-driven repayment borrowers tend to have lower reported family incomes than borrowers on the standard repayment plan. Among borrowers with undergraduate loans who were enrolled in income-driven repayment as of the third quarter of FY 2015, the average family income (in real 2014 dollars) based on the first FAFSA filed was $45,000, compared with $57,000 for those on the standard repayment plan. For borrowers with graduate loans, the average income among those enrolled in income-driven repayment was $60,000, compared with $74,000 for borrowers on the standard plan. Even within sectors of educational institutions, borrowers enrolled in income-driven repayment tended to come from lower income backgrounds than those enrolled in the standard plan, suggesting that these plans are reaching the students who may need them the most. One factor contributing to lower incomes among undergraduate income-driven repayment enrollees was that these borrowers were more likely to be classified as independent, and independent borrowers tend to have lower reported incomes since their parents' incomes are not counted as part of their family's income. Overall, 52 percent of borrowers in income-driven repayment were classified as independent, as opposed to 42 percent of borrowers under the standard repayment plan.

Given that income-driven repayment plans tend to change repayment schedules more dramatically for borrowers whose debt is high relative to their incomes, it is perhaps unsurprising that borrowers in income-driven repayment tend to have larger loan balances outstanding (Figure 5-16). As of the third quarter of FY 2015, the median debt for these borrowers was $34,000, while the median was just $10,000 for borrowers in the standard plan. This difference partly reflects a larger share of graduate borrowers; 30 percent of income-driven repayment borrowers had graduate loans, compared with 10 percent of borrowers under the standard plan. However, substantial differences remain even among graduate and undergraduate borrowers. Differences in outstanding balances also remained when looking within sector, and data for the 2011 repayment cohort suggest they were partly driven by the fact that borrowers entering income-driven repayment

Figure 5-14

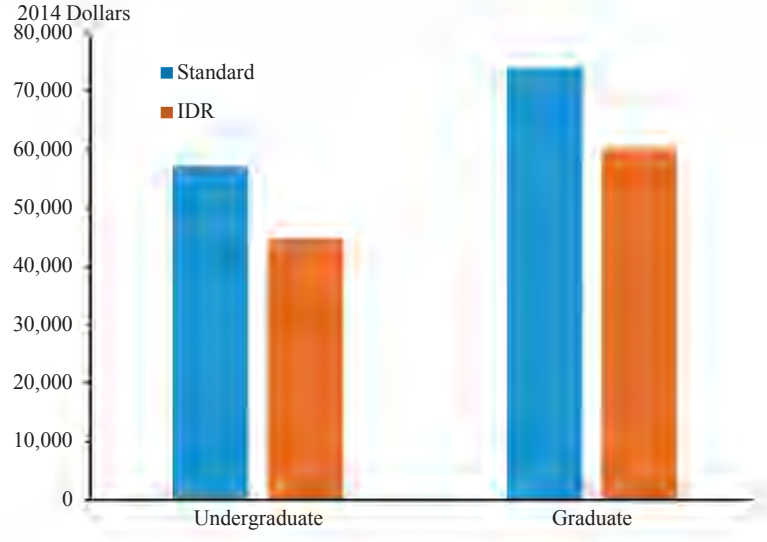
Borrowers in Income Driven Repayment Over Time



Note: Data are restricted to Federally-managed debt.
Source: Department of Education

Figure 5-15

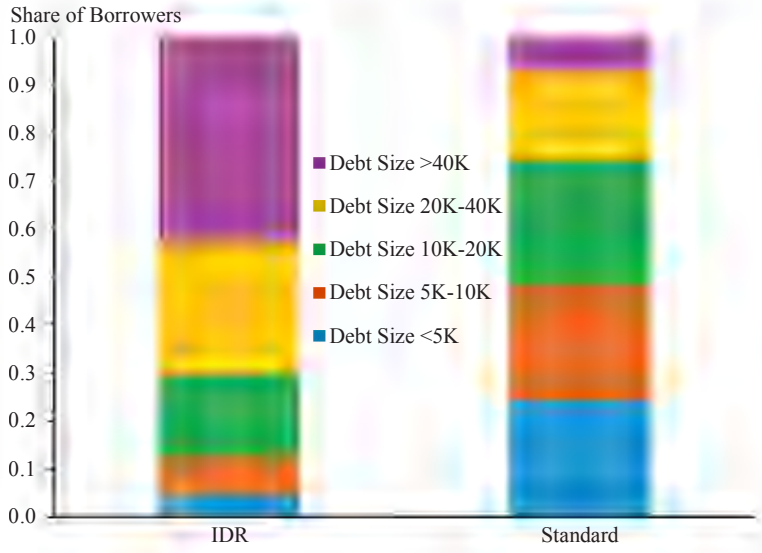
Average Family Income by Repayment Plan



Note: Data are as of the third quarter of fiscal year 2015. Income based on first FAFSA filed, converted to 2014 dollars. Undergraduate and graduate are broken apart at the loan level.
Source: Department of Education

Figure 5-16

Size of Outstanding Loan Balance by Repayment Plan



Note: Data are as of the third quarter of fiscal year 2015. Debt size is based on outstanding loan balance.
Source: Department of Education

typically have larger principal loan balances than borrowers in the standard repayment plan.

Consistent with both the larger debt and the prevalence of graduate student debt among borrowers in income-driven repayment, these borrowers are more likely to have completed their undergraduate degrees than borrowers in the standard repayment plan. Among those in the 2011 repayment cohort, 64 percent of borrowers in income-driven repayment had completed, compared with only 48 percent of borrowers in the standard plan. Many of those who completed their undergraduate degree accumulated more debt because they subsequently enrolled in graduate school. But even among borrowers with no graduate school debt, those enrolled in an income-driven repayment plan were still slightly more likely to have completed a degree.

The positive relationship between completion and income-driven repayment enrollment suggests that students who enroll in income-driven repayment are more likely to have large long-run returns to their college investments and to be able to eventually pay off their loans. However, data on prior repayment behavior also show that individuals with short-run repayment difficulties are using income-driven repayment. Among borrowers entering repayment in FY 2011, a sizeable fraction that enrolled in income-driven repayment had experienced difficulty in repaying their loans

before entering income-driven repayment, with slightly higher signs of distress compared with borrowers under the standard plan. Over 40 percent of these borrowers had defaulted, had an unemployment or economic hardship deferment, or had a single forbearance of more than 2 months in length before entering their first income-driven repayment plan. A much smaller fraction of these borrowers, roughly 10 percent, experienced difficulty in repayment after entering income-driven repayment.

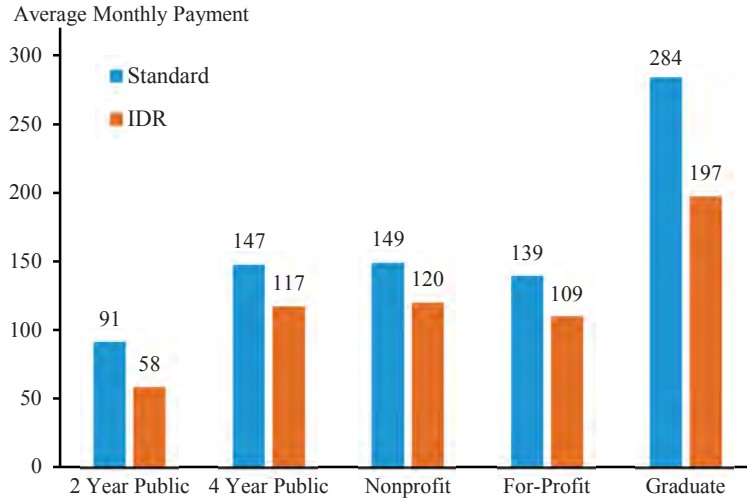
A key way that income-driven repayment helps to improve outcomes for borrowers is by reducing monthly payments, since payment amounts are spread over a longer time period and are tied to earnings. For the 2011 repayment cohort, Figure 5-17 shows that borrowers in income-driven repayment had lower monthly payments across all sectors, despite serving borrowers who accumulated larger amounts of debt.

Some borrowers in income-driven repayment plans may have zero-dollar monthly payments. These plans allow borrowers who attended low-quality schools and subsequently experienced low earnings to stay out of default, and give borrowers who experience temporary periods of economic difficulty time to get back on their feet. Data show that the same types of borrowers who have more difficulty repaying their loans in terms of college sector, debt size, and borrower characteristics are also more likely to have zero-dollar scheduled payments, highlighting the importance of income-driven repayment in helping these borrowers manage their debt. It is important to note, however, that another factor driving the group of income-driven repayment borrowers with zero-dollar scheduled payments is that, on average, borrowers in income-driven repayment entered repayment relatively recently. As of the end of FY 2015, income-driven repayment borrowers had been in repayment for an average of about three years. As Figure 5-4 above shows, earnings increase over a career, so as borrowers progress through their careers, their scheduled payments are also likely to increase.

To further expand income-driven repayment to borrowers who could benefit from more manageable monthly payments, the Administration has announced a series of new actions to enroll 2 million more borrowers into income-driven repayment plans. Data about the characteristics of borrowers enrolled in income-driven repayment highlight the importance of these initiatives. For example, though low-balance borrowers and borrowers who did not complete school are more likely to default on their loans, they represent a relatively smaller share of borrowers in income-driven repayment. Enrolling more of these types of borrowers in flexible repayment plans like income-driven repayment will help make their debt more manageable and help them to avoid costly and unnecessary defaults.

Figure 5-17

Average Monthly Payment by Sector and Repayment Plan, 2011 Repayment Cohort



Note: Data are for the fiscal year 2011 cohort as of fiscal year 2014. Some small sectors are excluded from this chart. Data contain some duplication across and within categories.
Source: Department of Education

At the same time, as research has shown, college choice is a crucial factor. It is critical to help borrowers avoid investing in colleges that are unlikely to increase their lifetime earnings and might leave them with high debt and low earnings. This Administration's policies have focused on strengthening the information available to students and ensuring college accountability to help students make good decisions.

Improving Information and Reducing Procedural Complexities

When students have better information, they can make better choices about their education. When choosing a college, students need information on college quality and cost to know whether their investment in higher education will pay off. Research shows that, for high-achieving low-income students, providing information about college cost and quality, like semi-customized net price and graduation rates, enables students to attend and progress at schools that better match their qualifications (Hoxby and Turner 2013). Further research shows that clear and detailed information about earnings can lead students to revise their employment expectations (Ruder and Van Noy 2014; Wiswall and Zafar 2013; Oreopoulos and Dunn 2012) and change their major choice (Ruder and Van Noy 2014; Baker et al. 2016). Accessible information about costs and economic outcomes thus plays a

crucial role in encouraging students to make informed decisions about enrolling in higher education and choosing the best college for their needs.

At the same time, evidence suggests that, while prospective students can benefit from improved information, procedural complexities may prevent some individuals from using the information and other resources available to them. In particular, as described above, the complexity of the FAFSA has created barriers to efficiency and equity in the distribution of student financial aid, deterring many students who would benefit from aid from applying. It follows that reducing this complexity should help students access Federal student aid to better invest in their education, and the research supports this conclusion. In an experiment that provided low-income families with personalized aid eligibility information and, in some cases, assistance completing the FAFSA, only families who got both assistance and information were more likely to see the benefits of greater financial aid and college enrollment (Bettinger et al. 2012). This section details key Administration initiatives to improve information and reduce procedural complexities for students.

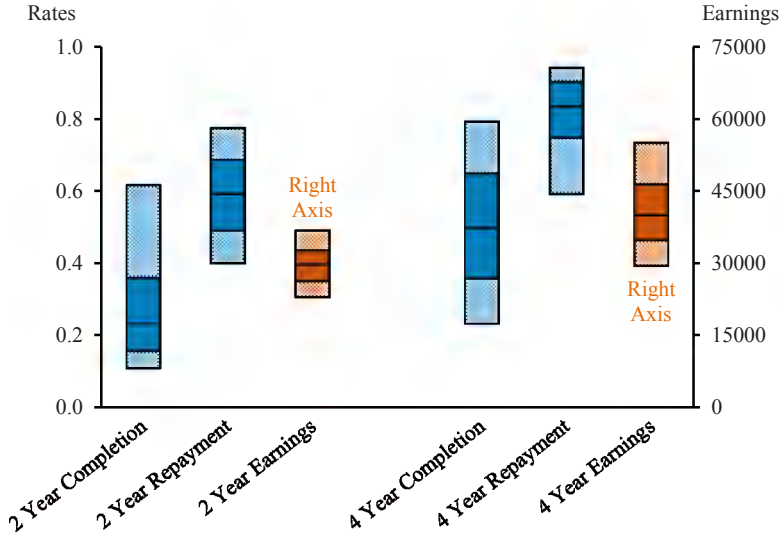
College Scorecard

In 2015, the Department of Education launched the redesigned College Scorecard to help empower Americans to select colleges based on what matters most to them. The online Scorecard provides reliable, unbiased, comprehensive, and nationally comparable data on college outcomes for all institutions. These outcomes include former students' earnings, student debt for graduates, and debt repayment rates; the data are also broken down by demographic group, which allow students to assess how well colleges are serving similar students to themselves before deciding where to apply and attend. Figure 5-18 highlights the importance of these data, showing the large variation in outcomes at two- and four-year colleges. CEA's technical report on using Federal data to measure and improve the performance of U.S. institutions of higher education provides more information about the Scorecard, including a guide to the available measures, methods for assessing college quality, and data-driven lessons for performance management (CEA 2015c).

Within its first year, the College Scorecard has reached students and families across the country (Figure 5-19), and students now have multiple opportunities to use Scorecard to make better decisions. For example, the College Scorecard data will be clearly featured in the hundreds of millions of Google searches related to colleges and universities taking place in the United States each year, and other companies like College Board are integrating the data into their college application products and programs.

Figure 5-18

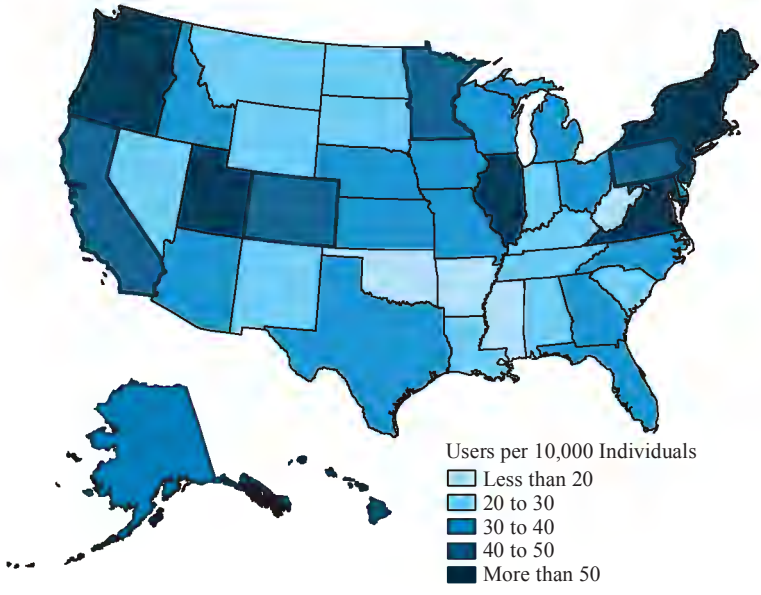
Distribution of Key Outcome Measures at 2 and 4 Year Schools



Note: Data are for the most recent cohorts using 150% completion rates from IPEDS, 3-year repayment rates, and 10-year median earnings.
Source: College Scorecard

Figure 5-19

Scorecard Usage by State



Note: Usage data are as of September 12, 2016. They only represent unique visitors to the Scorecard tool itself and exclude calls for the data through the API. The data are for individuals of all ages and are normalized with 2015 Census data.

College rankings like *Forbes*, *Money*, Brookings Institution, *Economist*, *Wall Street Journal*, and *Washington Monthly* are also using new outcomes data included in the Scorecard. Since the College Scorecard initially launched, the data have been accessed nearly 13 million times by API users and through the website. Additionally, more than 700 developers have accessed College Scorecard's Application Programming Interface (API), which allows users to create tools and insights that will help prospective college students make important decisions.

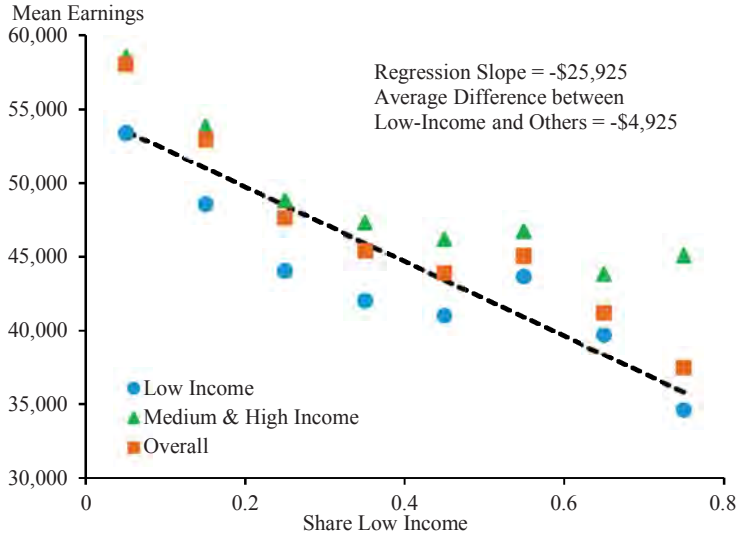
The revised College Scorecard contains a variety of information that is useful for students, parents, and administrators when considering the right college for a particular student. For example, though earnings and employment are primary motivations for students to attend college, students also care about cost, completion rates, and debt repayment outcomes, as well as broader goals like becoming a better person (Eagan et al. 2014; Fishman 2015). Based on academic literature and consumer testing, the Administration developed a series of measurable outcomes that students had identified as important. Because students value each factor differently depending on their own circumstances and preferences, the Scorecard presents each indicator independently so that students can emphasize and compare the attributes most important to them.

Additionally, because students come from a variety of backgrounds, it is helpful to provide information about how prospective institutions serve students like them. Ideally, a single measure of college quality would isolate the effect that attending an institution has on its students' outcomes from other inputs such as the types of students it enrolls. However, it is very difficult to disentangle these effects since they tend to be closely related, as demonstrated in Figure 5-20. This Figure shows that low-income students tend to have lower outcomes both because they disproportionately attend schools with poorer outcomes for all students and because of other, unobservable characteristics, such as academic preparation. In light of these challenges, the College Scorecard presents information on both student outcomes as well as characteristics of the students attending a university to help users assess quality. Moreover, the Scorecard includes data disaggregated by student subgroup to help researchers and policymakers assess institutions' successes and failures in serving disadvantaged students.

The Scorecard includes a combination of short-term measures, which are more responsive to changes in school practices, and long-term measures, which may better represent the more permanent outcomes associated with attending a particular institution. It also notes the program mix of the institution and other factors that may relate to wide variation in outcomes, and makes efforts to ensure the reliability of performance measures

Figure 5-20

Earnings by Family Income at 4 Year Schools



Note: Data for 10 year earnings for the 2002 cohort. Low income defined as family income of less than $30,000, and medium/high income defined as greater than $30,000.
Source: College Scorecard

and information for smaller schools where small changes could lead to substantially different results. Overall, the College Scorecard—released in September 2015 and updated September 2016—represents a significant step forward in providing transparent and comprehensive data on college costs and outcomes and has encouraged the research community to focus on developing a Federal and State data agenda for postsecondary education.

The Administration has also focused on more directly getting information into the hands of students in key areas of high impact, such as when they are applying for student aid or in the form of disclosures related to accountability measures. These initiatives are discussed in further detail in the following sections.

FAFSA Simplification

In light of the evidence about the benefits of simplifying aid, the Administration has undertaken a number of administrative reforms to streamline the FAFSA process so that it can better serve students and their families. Many initiatives have focused on reducing the number of questions presented to students and families and by making it easier for applicants to directly transfer tax and income information from the Internal Revenue Service (IRS). The Administration has revamped the online form for all

Box 5-4: Improving Information to Drive Evidence-Based Policies

Building an evidence base to determine what works and what does not work has been a cornerstone of this Administration's education policy. Educational leaders, Federal and State policymakers, and researchers are increasingly interested in questions of institutional outcomes to better share and adopt best practices, steward taxpayer dollars, and determine how resources can be more efficiently allocated to benefit students. Efforts to improve data quality and facilitate research and innovation have also helped educators to learn both from their own experiences and from others and to ensure that resources are spent on the most effective practices.

In higher education, the Administration has encouraged greater innovation and a stronger evidence base around effective strategies to promote college access and success through 42 First in the World (FITW) grants. These grants support the development, replication, and dissemination of innovative and evidence-based interventions at institutions of higher learning across the Nation. Although the program has since been de-funded by Congress, the grants already made to institutions target adult learners, working students, part-time students, students from low-income backgrounds, students of color, students with disabilities, first-generation students, and other students at risk of not persisting in or completing college. In addition, through the Experimental Sites Initiative, the Administration has tested innovative practices in the delivery of Federal student aid dollars and has used the resulting evidence to inform higher education policies. Some of these experiments include, on a limited basis, making Pell Grants available to low-income high school students that dually enroll in college programs and to eligible incarcerated individuals.

Through investments in the Recovery Act, the Administration was also able to advance the use of data through three critical investments: Investing in Innovation Fund (i3); Race to the Top; and the Statewide Longitudinal Data Systems grant program. With similar goals as FITW but targeted at the K-12 level, the i3 program was designed to fund school districts and nonprofits developing and scaling innovative and evidence-based strategies that address challenges in K-12 classrooms, particularly those serving disadvantaged students. Since its establishment in 2009, more than $1.3 billion of grant money has been invested in 157 projects.

Additionally, the Administration's Race to the Top program provided support to states implementing data system improvements in four areas, including the use of data systems and technology to inform and enhance instruction. Recent research has shown that better integration of data in the classroom can help teachers tailor instruction according

to student needs and improve test scores (Dobbie and Fryer 2011; Fryer 2014). Furthermore, by relying on data to inform daily instruction, researchers can compare what is and is not effective across districts and provide teachers with new insights on how to address the academic needs of their students. In addition, under this Administration, the Statewide Longitudinal Data Systems program has expanded support for states to create and link data systems across early learning, K-12, postsecondary, and labor systems so that states have better information on what works. Several states, such as Florida, North Carolina, and Texas, have collected and maintained extensive PreK-12 population-level data on public school students that have been used to study the long-term impact of schooling over time on post-secondary education, the labor market, and even the criminal justice system (Figlio, Karbownik, and Salvanes 2015).

Finally, in an effort to better understand where educational inequities currently exist, through executive action in 2011–12, the Administration changed the Department of Education Civil Rights Data Collection (CRDC) from a sample to universe collection, requiring every U.S. public school and school district to participate. The CRDC provides data on leading civil rights indicators related to access and barriers to educational opportunity at the PreK-12 levels. Having access to a full set of data helps policymakers to make more informed decisions concerning how Federal resources should be expended and to what extent schools are making progress in closing achievement and opportunity gaps.

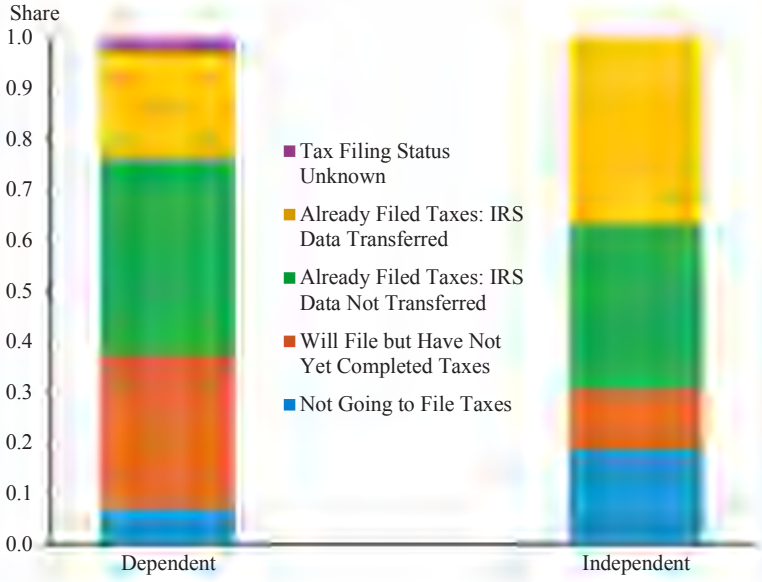
families so they can skip questions that are not relevant to them. In addition, over 6 million students and parents took advantage of the ability to electronically retrieve their income information from the IRS when completing their 2014–15 FAFSA, an innovation that improves both speed and accuracy. These efforts have translated to a meaningfully simpler FAFSA for students.

Additionally, in 2015, the Administration announced an earlier and easier process for applying for Federal financial aid, allowing students to apply to colleges and for financial aid in tandem. Beginning in 2016, FAFSA applicants have been able to complete the form on October 1 for the following academic year, three months earlier than the original January 1 start date, and use income information from two-years prior to fill out the form. This reform benefits students in two key ways:

First, students and their families can now have a reliable understanding of their Federal aid eligibility as early as the fall—the same time that many high school students are searching for, applying to, and even selecting colleges. An earlier FAFSA helps clear an important hurdle in reducing

Figure 5-21

FAFSA Tax Filing Status during Initial Application, 2014–2015



Source: Department of Education

information barriers related to cost. Importantly, the Administration is also working with states and colleges to provide financial aid award information on this earlier timeline. Moreover, the earlier FAFSA cycle presents an opportunity to provide students with more timely information about the schools where they are applying. Starting with the 2018–19 application year, the Department of Education will present Scorecard data through the FAFSA so that students can make more informed decisions about the schools at which they plan on applying for admission and student aid based on both cost and student outcomes.

Second, more students and families can complete their FAFSAs using information retrieved electronically directly from the IRS. In past years, a significant portion of FAFSA filers were unable to electronically retrieve their income and tax information from the IRS because they had not yet filed their tax returns before completing their FAFSA forms (Figure 5-21). For example, 34 percent of parents of dependent students had not yet filed their 2013 tax returns when they were initially completing their 2014-15 FAFSA. Such applicants had to manually input their estimated income and tax information into their FAFSA, or worse, did not submit a timely FAFSA because they erroneously believed that they were not allowed to do so unless then had filed their tax returns. By utilizing tax information from two years

Box 5-5: Making Sure Students Enter College Well-Prepared

Too many students enter college unprepared to tackle college-level courses and benefit from their higher education. A recent study found that half of all undergraduate students will take at least one remedial course before enrolling in a college-level course, averaging to an annual national cost of nearly $7 billion dollars (Scott-Clayton, Crosta, and Belfield 2014). This Administration has implemented a number of policies to help ensure that all Americans graduate from high school prepared for college and their careers, and over the past 7 years, students have seen important gains. Today, high school graduation rates are at an all-time high and dropout rates at an all-time low. This Administration has also seen National test scores in reading and math for fourth and eighth graders reach new highs (NCES 2016).

Encouraging Reform with Flexibility: When President Obama entered office, No Child Left Behind (NCLB) was two years overdue for reauthorization and in serious need of repair. In the absence of congressional action, the Department of Education offered states relief from the most onerous requirements in NCLB in exchange for a commitment to engage in needed reforms. Between 2011 and 2015, more than 40 states and the District of Columbia applied for and received this flexibility while working to improve their schools using many of the policy options detailed below. Many of these reforms were codified in the bipartisan Every Student Succeeds Act (ESSA), which the President signed in December 2015.

Higher Standards: The Administration encouraged all states to adopt high standards and aligned high-quality assessments based on college- and career-ready expectations through incentives in the Recovery Act funding provided to states through the Administration's Race to the Top program. In 2016, 49 states and the District of Columbia now have higher standards than before. In the future, every state will be required to hold students to standards that prepare them for college and career as a result of ESSA. Higher standards have been linked to higher test scores (Wong, Cook, and Steiner 2011) and can help identify whether students are well-equipped with the skills and content knowledge necessary for college-level coursework.

Excellent Teachers: This Administration has supported teacher development and excellence by encouraging the expansion of high-quality educator evaluation and support systems that help equip schools to use multiple measures, which are fair and reliable, to provide timely and meaningful feedback to educators. Economics research highlights that teacher quality can be measured as a predictor of student achievement (Chetty, Friedman, and Rockoff 2014a; Bacher-Hicks, Kane, and

Staiger 2014), and feedback from evaluations can help teachers substantially improve their methods and performance (Taylor and Tyler 2012; Kane et al. 2011). The long-term impacts of improving teacher quality on outcomes such as college attendance and earnings are large (Chetty, Friedman, and Rockoff 2014b).

STEM Initiatives: The Obama Administration has made Science, Technology, Engineering, and Math (STEM) education in K-12 schools a national priority. In 2011, the President pushed to recruit 100,000 excellent STEM teachers to work in public schools over the next 10 years, and by 2016, we have exceeded in reaching 30 percent of that goal and are on track to achieve it. The future of America's workforce will require a growing number of workers with an education in STEM fields (Sargent 2014; Rothwell 2014), and research shows that exposure to and training in advanced math and science courses during high school are linked with higher earnings and later labor market outcomes in STEM fields (Rose and Betts 2004; Black et al. 2015; Levine and Zimmerman 1995).

Closing Gaps: The racial and socioeconomic gaps in educational inputs and outcomes hold back too many American students from reaching their potential, and the Administration worked to close these gaps by targeting support among those who need it most.

- The Administration issued School Improvement Grants (SIG) to more than 1,800 of the Nation's persistently lowest-achieving public schools since the program's creation in the Recovery Act. A study of California schools by Dee (2012) found that SIG contributed to closing performance gaps between on-target schools and schools considered "lowest-achieving" by 23 percent.
- In 2014, President Obama established the My Brother's Keeper (MBK) Task Force to address academic, disciplinary, and economic disparities for disadvantaged youth, particularly young men of color. CEA's 2015 analysis finds that closing these gaps would potentially yield significant economic gains, with an estimated increase in U.S. GDP of at least 1.8 percent (CEA 2015a).
- The President has also focused on developing underserved communities via the Promise Neighborhood program that was created in 2010 appropriations, building on evidence that neighborhood quality plays an important role in children's outcomes (Chetty and Hendren 2015; Chetty, Hendren, and Katz 2016). Through this program, the Administration has partnered with local public and private organizations and invested nearly $270 million in low-income communities, producing significant gains in English and math test scores (Department of Education 2016b).

prior, the early FAFSA reform helps eliminate the barrier presented to individuals who have not yet filed their taxes. This not only simplifies the aid application process for students and their families and reduces the burden on institutions, it also improves the accuracy of the information used in the determination of students' aid eligibility.

With this change, about 4 million more students and families can use this IRS Data Retrieval Tool from the start, eliminating the need to send tax information to the government twice. This enhancement can ensure that hundreds of thousands more families receive the aid for which they are eligible, that students and families save well over half a million hours in paperwork, and that schools can transfer 3 million hours from verifying information to advising students and making financial aid awards.

Protecting Students from Low-Quality Programs and Encouraging Schools to Improve

As described in the previous section, better information can help students to choose higher-quality institutions, and Administration efforts have significantly improved the information available to students. However, some colleges fail to meet baseline levels of college quality, and this Administration has targeted its more rigorous accountability efforts on those schools in order to protect students and taxpayers. In particular, it has strengthened accountability efforts in higher education by setting standards for career training programs, including many programs offered in the for-profit sector where high costs and poor outcomes are more highly concentrated.

Descriptive analysis comparing students who attended for-profit colleges to those who attended community colleges or non-selective four-year schools shows that those who attend for-profits have lower earnings on average, and hold larger amounts of debt. These students are also more likely to be unemployed, to default on their loans, and to say that their education was not worth the cost (Deming, Goldin, and Katz 2012, 2013). Loan default data presented in Figure 5-22 also show similar patterns, especially when disaggregated by completion status.

Additionally, research that compares earnings of the same students before and after attending college—including a recent analysis using individual-level administrative and tax data for Federal student aid recipients enrolled in Gainful Employment programs (Cellini and Turner 2016)—finds that for-profit colleges offer lower returns than the returns that have been estimated for other sectors (Cellini and Chaudhary 2013; Liu and Belfield 2014).[12] These lower returns are especially concerning in light of evidence

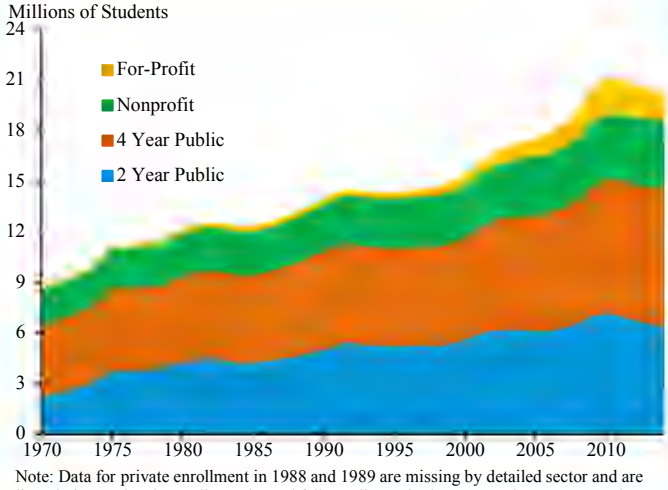
[12] However, one study, which focuses on the returns to for-profit colleges in the State of Ohio, finds more positive results (Jepsen, Mueser, and Jeon 2016).

Box 5-6: The Rise of the For-Profit Sector

The for-profit sector represents a small share of college enrollment, but it has grown rapidly in recent years. At its peak in 2010, for-profit enrollment reached over 2 million students, up from only 240,000 in 1995 (Figure 5-i), in part driven by funding constraints at community colleges (Deming, Goldin, and Katz 2012, 2013). Since then, for-profit enrollment has ticked down, standing at 1.6 million in 2014 and representing 8 percent of total enrollment at degree-granting institutions. The total amount of student loan dollars disbursed at for-profit colleges has also declined, standing at $15.7 billion in award year 2014–15, down from the 2009–10 peak of $24.3 billion.

Coupled with the rise in for-profit enrollment has been an increase in the number of for-profit institutions. The number of for-profit institutions, including branch campuses, increased from 345 in 1995 to 1,451 at its peak in 2012–2013 (Figure 5-ii). As with for-profit enrollment, for-profit institution counts have declined in recent years. The growth of the for-profit sector has presented a challenge to ensuring that students receive a high-quality education. A growing body of research, described in the section above, has found that outcomes for students at for-profit colleges are on average worse than at similar institutions they might otherwise attend.

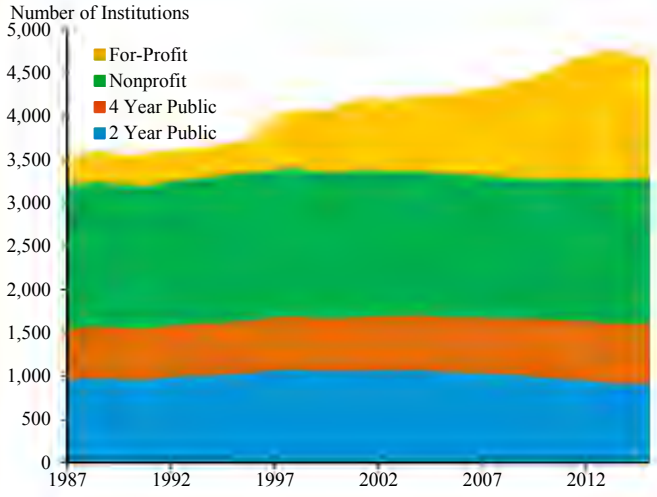
Figure 5-i
College Enrollment by Sector Over Time



Note: Data for private enrollment in 1988 and 1989 are missing by detailed sector and are linearly interpolated. Enrollment is total fall enrollment in degree granting post-secondary institutions.
Source: NCES (2015)

Figure 5-ii

Number of Institutions by Sector Over Time



Note: Number of degree-granting postsecondary institutions includes branch campuses.
Source: Department of Education

that for-profit colleges are more expensive than community colleges, even when adding in the value of the extra government support community colleges receive (Cellini 2012). Experimental evidence from resume-based audit studies further suggests that despite their relatively high cost, degrees from for-profit institutions are valued less by employers than degrees from non-selective public institutions (Deming et al. 2014; Darolia et al. 2015). Despite these poor outcomes, for-profit institutions have accounted for a large share of enrollment growth since the early 2000s.

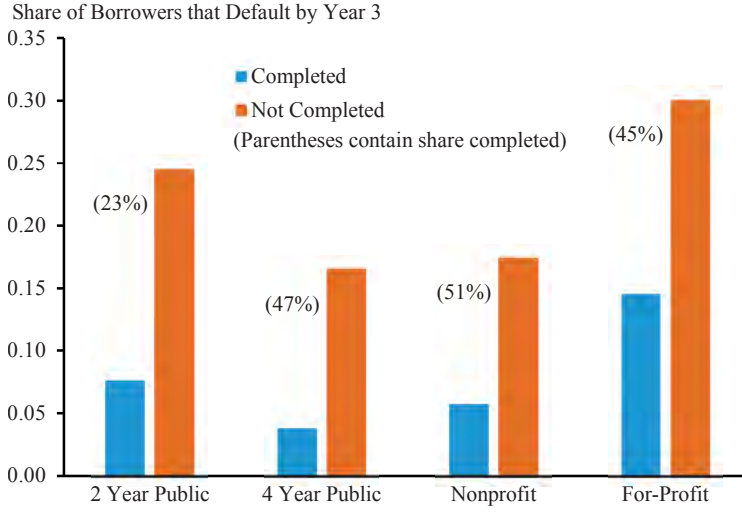
Gainful Employment Regulations

While some career college programs are helping to prepare America's workforce for the jobs of the future, far too many students at these schools are taking on unsustainable debt in exchange for degrees and certificates that carry limited value in the job market. With the landmark Gainful Employment regulations, the Administration will eliminate Federal aid to career college programs that consistently fail accountability standards.

Under the Gainful Employment regulations, programs whose graduates have annual loan payments of less than 8 percent of total annual earnings, or less than 20 percent of discretionary annual earnings, are considered to have passed the requirements. Programs whose graduates have annual

Figure 5-22

Relationship Between Undergraduate Default and Sector by Completion Status, 2011 Repayment Cohort



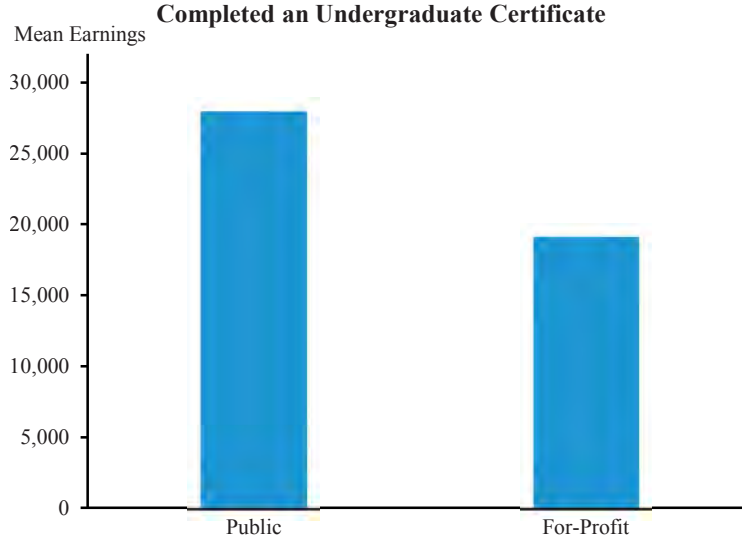
Note: Years are fiscal years. Some small sectors are excluded from this chart. Data contain some duplication across and within categories.
Source: Department of Education

loan payments between 8 and 12 percent of total earnings, or between 20 and 30 percent of discretionary earnings, are considered to be "in the warning zone" and at risk of failing the requirements. Programs are deemed to have failed the requirements if their graduates have annual loan payments greater than 12 percent of total earnings and greater than 30 percent of discretionary earnings. Programs that fail in two out of any three consecutive years, or are in the zone for four consecutive years, are no longer eligible for Federal student aid for a minimum of three years.

Based on data available at the time of rulemaking in 2014, the Department of Education estimated that about 1,400 programs serving 840,000 students—of which 99 percent are at for-profit institutions—would not pass the accountability standards. Initial data for students who completed during FY 2011 and 2012 confirm that students who completed certificate programs at for-profit colleges tend to earn less than those who completed programs at public colleges (Figure 23). The data suggest that for-profit colleges have higher proportions of graduates in less lucrative programs of study than public colleges and that graduates of for-profit colleges have lower earnings compared to those who graduated from similar programs of study at public colleges. All programs will have the opportunity to make immediate changes that could help them avoid sanctions; but if

Figure 5-23

Gainful Employment Earnings Outcomes for Individuals who Completed an Undergraduate Certificate



Note: Data are earnings in 2014 for students who completed an undergraduate certificate in FY 2011 or 2012 weighted by program size.
Source: Department of Education

these programs do not improve, they will ultimately become ineligible for Federal student aid—which often makes up nearly 90 percent of the revenue at for-profit institutions.

The Gainful Employment regulations also require institutions to provide disclosures to current and prospective students about their programs' performance on key metrics, like earnings of former students, graduation rates, and debt accumulation of student borrowers. This disclosure requirement complements the accountability measures in the regulation and provides additional program-level detail to the institution-level information provided in the College Scorecard.

Protecting Against Fraud and Deception

In addition to improving the information available to students, the Administration has worked to directly protect students and taxpayers from the subset of institutions of higher education who engage in fraud, deception, and other misconduct that harms students. A two-year investigation by the U.S. Senate Committee on Health, Education, Labor, and Pensions published in 2012 revealed such practices occurring in the for-profit sector. The investigation found that the 30 for-profit colleges examined spent about 30 percent more per student on marketing, advertising, recruiting, and admissions staffing than on instruction. The report also highlighted a number of

tactics (consistent with a 2010 Government Accountability Office report) that misled prospective students about program costs, the availability of aid, and information about student success rates and the school's accreditation status.

In 2010, the Obama Administration released a comprehensive set of rules—known as Program Integrity and Improvement rules—to strengthen the Department of Education's authority to protect students from aggressive recruiting practices fueled by incentive compensation; to take action against colleges engaging in deceptive advertising, marketing and sales practices; and to clarify minimum requirements for states to oversee postsecondary programs and handle student complaints. The Obama Administration is also proposing new Borrower Defense to Repayment regulations to protect borrowers and taxpayers against fraud, deception, and other misconduct by postsecondary institutions. The proposed regulations would create a clear, consistent, and transparent process for borrowers who have been harmed by their school's misconduct to seek debt relief. In addition, the proposed regulations include measures that would require new warnings to help students steer clear of poorly performing for-profit schools and financially risky schools. They would also end the use of both so-called "pre-dispute, mandatory arbitration agreements" and of class action bans that prevent students from having their day in court.

These regulations build upon a record of action by this Administration that has encouraged states to step up oversight in their role as authorizers, encouraged accreditors to focus on student outcomes, and created a new Student Aid Enforcement Unit to respond more quickly and efficiently to allegations of illegal actions by higher education institutions.

Next Steps

Despite the substantial progress made by the Obama Administration to expand a high-quality college education to all Americans, some challenges remain.

First, the costs of college remain too high for too many individuals, especially those from disadvantaged backgrounds. Expanding this Administration's work to provide free community college for responsible students will be a critical next step to make sure that all Americans can access a college education. However, at the same time, policymakers, community colleges, and other stakeholders will also have to work to improve student success at community colleges so that students who enroll receive the supports needed to complete a degree that raises their labor market prospects.

Additionally, Pell Grants can be better structured to put more low- and moderate-income students on the path to success, and the Administration's 2017 budget identifies various ways to improve the current program. To begin, the proposed budget further simplifies the FAFSA by eliminating burdensome and unnecessarily complex questions to make it easier for students and families to access Federal student aid and afford a postsecondary education. The Administration has also called upon Congress to indefinitely index Pell Grants to inflation in order to protect and sustain their value for future generations. Furthermore, it has included two key proposals to promote completion, creating incentives supported by academic research (MDRC 2016). The first would make additional Pell Grant funds available for an additional semester to full-time students, and the second would increase students' Pell Grants by $300 each year if they take at least 15 credit hours per semester, the amount typically needed to complete a two- or four-year degree on time. Finally, the Administration has requested that Pell Grants be expanded to incarcerated individuals eligible for release, with the goals of helping them complete college, get jobs, support their families, and strengthen their communities.[13]

There are also important changes to the education tax code that could reduce barriers to college access and success. In particular, the Administration has proposed streamlining and further expanding education tax benefits by: first, consolidating the Lifetime Learning Credit into an expanded AOTC, which would be available for five years and refundable up to $1,500 for students enrolled half-time or more; second, exempting Pell Grants from taxation and the AOTC calculation; and third, eliminating the tax on student loan debt forgiveness, while repealing the complicated student loan interest deduction for new borrowers.

Work is also needed to make sure that all borrowers can pay back their debt with an affordable repayment plan. Income-driven repayment plans are helping millions of borrowers stay on track with their payments, but too many borrowers do not take advantage of these plans, as described above. Complexities related to repayment plan selection, income verification, and recertification all present barriers to enrollment. In its 2017 budget, the Administration called upon Congress to improve and streamline PAYE and other income-driven repayment plans to create a single simple and better-targeted plan for borrowers. Academics have also proposed innovative ways to reduce the complexity of income-driven repayment plans (for example, Dynarski and Kreisman 2013). Such improvements will be critical to help borrowers manage their debt and stay out of default.

[13] See CEA's 2016 criminal justice report for a more detailed overview of the importance of this policy (CEA 2016b).

Better information and regulation of low-quality schools will also help students attend colleges that serve them well and enable them to pay back the debt they incur. The College Scorecard was a significant achievement, but additional efforts to improve the data's usage, the consumer tool, and the underlying data will help to expand the impact of the Scorecard. The Administration's efforts to protect students from low-quality schools have likewise been important accomplishments, and future policymakers must continue to be responsive to an ever-changing higher education landscape.

Lastly, work remains to continue strengthening outcomes at earlier levels of education to help ensure that students enter college well prepared to benefit from their investment in higher education. Despite this Administration's accomplishments, racial and socioeconomic gaps in PreK-12 educational inputs and outcomes remain, and these disparities must be addressed in tandem with the inequities in higher education access. ESSA has codified into law many initiatives created and championed by the Obama Administration to set the stage for this future policy, but further progress will require additional effort by policymakers.

Conclusion

The Obama Administration has enacted policies over its two terms to lower college costs, improve information, simplify student aid, and cap monthly student debt payments at a manageable portion of borrowers' incomes. The Administration has also promoted excellence and equity in PreK-12 education to better prepare students for college and their careers. Together, these policies represent a significant step forward in building an educational system that supports and encourages all Americans who wish to invest in an affordable, high quality college education to do so. Still, more work is needed to address the challenges that remain.

CHAPTER 6

STRENGTHENING THE FINANCIAL SYSTEM

Introduction

The financial system plays an important role in any modern economy, providing key services that not only match savers with borrowers but also provide services that facilitate such economic activity as safekeeping of financial assets and payment processing. While the markets for financial services generally succeed in providing these services, there are situations in which financial markets do not function well; referred to as market failures. Due to the existence of market failures, regulation plays an important role in helping to ensure that financial service providers continue to effectively provide necessary services to the economy.

The 2008-09 financial crisis highlighted several such market failures. Responding quickly, the President, Congress, and regulators addressed these failures by adopting necessary reforms to the financial system. These measures were designed to address three areas of concern: (1) increasing the safety and soundness of individual financial institutions; (2) identifying and mitigating sources of systemic risk – the risk that a threat to one firm or small number of firms could incite widespread panic in financial markets and threaten the entire financial system; and (3) improving transparency, accountability, and protections for consumers and investors.

During the Obama Administration, the passage and implementation of financial reform has worked to address these issues with measurable impact on the safety and soundness of financial markets. Although there is still work to be done, considerable progress is evident. The financial system in 2016 is more durable and able to perform its necessary and important functions without undue risk.

The reforms involved a substantial reshaping of the financial regulatory landscape in the United States. Rules were changed to make banks

hold more capital and have better access to liquidity. The ability of banks to engage in risky trading was reduced. Over-the-counter (OTC) derivatives trading is now better regulated and more transparent. The rules governing credit ratings agencies that many investors rely on were substantially reformed. Importantly, two new institutional structures were created: the Financial Stability Oversight Council (FSOC) that brings together different regulators to consider and respond to systemic risks and the Consumer Financial Protection Bureau aimed at making sure financial institutions interact in a fair manner with their clients.

This chapter focuses on the steps taken during the Obama Administration to reform the financial system, starting with a discussion of the economic rationale for regulation, particularly as it applies to financial market failures. The state of financial markets just prior to, and during, the financial crisis is detailed, followed by an outline of specific financial reforms undertaken in response to the crisis and the measurable impact of those reforms. A final section provides a snapshot of the state of financial markets in the fall of 2016 after the implementation of most of the financial reforms discussed below.

Economic Rationale for Regulating Financial Markets

The financial system —commercial banks, along with insurance companies, investment banks, mutual funds, and all the other institutions where individuals and firms put their savings or borrow funds—plays an integral role in any modern economy. Providers of financial services stand between savers who seek a return on their savings and borrowers who are willing to pay to use those savings to start a company or buy their first home. The U.S. financial system, among other things, provides financial intermediation between savers and borrowers; yet the infrastructure to perform that function is necessarily complex and costly. While the markets for financial services generally succeed in facilitating the matching of those wishing to lend or invest their savings with those wishing to borrow or invest those savings, there are situations in which financial markets do not function well — often referred to as market failures — or may not achieve the desired outcome from society's point of view. Due to the existence of market failures, regulation plays an important role in helping to ensure that financial service providers continue to effectively intermediate between savers and borrowers.

Without a financial system, the modern economy could not function. In the short run, people could keep their savings in their homes, and the only apparent losses would be the forgone interest and dividends. But

with no easy way to get the funds from savers into productive investment, the economy would face bigger problems very quickly. Entrepreneurs with ideas would find it difficult to get capital, large companies in need of money to restructure their operations would have no way to borrow against their future earnings. Young families would have no way to buy a house until they had personally saved enough to afford the whole thing. Workers saving for retirement, and firms and individuals attempting to insure against risk, would find it hard to do so.

As part of collecting savings and making them available to borrowers, financial firms perform several important functions. The first is to evaluate the potential borrower and the reasons they wish to borrow, and to make reasonably sure that the loan will be repaid and that the investment will perform as promised. This includes the continued monitoring of the borrower to ensure the money is being used as promised. When the system works well, the financial service provider acts on behalf of the saver – and in the process helps ensure that capital is allocated more efficiently in the economy. Savers or investors may lack information about the quality of a firm looking to borrow money. Figuring out the creditworthiness of potential borrowers and supervising the borrower after a loan is made is costly. By specializing in making loans or providing funds, the financial service provider typically has better information than savers about potential and actual borrowers as well as the likelihood that loans will be repaid and investments will perform as expected. Problems may develop, however, if or when the financial service provider puts its interests ahead of the saver. Economists refer to this as an example of the principal-agent problem.

Another important function of financial service providers is to supply liquidity and maturity transformation. Borrowers often wish to borrow for a long period of time to invest in a home or a new business. However, savers may wish to have the ability to cash out of their investment should they desire to use their funds for other purposes. An example of maturity transformation is when a credit union that aggregates the savings deposits of many customers to make a mortgage loan that will be repaid over 30 years.

Financial service providers also facilitate diversification. Savers who invest through an intermediary typically have a small investment in many large projects rather than having "all their eggs in one basket." The financial system allows investors not only to have ready access to their funds if needed, but also to spread a relatively small amount of money across a wide range of investments.

Finally, the financial system plays a key role in the way payments are made in our economy. While people can always use cash for their purchases, it is not always the most convenient method. Checks, transfers, credit cards,

and other non-cash payment methods offer effective alternatives. People depend on the financial system to make these alternatives possible.

"Financial institution" often means a commercial bank, but there are many other types of financial institution. Investment banks help firms sell stakes in the company directly to investors as well as borrow money directly from investors. Rather than taking a loan from a bank, a firm could issue stock to build a new factory. Brokers allow investors to access equity and bond markets to make it possible to buy and sell stocks and bonds. Rather than rely on a bank, investors can access liquidity through secondary markets. Over time, financial firms have learned to pool various types of individual loans or debt obligations and combine them into different securities that they can sell, a process known as securitization, allowing further diversification. Derivative contracts allow hedging, or other types of investing behavior. Various insurance products on real life or financial events can also play an important role by allowing for hedging of many different types of risk.

Financial institutions effectively provide services to their customers much of the time; however, fragility, instability, or disruption in financial markets can cause those institutions to fail. Individuals or firms, acting independently, may not be able to effectively address these market failures because there is often a conflict between the individual's or firm's best interest and the aggregate best interest of all market participants. Economists refer to this as a collective action problem. In such cases, it may be efficient for government to step in to regulate, including the monitoring and supervision of financial firms.

An example of fragility in the financial system that can lead to a market failure involves liquidity and maturity transformation. A financial service provider that offers liquidity and maturity transformation may have illiquid long-term assets and liquid short-term liabilities. If creditors all call these liabilities at the same time, the financial service provider may find itself unable to raise the cash to meet those calls. The classic example is a bank run, where depositors all "run" at the same time to withdraw their funds, leaving banks unable to sell the illiquid business loans and mortgages quickly enough to meet those demands. So-called "run-risk" can occur in a wide variety of nonbank institutions as well.

Runs can occur when all individuals are acting in their own best interests. The fact that they lack full information about a financial institution's investments means that if they believe the institution may be in trouble, the rational response may be to withdraw their funds. Once the run starts, it makes even more sense for others to try to withdraw their funds before the institution runs out of liquidity (Diamond and Dybvig 1983). Because the

public has limited information, runs on an individual institution may spread to other institutions. People could worry that whatever problem afflicts the first institution may also affect others, or they could worry that the failure of the first institution may cause problems in others with which it does business. These other institutions, even though solvent, may not have sufficient liquid assets on-hand to meet the demands of depositors. In the absence of a mechanism that either stops the initial run or the contagion effects, a run on a single institution can become a run on the broader financial system.

One lesson driven home by the financial crisis is that actions taken by a single systemically important financial institution can negatively impact the stability of the entire system, particularly if the financial system is already threatened. Threats to the systemic stability can pose costs on society, and such societal costs are typically not considered in the decision-making of the firm. Thus, regulations that seek to limit the risk that the failure of a single institution can pose to the financial system are warranted when the social costs of the failure of a financial institution exceeds the private costs.

Systemic risk issues have traditionally been central to the regulation of banks due in part to the danger banks face from runs. A bank run has the potential to cause significant harm to the economy because of the pivotal position of banks in the financial system, including in clearing and payment systems, and because a run on one bank has the potential to impact the health of other banks. The dangers resulting from bank runs and issues of adverse selection and moral hazard associated with safety-net arrangements designed to lower the risk of a run, such as deposit insurance and access to the central banks as a lender-of-last resort, are common justifications for bank regulation.[1] However, run-risk can occur in financial institutions other than banks if there is a liquidity and maturity mismatch between assets and liabilities.

Run risk may be mitigated through government insurance schemes, regulations that limit the ability of financial institutions to engage in liquidity and maturity transformation, regulations that limit the ability of financial institutions to take risks, or by requiring financial institutions to keep enough loss-absorbing capital to lower the chance of a run. The government or central bank could also act as a lender of last resort — providing loans to financial firms that have good, but illiquid assets during a crisis. Each of

[1] Adverse selection occurs when one party to a transaction has better information than the other and will participate in trades which benefit it the most, typically at the expense of the other party. A bank that takes advantage of a lender-of-last-resort arrangement may be a much less creditworthy borrower than a typical bank.
Moral hazard occurs when the one party is more likely to take risks when another party bears part or all of the cost of a bad outcome. For example, a bank may be more likely to make loans to risky borrowers at high interest rates if deposits are insured.

Box 6-1: Financialization of the U.S. Economy

Since the late 1970s, financial deregulation, innovation, and advances in information technology have fueled an expansion of the financial services industry. The growth of the financial services industry relative to the economy, referred to as "financialization," accelerated since the 1980s, peaking before the global financial crisis that began in 2007. Most industrial countries have experienced financialization, joined more recently by emerging market economies as they liberalize their domestic capital markets.

Expanded financial markets bring many potential benefits. For example, households today have more access to financial services which, in turn, gives them greater ability to finance the purchase of homes and automobiles, and to save at low cost in diversified portfolios. Increased trading activities can enhance market liquidity and aid in price discovery. These gains may be magnified when financial activity occurs across larger and more inclusive markets.

However, there are a number of reasons to be concerned that, past a certain point, a larger financial sector could be economically costly. First, a larger financial sector may threaten the overall economy if its size is coupled with fragility as, the larger the sector, the more problematic the spillovers may be to the broader economy if a crisis does hit. Second, financial services may have expanded beyond their social value, effectively capitalizing on information asymmetries to oversell unneeded services to an unwitting population. Finally, if the financial sector is earning excess profits and some of that is used to raise the pay of those who work in the sector, the higher pay could draw talent away from alternative activities that would provide social value.

Size of the Financial Sector

A common measure of financial-sector size is the share of GDP contributed by financial services – consisting of (1) insurance, (2) securities trading, and (3) credit intermediation.[1] This measure does not capture asset *stocks*, such as outstanding mortgage credit; rather, it gives the flow of value added (the flow of compensation, depreciation, profits, rent, and other income streams) from the financial service activities. Financial services comprised 4.5 percent of GDP in 1977, crested above 7.5 percent in the mid 2000's, before crashing in the financial crisis. The

[1] In what follows, "Insurance" is defined as the NAICS code 524, which includes insurance carriers, agencies, brokerages, and related activities; "Securities Trading" as NAICS codes 523 and 525, which include securities and commodity contracts intermediation and brokerage, as well as funds, trusts, and other financial vehicles; "Credit Intermediation" as NAICS code 521 which includes monetary authorities, depository credit intermediation, non-depository credit intermediation, and related activities.

value added of the sector has gradually climbed since then to approximately 7 percent in 2015 (Figure 6-i).

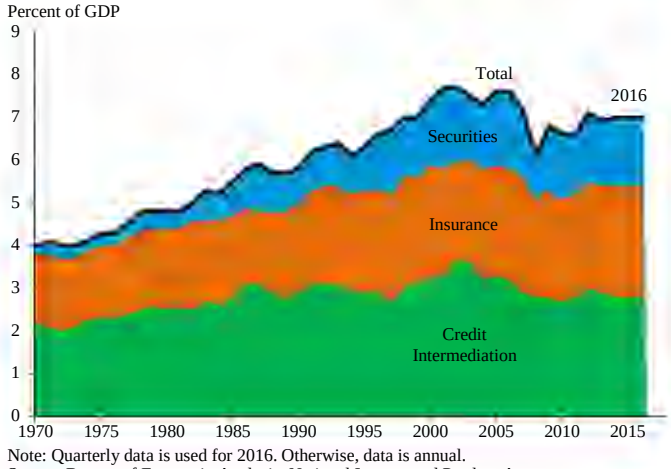
Note that this measure may inflate financial sector growth. For example, the shift from defined benefit pension funds, often managed by the pension sponsor, to defined contribution pension plans, typically managed by a financial services firm, could result in activity shifting from the sector of the sponsor to financial services.

As the financial sector grows, any associated risks may generate larger risks to society as a whole. This is not purely a function of size, but a question of size combined with fragility. In some countries where financialization has far outpaced that of the United States, the burden of a failing financial system has been quite large. In Ireland, for example, cleaning up the financial sector following the global financial crisis required a sizable government intervention, contributing to fiscal deficits as high as 30 percent of GDP in 2010. The U.S. financial sector, though smaller relative to GDP, was still able to generate large economic costs, helping propel the economy into a protracted recession. When well-regulated and smoothly functioning, the raw size may be unimportant, but when problems strike, the size can matter.

The Value of Financial Services

Almost half of the growth in financial services as a share of GDP from 1980 to its peak in 2006 has been in the securities trading category. The asset management subcomponent of the securities trading category

Figure 6-i
Financial Insurance and Services: Value Added, 1970–2016



Note: Quarterly data is used for 2016. Otherwise, data is annual.
Source: Bureau of Economic Analysis, National Income and Product Accounts.

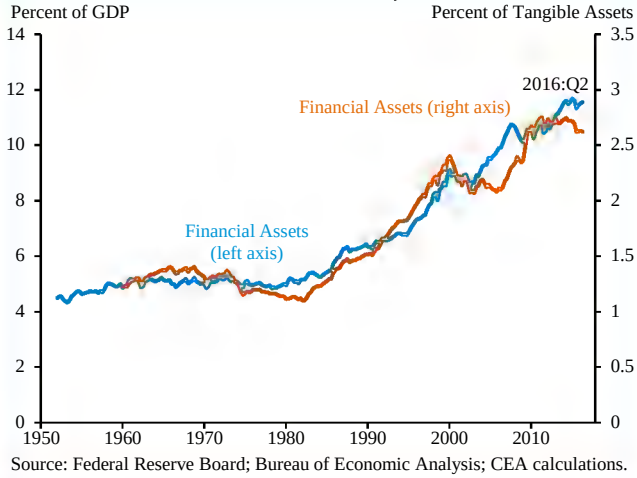
accounted for half of the industry's gross output by 2007. The Credit Intermediation subcomponent that includes many traditional banking services has grown as well but more slowly. Transactional services, particularly fees related to consumer and mortgage credit, account for nearly all the growth in Credit Intermediation, approximately a quarter of the financial industry's growth. Thus, in many ways, the question of the value of this growth rests on the value of the asset management services and the expansion of credit to households.

Professional Asset-Management

Management fees account for most of the growth in professional asset management. Greenwood and Scharfstein (2013) estimate these fees to be relatively flat as a percent of assets under management, fluctuating between 1.1 and 1.6 percent. The growth in the total dollar amount of these fees is due to the growth in both the value of assets and the share of these assets that are professionally managed. Figure 6-ii below illustrates the growth in the value of total U.S. financial assets, relative to both GDP and U.S. nonfinancial (tangible) assets.

Greenwood and Scharfstein find the growth in the share of assets under professional management puzzling because there is considerable evidence that active managers tend to underperform when compared with passively managed funds, after controlling for risk. For example, Fama and French (2010) find little evidence of skill in fund management, particularly when examining returns net of fees charged by fund

Figure 6-ii
Growth of Financial Assets, 1952–2016



Source: Federal Reserve Board; Bureau of Economic Analysis; CEA calculations.

managers. Thus, after fees, savers on average earn less when they invest in actively managed funds vs. passively managed funds. Households often misunderstand the pricing of the financial products they purchase, which could mean individuals do not recognize the overpricing of active management. Index funds, automated investment advice, and substantially less trading and lower fees might leave people better off.

Cochrane (2013) notes that financially sophisticated managers of endowments typically invest in actively managed funds. He argues that basing an explanation of the growth of active management on investor naïveté ignores the behavior of such sophisticated investors, though it is also possible that sophisticated institutional investors simply have access to better fund managers than regular investors. Further, he points to academic literature (see, for instance, Berk and Green 2004) that proposes explanations for both rational investors pursuing an active investing strategy and the observed absence of evidence in support of superior performance of active managers highlighted by Greenwood and Scharfstein.

The growth of professional asset management may also provide benefits to ordinary Americans as mutual funds or employer-sponsored retirement plans have made it easier for households to participate in securities markets and diversify their wealth. The share of households between the 20th and 80th income percentiles owning stock (including through retirement accounts) rose from 29 percent in 1989 to 49 percent in 2013, having peaked at 55 percent in 2001 (Figure 6-iii).

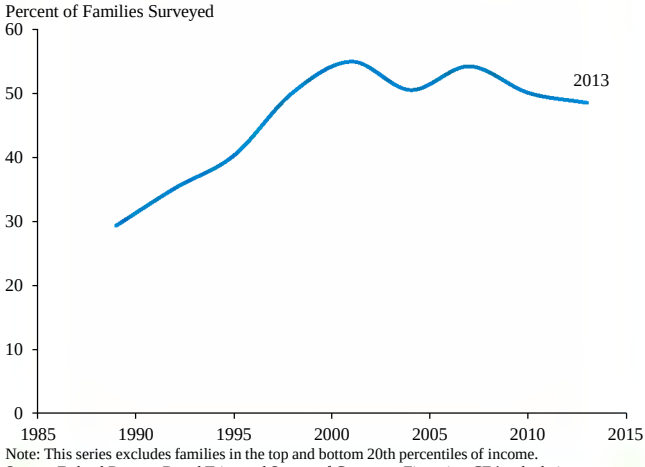
Credit Intermediation

Fees associated with consumer and mortgage credit largely have driven the growth in credit intermediation. Jorda, Schularick and Taylor (2016) point out this is a trend across 17 advanced economies where the bulk of credit growth over the second half of the 20th century came in the form of bank financed mortgages, not business investment.

Household credit, mainly in the form of mortgage debt, grew dramatically from 48 percent of GDP in 1980 to 99 percent in 2007. Meanwhile, household debt held by banks as a share of GDP was stable at 40 percent, meaning the broader financial market, not just banks, held the assets that were generated by this expansion of mortgage debt. Household credit that was not held by traditional banks was packaged into asset-backed securities. The expansion of the securitization market, and the plentiful assets associated with it, helped increase the supply of credit available in the housing market. However, this form of credit expansion also increased the vulnerability of the financial system to the housing collapse by creating highly-rated securities backed by portfolios of mortgages supposedly protected by equity tranches that would absorb losses in the event some mortgages in the portfolio defaulted. This loss

Figure 6-iii

Families with Direct or Indirect Holdings of Stock, 1989–2013



Note: This series excludes families in the top and bottom 20th percentiles of income.
Source: Federal Reserve Board Triannual Survey of Consumer Financies; CEA calculations.

absorbing layer proved inadequate when it became clear the mortgages in the portfolio were of questionable quality.

Greenwood and Scharfstein provide evidence that mortgage securitization extended the number of intermediaries between initial borrowers and investors who ultimately assumed the risk of the mortgage defaults. The increase in credit intermediaries resulted in information asymmetries, where intermediate investors knew less about the original borrowers than the initial lender who created the loans. In this market, there was an incentive for original lender to grant loans to sub-optimal borrowers, knowing intermediaries would purchase the loan. When individuals began defaulting on loans, intermediaries were unable to distinguish between low-risk loans and loans at risk of default. Several studies note that this mechanism is at the core of what made the financial sector fragile.

As Cochrane points out, the problem was not strictly with the size of this market as a function of GDP but with its fragility. He also points out that this financial innovation has potentially large social benefits. Securitization of mortgage debt allows loan originators to create portfolios of loans and sell them to investors with greater ability and willingness to bear the associated risk. Securitization thus could increase risk in the market by making the credit chain longer and more opaque, but may also spread that risk in possibly efficient ways and make funds available for lending to homeowners, possibly at a lower price.

Too Many Resources in Finance?

Beyond the question of the size of the financial sector or the value it creates is the question of whether the United States dedicates too many resources—such as talent and capital—to reallocating funds from savers to borrowers. On the income side, there is concern that financialization is driving up financial sector wages relative to other industries. Philippon and Reshef (2012) find that between 1950 and 1980 wage profiles of finance and other sectors were similar. However, in 2006, the average finance worker earned 50 percent more than the average private-sector worker, adjusted for education. In high management, executives in finance earned 250 percent more than other private-sector executives in 2005. According to Benaubou and Tirole (2016), high wages in financial services may be luring talent (highly-educated individuals) away from more productive industries, which can be costly in terms of economic growth. However, Philippon and Reshef finds evidence that the high-skill high-compensation nature of our current financial system is not inherent to finance. They suggest instead that financial deregulation "may increase the scope for skilled workers to operate freely and to use their creativity to produce new complex products." Philippon and Reshef find that periods of financial deregulation in the United States see talent inflows to the financial sector, while periods of regulation see talent outflows.

The financial sector attracts not only talent, but huge, arguably excessive, amounts of capital in activities whose social benefits are unclear. For example, companies have spent billions of dollars creating slightly faster trading platforms to beat competing trades to the market by milliseconds. The returns of imperceptibly faster trading to the fastest trader may be immense, but the social value is difficult to discern. As some traders become faster, the cost of adverse selection increases for all traders, increasing incentives for investing in faster technology. Ultimately, trading becomes more expensive for all traders, with little evidence of substantially increasing benefits to society (Biais, Foucault, and Moinas 2015). Liquidity provision, price discovery, and opportunities for diversification have benefits; however, the important questions for policymakers are whether financialization implies too much talent is being drawn into the creation and sale of these new products and whether these products generate benefits broadly or just allow the accumulation of excess profits for the most successful financial firms.

While the financial sector has indeed grown and the global financial crisis exposed distortions in financial markets, not all financial market distortions are associated with financialization. As the country has seen, distortions caused by the growth of securitization of mortgages

are due in part to information asymmetries, which are not necessarily characteristics of a large financial sector. Distortions stemming from inefficient consumer behavior may be due to a lack of information or insufficient consumer protection. Thus, carefully considered regulation that focuses on eliminating distortions will improve the overall system. The goals of such reforms should not necessarily focus on the size of the financial system or individual institutions *per se*. Reforms should instead focus on the reduction of market distortions so that resources find their most productive use, which may or may not impact the size of the financial sector.

these methods has benefits and drawbacks and may be used in combination to lower the systemic risk posed by run risk.

One notable risk of insurance schemes, lenders-of-last-resort, or the widespread belief that the government will not allow a particular financial firm to fail is the moral hazard it introduces into the behavior of both consumers and firms. Consumers may be less careful in the selection of financial institutions or even seek high-risk firms that offer higher returns because, if the firm fails they will be compensated by a government-backed insurance scheme. The firm is incentivized to take more risk because resulting profits may be retained while losses are born by the insurance provider. The incentive to engage in such behavior becomes stronger the closer the firm comes to failing. This is similar to what occurred during the savings and loan (S&L) crisis of the 1980s and 1990s that resulted in the failure of almost one-in-three S&L institutions. Depositors were unconcerned about risky loans and investments made by S&Ls because the Federal Savings and Loan Insurance Corporation insured their deposits. Such insurance schemes protect against bank runs and may also reduce the problem of a single firm's failure posing significant risk to the larger financial system; however, deposit insurance also requires rules to reduce incentives to take on too much risk and continual monitoring for compliance.

Financial regulation can also be necessary to correct for specific market imperfections or failures that reduce consumer welfare. These include consumers having inadequate information available to make well-informed decisions, agency costs, and the difficulties consumers face in assessing the safety and soundness of financial institutions. Many of these problems arise because of the information advantage held by financial institutions and because financial contracts are long-term in nature. This results in the inability of the consumer to ascertain the quality of a contract at the time of purchase, potential moral hazard that may emerge in that the behavior

of the firm after the purchase affects the value of the contract, and the firm may have incentives to behave opportunistically. The purpose of required information disclosures is to reduce the information advantage of financial institutions, to make consumers more confident that they possess the information necessary to make well-informed decisions, and to reduce costs of making poor decisions.

Information asymmetries may reduce demand for financial services. If consumers know there are good and bad firms and products but are unable to distinguish between them, a cautious consumer may simply not purchase such products. This means families may make poor investment choices leaving them with less wealth for retirement or may not purchase products such as life insurance that may protect the family's future should tragedy strike. Similarly, firms may not take advantage of opportunities to hedge business risks or reduce financing costs, putting their financial health, and therefore the jobs of their employees, at risk.

The financial system plays a key role in the economy, but because of these various market failures, it cannot be relied upon to do so safely without regulation. The next section summarizes the state of U.S. financial markets leading up to the crisis.

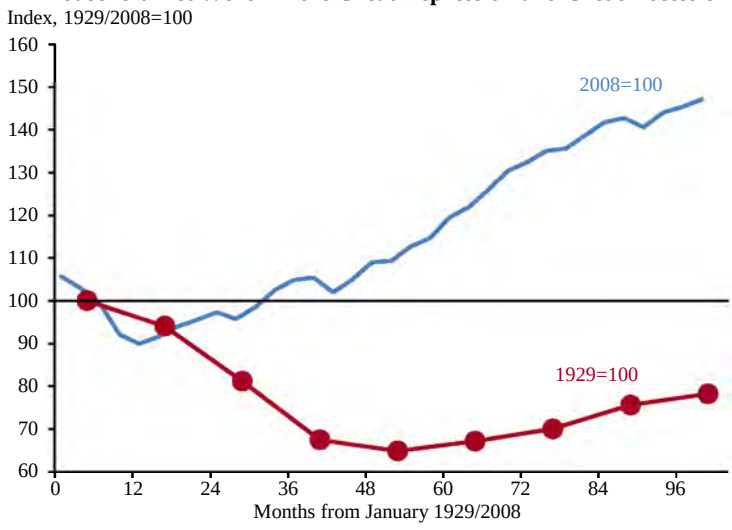
U.S. Financial Markets in 2007-08

Financial crises result from the collapse or serious disruption of financial intermediation. In a crisis, the ability of the financial system to move savings into investment is severely impaired with far reaching repercussions for the economy. The 2007-08 crisis and the recession that followed resulted in millions of lost jobs, trillions in lost output, and hardship for many who lost homes, savings, or financial security. As a result of declining asset prices, U.S. households lost a total of $13 trillion in wealth, 19 percent of total U.S. household wealth from its peak in 2007 to its trough in 2009. The decline in wealth was far more than the reduction in wealth experienced at the onset of the Great Depression (Figure 6-1).

While the vulnerabilities that created the potential for crisis were years in the making, the collapse of housing prices ignited a string of events that led to a full-blown crisis in the fall of 2008.[2] Banks took advantage of securitization opportunities to institute relaxed lending standards that drove a boom in mortgage lending. In particular, as seen in Figure 6-2, there was significant growth in mortgage loan types — Alt-A and subprime — that were typically made to riskier borrowers during the pre-crisis period.

[2] See FCIC (2011) for more complete discussion of the causes of the financial crisis.

Figure 6-1
Household Net Worth in the Great Depression and Great Recession

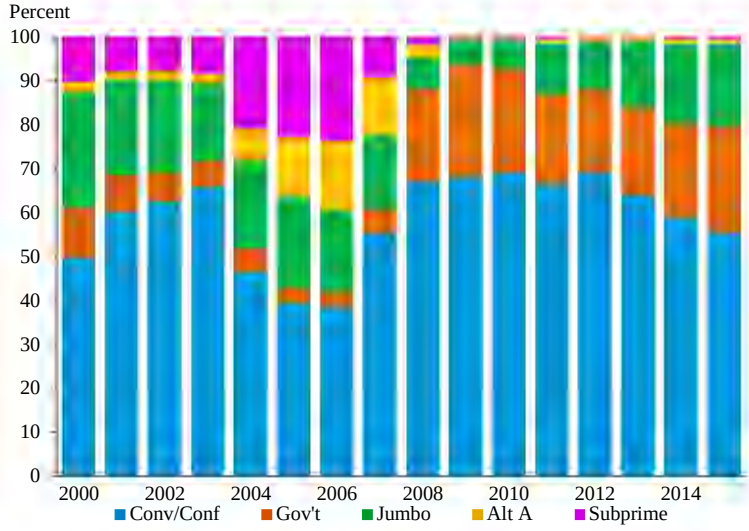


Note: Red markers represent annual averages.
Source: Federal Reserve Board of Governors; Mishkin (1978).

This expansion of lending, and the financial system behavior that encouraged it, both fueled an unsustainable rise in housing prices and filled the financial system with risky assets that left financial firms over-leveraged and vulnerable. Publicly traded government-sponsored enterprises (GSEs) including Fannie Mae and Freddie Mac used leverage as high as 75-to-1 to build a $5 trillion mortgage exposure. This included the purchase of a growing fraction non-GSE subprime mortgage-backed securities, rising from 10.5 percent in 2001 to 40 percent in 2004. Trillions of dollars in mortgages were held directly and indirectly by many different types of market participants as mortgage-related securities were packaged, repackaged, and sold to investors around the world. When housing prices collapsed, hundreds of billions of dollars in losses in mortgages and mortgage-related securities caused problems for financial institutions that had significant exposures to those mortgages and had borrowed heavily against them. What had been excessively loose lending quickly became tight, and impacts started spilling into other sectors of the economy.

Uncertainty about exposure to losses from mortgage-related securities as well as derivatives based on those securities led to uncertainty about the creditworthiness of major financial institutions. Short-term wholesale funding became more challenging. The crisis intensified in September 2008 with

Figure 6-2
Mortgage Originations by Product Type, 2000–2015



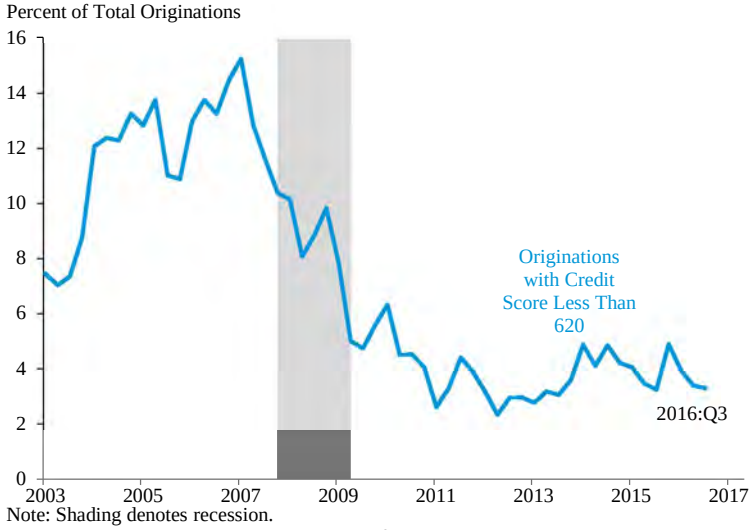
Source: Inside Mortgage Finance.

the failure of Lehman Brothers and the near collapse of the insurance giant American International Group (AIG) shortly thereafter.

A particularly noteworthy event occurred in money markets during the crisis. The net asset value of the Reserve Primary Fund, a money market mutual fund with significant holdings of commercial paper issued by Lehman Brothers, declined below $1, the usual share price of this type of fund. In industry jargon, the fund "broke the buck." Investors in money market funds often thought of them as safe and risk-free as a bank account and, while they did in fact provide investors with immediate access to their funds, they were not in fact regulated banks with insured deposits. When a major money market fund returned less than what investors had deposited, it stood as a stark reminder that such seemingly low-risk investments could decline in value and this caused investors effectively to stage a run on this portion of the financial system. This further drove down the prices of assets as funds sold their holdings to meet investor redemption requests. These events highlighted the risks of non-banks conducting the traditional banking functions of credit, maturity, and liquidity transformation without the safety-net of the banking sector.

Additional uncertainty about the exposures of surviving financial institutions to those that had either already failed or were thought to be close to failure, and the lack of transparency of the balance sheets of those

Figure 6-3
Subprime Mortgage Originations, 2003–2016



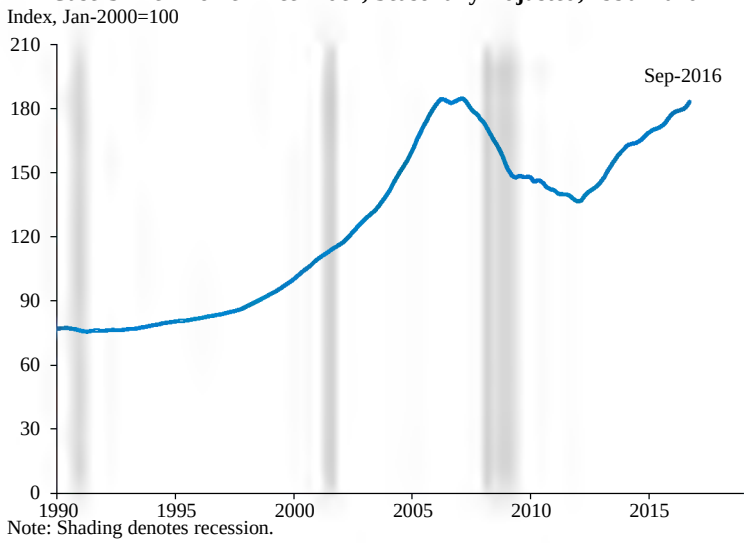
Note: Shading denotes recession.
Source: FRBNY Consumer Credit Panel; Equifax.

financial institutions coupled with a tangle of interconnections among financial institutions caused credit markets to seize up. Trading in many securities ground to a halt, the S&P 500 stock market index lost more than half its value between early December 2007 and March 2009, and as the financial collapse disrupted the functioning of the real economy, the nation plunged into a deep recession.

There were many signs of potential instability in financial markets in the years leading up to the crisis. As shown in Figure 6-3, the fraction of mortgages that were subprime rose rapidly in the years directly preceding the financial crisis. This was accompanied by widespread reports of egregious and predatory lending practices. Easy access to credit contributed to a near doubling of housing prices in the eight years ending in February 2007 (see Figure 6-4). The rise in housing finance activity resulted in a dramatic increase in household mortgage debt as a percentage of disposable personal income, as shown in Figure 6-5.

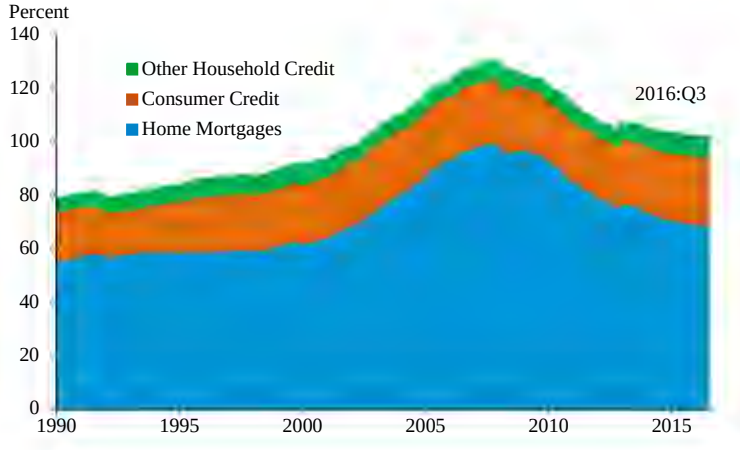
There were also warning signs within the financial services sector. The relatively less regulated shadow banking sector was growing considerably faster than the traditional banking sector. Shadow banks are financial intermediaries that conduct maturity, credit, and liquidity transformation without explicit access to central bank liquidity or public sector credit guarantees. Examples of shadow banks include finance companies, asset-backed commercial paper (ABCP) conduits, structured investment vehicles

Figure 6-4
Case-Shiller Home Price Index, Seasonally Adjusted, 1990–2016



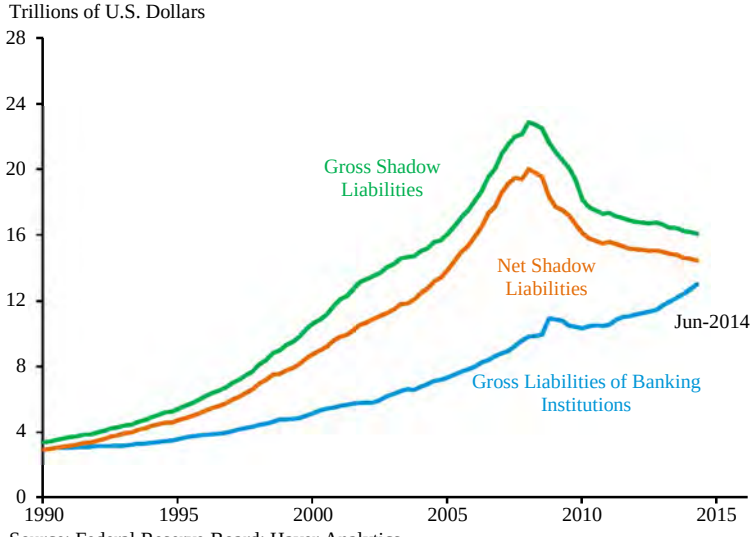
Note: Shading denotes recession.
Source: Standard & Poors.

Figure 6-5
Household Credit as a Percent of Disposable Personal Income, 1990–2016



Note: Other household credit includes loans to both households and nonprofit organizations.
Source: Federal Reserve; Bureau of Economic Analysis.

Figure 6-6
Growth of Shadow Banking, 1990–2014



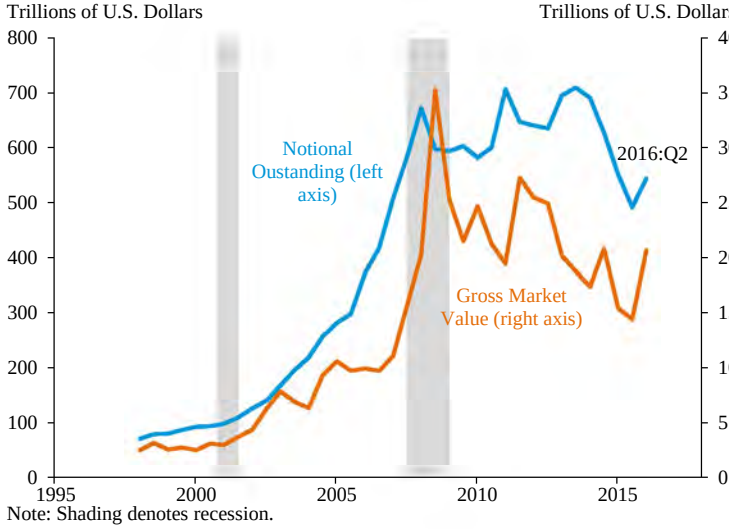
Source: Federal Reserve Board; Haver Analytics.

(SIVs), credit hedge funds, money market mutual funds, securities lenders, limited-purpose finance companies (LPFCs), and government-sponsored enterprises (GSEs). Pozsar et al. (2012) estimate the size of the shadow-banking sector over time using flow-of-funds data.[3] Figure 6-6 uses the same methodology and shows that net liabilities of the shadow-banking sector grew at almost 1.5 times the growth rate of traditional banking sector liabilities in the decade preceding the financial crisis. By 2007, the net liabilities of the shadow-banking sector were substantially larger than the gross liabilities of banking institutions.

As shown in Figure 6-7, there was rapid growth in financial firms' trading in unregulated over-the-counter (OTC) derivatives. Many institutions took on too much risk with, as it is now known, with too little capital and with too much dependence on short-term financing. Although the rise in trading volume in these markets may have been a rational response to financial and technological innovations, the financial crisis made clear that there was a lack of transparency and market oversight that required carefully considered regulatory solutions.

[3] The gross measure sums all liabilities recorded in the flow of funds that relate to securitization activity (MBS, ABS, and other GSE liabilities), as well as all short term money market transactions that are not backstopped by deposit insurance (repos, commercial paper, and other money market mutual fund liabilities). The net measure attempts to remove double counting.

Figure 6-7
Global OTC Derivative Market, 1998–2016



Note: Shading denotes recession.
Source: Bank for International Settlements (BIS).

Impact of Reforms to Establish a More Sustainable Financial System

The new Administration's highest priorities were (1) to cushion the blow to the economy, (2) stabilize the financial system, and (3) get the economy growing again. The American Recovery and Reinvestment Act of 2009 provided substantial fiscal stimulus in the form of tax cuts, direct aid to states or affected individuals, along with important investments in transportation, clean energy, and other long-term priorities.[4] (For a more detailed discussion of the Administration's response to the crisis, including the Recovery Act, see Chapter 1.) At the same time, the Federal Reserve used its authority to provide monetary accommodation to support the broad economy and to provide liquidity in particular financial markets where private markets were frozen.

Congress had passed the Emergency Economic Stabilization Act of 2008, creating the Troubled Asset Relief Program (TARP), and the Bush and Obama Administrations used the authorities in TARP to provide capital injections to banks, aid to homeowners, as well as support for the automobile industry. The financial rescue was followed by stress tests of the largest banks that revealed information to the markets about the health of

[4] See 2014 *Economic Report of the President*, Chapter 3 "The Economic Impact of the American Recovery and Reinvestment Act Five Years Later."

these financial institutions and the magnitude of their capital needs. Banks with shortfalls under the stress tests were able to subsequently raise private capital. Many smaller banks that were unable to raise private capital, as well as many large banks, were recapitalized through TARP funds. These actions aimed to stabilize the economy and the financial system, but were not solutions to the underlying problems in the regulatory framework that the crisis revealed.

At the same time, President Obama did not wait to push for longer-run changes to address the risk of future financial crises; in July 2010, he signed into law the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) whose stated purpose was "to promote the financial stability of the United States by improving accountability and transparency in the financial system, to end 'too big to fail,' to protect the American taxpayer by ending bailouts, to protect consumers from abusive financial services practices, and for other purposes."[5] There have been multiple other efforts to identify opportunities for regulatory solutions to improve the functioning of financial markets and promote financial stability. The Basel Committee on Banking Supervision, for example, recommended a set of international banking regulations, Basel III, to strengthen the regulation, supervision, and risk management of the banking sector.

In many ways these longer-run reforms have reshaped the financial regulatory system of the United States. Banks and other financial institutions now face different rules designed to make them safer and less of a threat to the overall system. With the creation of FSOC, regulators now have a way to pool knowledge and insights about risks to the financial system. With the creation of the Consumer Financial Protection Bureau (CFPB), consumers now have a regulator whose sole job is to look out for the interests of consumers in the financial system.

The many individual components of financial reform over the past eight years can be classified into three broad overlapping categories. The first includes measures aimed to improve the safety and soundness of individual financial institutions by not only increasing their capital and liquidity but also decreasing risky behavior. These reforms should increase the banking sector's ability to absorb shocks arising from financial and economic stress. The second category of reforms includes measures aimed at reducing systemic risk in the financial system by bringing more of the financial system under a regulatory umbrella, improving financial regulatory coordination, and ensuring that individual financial institutions can fail without derailing the system. The third includes measures designed to increase transparency and accountability in financial markets as well as provide additional

[5] Dodd-Frank Act preamble

consumer and investor protections. These include reforms designed to improve risk management, governance and transparency of the financial system by strengthening banks' transparency and disclosures, improving consumer protections, and better regulating credit rating agencies. These three categories of longer-run reforms are the focus of this section.

Increasing the Safety and Soundness of Individual Financial Institutions

The crisis revealed clear fault lines in the financial system. Many financial firms lacked the ability to absorb losses because they had inadequate levels of capital or lacked the ability to survive runs because they lacked sufficient liquid assets. In fact, these two issues are related because fears about solvency or insufficient liquidity can lead to runs. Moreover, many firms engaged in excessively risky trading and lending activity while at the same time enjoying the benefits of federally insured deposits and access to borrowing at the Federal Reserve. Financial reform has helped make the financial system more secure by requiring financial firms to have less unstable funding, more liquid assets, higher capital levels, and reduced risk-taking.

Capital Levels

An important step toward increasing the safety and soundness of individual financial institutions was the publishing of the Basel III recommended reforms in December 2010. These reforms recommended both higher minimum capital ratios and capital buffers for banks and a stronger definition of what counts as regulatory capital. In July 2013, the Federal Reserve implemented important parts of the Basel III recommendations by finalizing rules that strengthened the definition of regulatory capital, mandated that common equity tier 1 capital must be 4.5 percent of risk-weighted assets, and introduced a capital conservation buffer of 2.5 percent of risk-weighted assets.[6] The Federal Reserve's final rules implementing Basel III also usefully constrained the role of bank internal models in the bank regulatory capital framework.

Dodd-Frank-required stress testing is a means for regulators to assess whether the largest bank holding companies (BHCs) have enough capital to weather another financial crisis. The Federal Reserve uses the results of the

[6] Tier 1 capital consists primarily of common stock and retained earnings, but may also include certain types of preferred stock. Risk-weighted assets are the bank's assets or off-balance-sheet exposures weighted according to risk. For example, a corporate bond would typically have a higher risk weight than a government bond reflecting the higher risk of default. A capital conservation buffer is extra capital built up when business conditions are good so that minimum capital levels are less likely to be breached when business conditions are bad.

Box 6-2: A Cross-Country Comparison of Bank Size

The financial crisis refocused attention on the challenges posed by large financial institutions that could threaten the financial system should they become insolvent, otherwise known as "too-big-to-fail" (TBTF), (see Box 6-4). Because increases in size may bring additional risk and managerial challenges, some argue that certain U.S. banks are so large that, in the event of another financial crisis, there is still a significant risk that investor uncertainty may force governments to intervene to prevent another financial crisis.

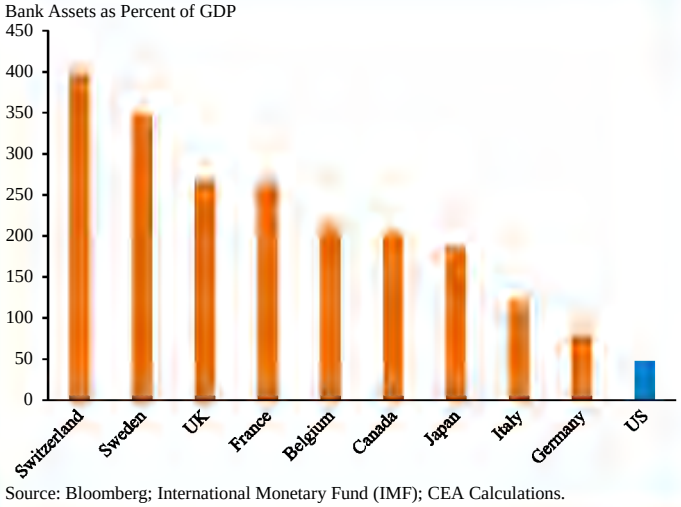
There may be certain advantages associated with bank size that help balance the potential risks. For example, large banks enjoy economies of scale in both operations and in the management of credit and liquidity risks by holding diversified portfolios of these risks (Hughes and Mester 2013). Beck, Demirguc-Kunt, and Levine (2006) also provide evidence suggesting that concentrated banking systems tend to be more stable and better able to withstand a financial crisis because banks in concentrated banking systems are more diversified and easier to monitor. However, healthy large banks may threaten competition and, when near failure, may threaten the stability of the financial system. One approach to evaluating whether large U.S. banks are "too large" and subsequently "too risky" is to compare them with the size, concentration, and systemic risk of banks of other advanced economies.

How Big is "Big?"

The five largest U.S. banks account for a large share of the U.S. banking sector's total assets, market capitalization, and revenue. In a Bloomberg ranking of the largest banks by total assets as of December 2015, four of the top 20 are based in the United States, with the largest U.S. bank ranked sixth in the world. However, these U.S. banks do not appear as large when scaled by measures of the size of the economy. For example, in Switzerland, Sweden, France, the United Kingdom, and Belgium, total assets of the top five banks were about two to four times as large as their home country's GDP, while in the United States, they were about half the size of GDP in 2015 (Figure 6-iv). Even if scaled to the aggregated Eurozone GDP (though this is not the approach used in Figure 6-iv because the repercussions of these banks' failure likely would predominantly fall on the individual country), the top five Eurozone banks still make up a greater share of their economy than do the top five U.S. banks (nearly 80 percent of GDP for the former and about 50 percent for the latter).

Beyond the traditional measures of total assets, a number of other benchmarks may be used to assess the size of banks. Across these mea-

Figure 6-iv
Top 5 Banks as Share of GDP in 2015



Source: Bloomberg; International Monetary Fund (IMF); CEA Calculations.

sures, U.S. banks also do not appear to be particularly large compared with those of other advanced economies.

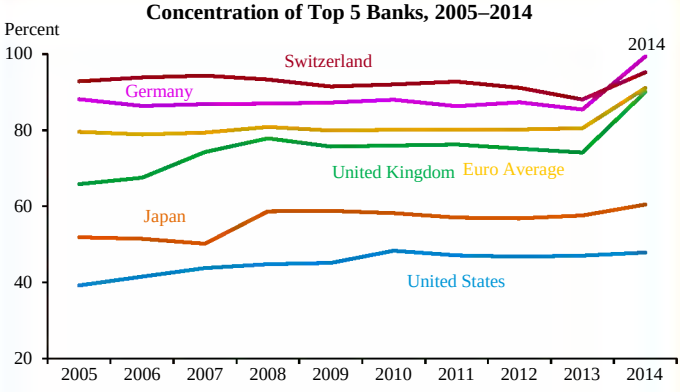
When is "Big" Bad?

Large banks pose several potential risks to the economy. First, large banks have the potential to engage in monopolistic and rent-seeking behavior, crowding out smaller institutions. Economists often measure the potential for such behavior by the concentration of large firms within a sector. Several studies show that in the run-up and immediate aftermath of the financial crisis, large banks increasingly dominated the global financial sector. For example, International Financial Services London Research found that the share of assets of the 10 largest global banks compared with the largest 1000 rose from 14 percent in 1999 to 26 percent in 2009 (Goldstein and Veron 2011). However, there is some evidence that this trend may have changed in recent years in the United States. World Bank data shows that bank concentration (assets of the five largest banks as a share of total banking assets) in the United States rose until 2010 before stabilizing at about 47 percent. In the United Kingdom, Eurozone, and Switzerland, bank concentration has been considerably higher than in the United States and increased sharply between 2013 and 2014 (Figure 6-v).

Second, the failure of a large financial institution could cause the failure of other financial institutions with which it has business relationships. Economists refer to the risk that the failure of one bank may pose

to the larger financial system as systemic risk. For example, though Lehman Brothers was only the fourth largest investment bank in 2008 and only about a third the size of the largest, its failure created repercussions throughout the financial sector and the larger economy (Wiggins, Piontek, and Metrick 2014). Recognizing that large or highly interconnected financial institutions may pose systemic risk, the Financial Stability Board designates firms that meet certain criteria as "systemically important financial institutions."

Figure 6-v
Concentration of Top 5 Banks, 2005–2014



Note: Assets of five largest banks as a share of total commercial banking assets shown. Euro Area includes Austria, Finland, France, Germany, Italy, Latvia, Lithuania, and Spain where data is available from 2005 to 2014. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax, discontinued operations, and other assets.
Source: World Bank Global Financial Development Database.

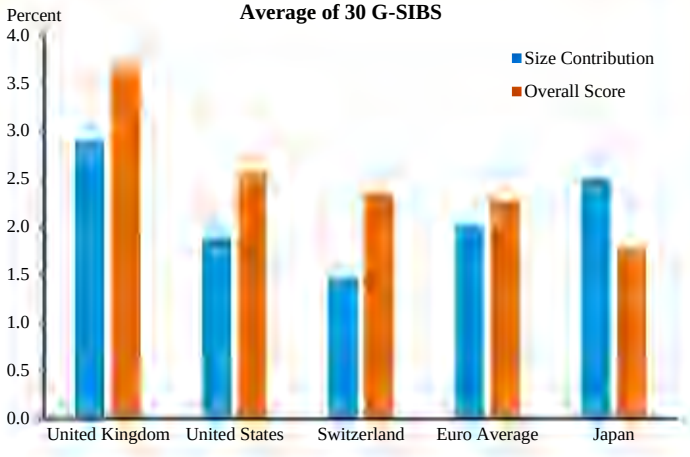
Glasserman and Loudis (2015) evaluate the risk of large banks using the five factors employed by the Basel Committee on Banking Supervision for designating global systemically important banks (G-SIBs): size, cross-jurisdictional activity, interconnectedness, substitutability, and complexity.[1] The methodology assumes that the distress or failure of banks that are larger, operate in more countries, do more business with other financial institutions, provide services that are diffi-

[1] G-SIBs are designated based on a cut-off score determined based on the scores of a sample of banks. Banks in the sample include: the 75 largest global banks based on financial year-end Basel III leverage ratio exposure, banks designated as G-SIBs in the year before, and banks added by national supervisors using "supervisory judgement." The cutoff score is then used to allocate banks to four buckets with different level of loss absorbency requirements, determined on an annual basis. There were about 90 banks in the sample in the end of 2014 exercise. See: http://www.bis.org/bcbs/gsib/gsibs_dislosures_end2014.htm.

cult to replace with services from other providers (for example, payment processing), and have more complex operations, pose greater risk to the global economy (Basel Committee on Banking Supervision 2013).[2] Figure 6-vi shows that when this overall score is decomposed into its five components, U.S. banks stand below those of several other countries in size and cross-jurisdictional activity and above those in many other countries in substitutability and complexity (particularly in the operation of payment systems), suggesting that size is not the decisive factor contributing to the systemic risk of the largest U.S. banks. This does not mean the largest U.S. banks pose no risks, but it suggests their size may not be the main issue.

Figure 6-vi

Systemic Importance Score 2013
Average of 30 G-SIBS



Source: Glasserman and Loudis (2015).

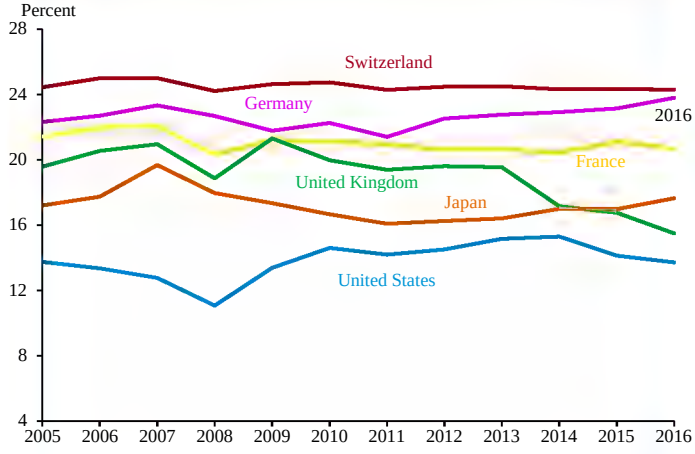
New York University's Volatility Laboratory offers an alternative measure of the systemic risk of individual financial institutions

[2] Glasserman and Loudis' (2015) G-SIB score show the mean score for the top thirty banks on the G-SIB ranking scale, grouped by country. The score is calculated as the average of (1) Cross-jurisdictional activity: foreign claims, cross-jurisdictional liabilities; (2) Size: Total exposure, a more comprehensive indicator than total assets because it maintains a consistent measure across jurisdictions while assets are specific to national accounting standards; (3) Interconnectedness: intra-financial system assets, intra-financial system liabilities, total securities outstanding; (4) Substitutability: assets under custody, payments activity, underwriting activity; (5) Complexity: over-the-counter derivatives, level 3 assets, trading and available for sale value.

by scoring banks based on their percent contribution to the aggregate capital shortfall in the event of a financial crisis (SRISK%) (Engle 2012, Glasserman and Loudis 2015).[3] Firms with a high SRISK% in a crisis are not only the biggest losers in a crisis but also are the firms that create or extend the crisis. The measure, plotted in Figure 6-vii, shows that the top four U.S. financial institutions with the highest SRISK% average less than 16 percent contribution consistently from 2005 to 2016, which is well below the average percent contribution of the top four banks of France, Germany, and Switzerland over this same time period (Acharya, Engle, and Richardson 2012; Acharya et al. 2016).

The Dodd-Frank Act takes many steps to try to limit the risks posed by the largest financial institutions in the United States as well as

Figure 6-vii
Average SRISK of Top Four Banks, 2005–2016



Note: Data gathered for October of each year (2005-2016).
Source: NYU Volatility Lab; CEA Calculations.

limiting the ability of very large financial institutions to grow through acquisition. In addition, the President has proposed a financial fee on the liabilities of the largest financial institutions, which would reduce the incentive for such institutions to leverage, reducing the cost of externalities arising from financial firm default as a result of high leverage (Department of Treasury 2016).

[3] The Volatility lab samples 1,200 global financial firms. https://www.unige.ch/gsem/iee/files/7613/9574/8572/Solari_2012_slides.pdf.

Are U.S. Banks Too Big?

The question of whether individual banks are too big is separate from the question of whether the financial system as a whole is too large relative to the economy that could come about, for example, with many smaller firms. This issue is discussed in Box 6-1. Viewed individually, large U.S. banks do not appear disproportionate to the scale of the economy when compared with those in other advanced economies. However, their interconnection highlights the importance of global cooperation in regulating these large institutions, ensuring that the comparative benefits of large banks outweigh their risks, and enhancing the resiliency of the financial sector in the face of an economic downturn. Moreover, it is important that the size of banks reflects the underlying economics, including any external risks posed by size, and that there not exist any implicit subsidies related to size.

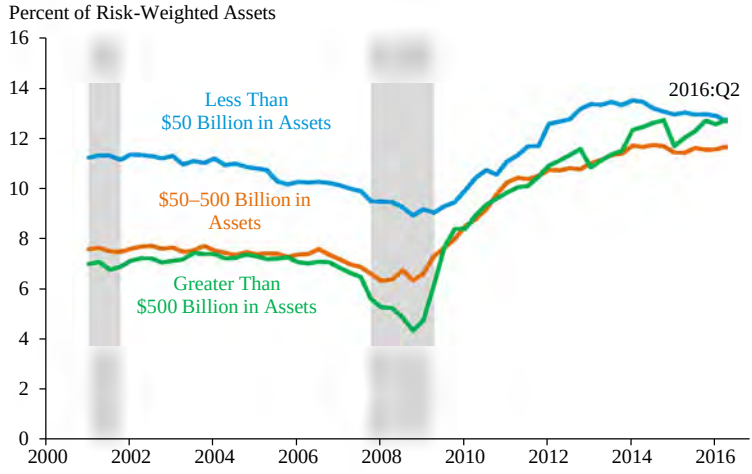
stress tests as a complement to its annual Comprehensive Capital Analysis and Review, a thorough qualitative and quantitative assessment of each BHC's capital plan. Within the quantitative assessment, the Federal Reserve examines the effects of various simulated financial stress scenarios on a BHC's capital ratios. The Federal Reserve also examines qualitatively the BHC's internal controls, contingency planning, governance, and the overall robustness of its capital planning process. Those banks that do not pass the annual review may not make any capital distributions such as dividend payments and common stock repurchases unless expressly permitted by the Federal Reserve.

The overall quantity and quality of capital has increased at BHCs since the crisis. As seen in Figure 6-8, from March 2009 to June 2016, aggregate tier 1 common equity capital for the largest banks and the BHCs increased from 4.8 percent to 12.7 percent of risk-weighted assets, well above the minimum required total capital ratio of 8 percent that the Federal Reserve adopted in 2013. In the most recent annual review, completed in June 2016, 30 of the 33 BHCs passed the Federal Reserve's test. The Federal Reserve objected to the capital plans of two banks, and did not object to the plan of a third, but required it to resubmit its plan with revisions by the end of 2016.

Liquidity

Federal banking regulatory agencies have also instituted reforms that help banks survive periods of financial stress by improving their ability to withstand acute short-term liquidity stress and improve their long-term funding positions. To better manage short-term liquidity stress, regulators have raised the quality and stability of the assets that banks hold to ensure

Figure 6-8
Tier 1 Common Equity Ratios for U.S. Banks by Bank Size, 2001–2016



Note: Shading denotes recession. Includes data for U.S. bank holding companies (BHCs) and "stand-alone" banks not controlled by a BHC, but not savings bank holding companies, branches and agencies of foreign banks, or nonbanks that are not held by a U.S. BHC.
Source: Federal Reserve Bank of New York; Haver Analytics.

that they will not run out of cash, or liquidity, during times of financial stress. In September 2014, the Office of the Comptroller of the Currency (OCC), the Federal Reserve, and the Federal Deposit Insurance Corporation (FDIC) finalized a rule that mandates minimum Liquidity Coverage Ratios (LCR) to be consistent with Basel III for large banks and BHCs. LCR is the ratio of a bank's high-quality liquid assets to its projected cash outflows during a 30-day stress period. The Federal Reserve defines high quality liquid assets as assets that a bank can easily convert into cash within 30 days such as central bank reserves and government or corporate debt. Mandating a higher LCR will reduce the likelihood that banks face a short-term liquidity crisis.

To improve the longer-term funding resilience of banks, the three regulatory agencies proposed a rule in May 2016 to require large banks and BHCs to have a Net Stable Funding Ratio of at least 1. This ratio is calculated by assigning scores to each type of funding based on the price "stability" of the funding source. Equity capital and long-term deposits earn higher scores, while very short-term funding (such a repurchase agreements) earn the lowest score. They then calculate the bank's required amount of stable funding based on the quality and stability of its assets. Banks must maintain the ratio of their available stable funding to required level of stable funding at a specified level, thus lowering their liquidity risk profiles.

The three federal banking agencies have tailored both the LCR and the Net Stable Funding Ratio rules to a bank's riskiness and complexity. The full requirements of each rule would apply to BHCs with $250 billion or more in total assets while less stringent versions of these rules would apply to BHCs with more than $50 billion but less than $250 billion in assets. These rules do not apply to community banking institutions.[7] The LCR rule became effective on January 1, 2015, starting with an LCR of 80 percent and increasing to 100 percent by January 1, 2017. The Net Stable Funding Ratio requirement will not become effective until January 1, 2018. Despite criticism of the expected negative impact of Net Stable Funding Ratio requirements, the Federal Reserve Board found that, as of the end of 2015, nearly all covered companies were already in compliance with the standard. The Federal Reserve Board also found that because the aggregated stable funding shortfall amount would be small relative to the size of these companies, the costs connected to making changes to funding structures to comply with the NSFR requirement would not be significant.

The result of the new bank liquidity requirements has been a general improvement in the liquidity positions of U.S. banks. The liquidity ratio reported in Figure 6-9 is similar to LCR but calculated using only publicly available data.[8] Figure 6.9 shows the average liquidity ratio of the largest one percent of U.S. BHCs has risen from its trough at the beginning of the financial crisis to well above levels observed before the crisis. Further, Figure 6-10 shows that BHCs reporting LCR using either the standard or modified methods of calculating the LCR show marked improvement in the liquidity available to them.

Thus, banks appear to be in a better position to weather a crisis or liquidity event than they were on the eve of Lehman's collapse. They have more stable funding and more liquid assets than before, and hence the risks that runs could cause an institution to seize up have been moderated.

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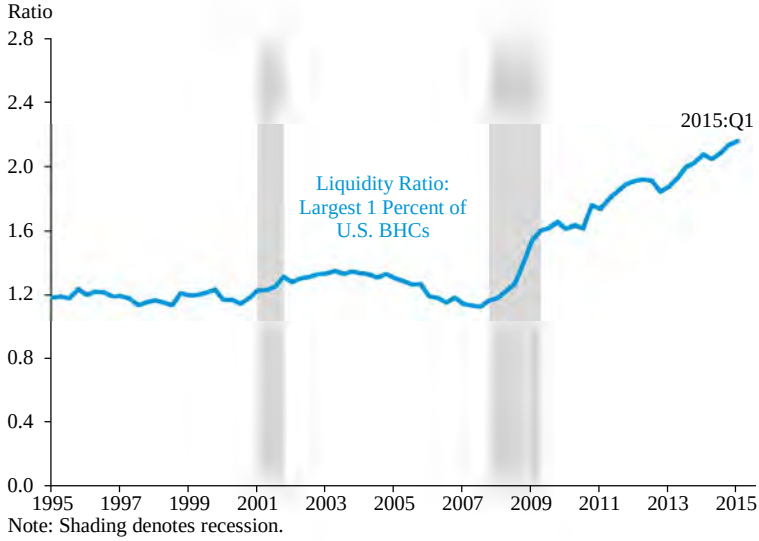
[7] The LCR rules apply to all banking organizations with $250 billion or more in total consolidated assets or $10 billion or more in on-balance sheet foreign exposure and to these banking organizations' subsidiary depository institutions that have assets of $10 billion or more. The rule also will apply a less stringent, modified LCR to bank holding companies and savings and loan holding companies that do not meet these thresholds, but have $50 billion or more in total assets.

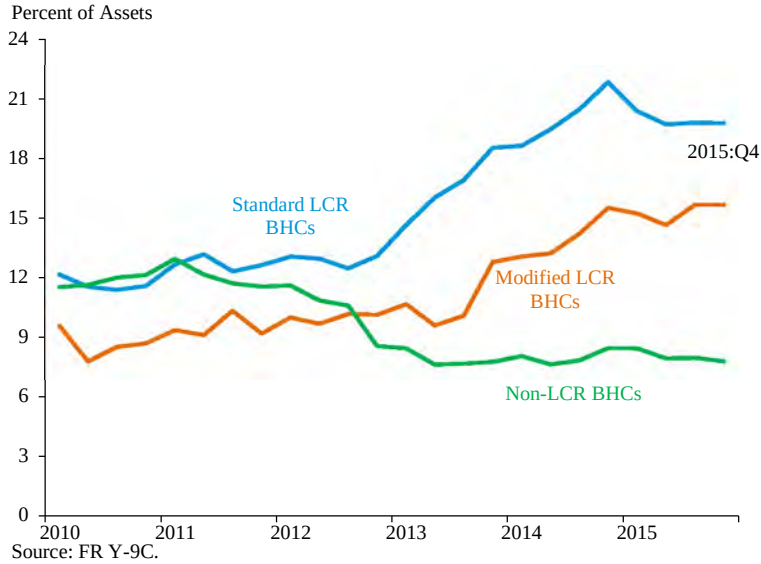
[8] This figure is reproduced from Choi and Choi (2016) with permission. The liquidity ratio is similar to LCR, which is the ratio of the stock of high quality liquid assets (HQLA) to potential net cash outflow over a 30 calendar day liquidity stress scenario. However, there are differences in the liquidity adjustments for certain assets and liability classes from those used in the LCR because the liquidity ratio uses only publicly-available data. Derivative exposures are ignored due to data limitations.

Figure 6-9
Liquidity Ratio for Largest U.S. Bank Holding Companies, 1995–2015



Note: Shading denotes recession.
Source: Choi and Choi (2016).

Figure 6-10
Selected High-Quality Liquid Assets at BHCs, 2010–2015



Source: FR Y-9C.

Risk Taking

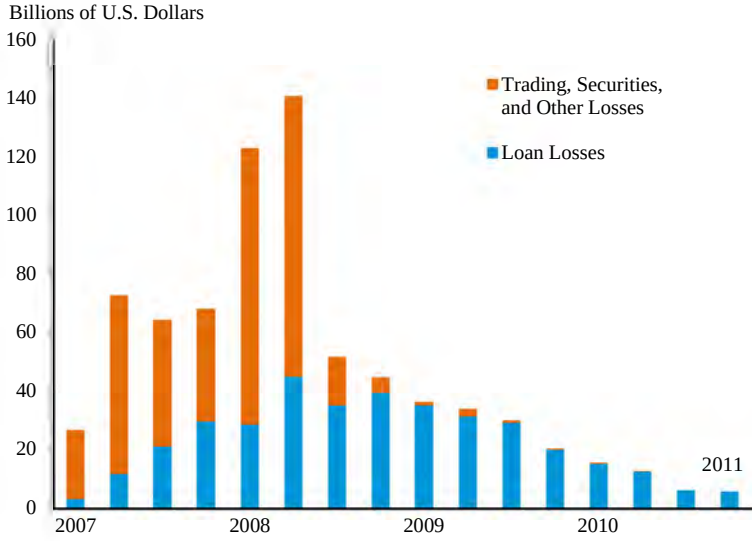
The Dodd-Frank Act took a number of steps to limit risky behavior by financial firms. One component dubbed "the Volcker Rule" is named for Former Federal Reserve Chair Paul Volcker. As required by Dodd-Frank, the SEC, CFTC and banking regulators finalized the Volcker Rule in 2013 to restrict federally insured banking entities from engaging in proprietary trading or investing in or sponsoring private equity or hedge funds. As seen in Figure 6-11, activities related to trading and securities contributed to significant losses during the crisis. The Volcker Rule is meant to mitigate the moral hazard inherent in access to federally insured deposits by limiting high-risk-taking activities. Banks have until July 2017 to conform investments in, and relationships with, covered funds. In the meantime, banks are recording and reporting certain quantitative measurements to regulators, and divesting their proprietary positions, including those in hedge funds.

Banking regulations typically require firms to meet a minimum ratio of capital to risk-weighted assets. A risk-weighting system assigns a weight to each asset or category of assets that reflects its relative risk. Figure 6-12 shows a general decline in risk-weighted assets as a fraction of total assets, reflecting declining relative risk of bank assets over time. Both Basel 2.5, effective in January 2013, and Basel III, effective in January 2016, revised the risk-weighting methodology and are reflected in the Figure as discrete increases on these dates.

The Dodd-Frank Act included several reforms of the Federal Deposit Insurance Corporation (FDIC) to better protect depositors and stabilize the financial system. First, it permanently raised the level of deposits insured for each depositor from $100,000 to $250,000 for each insured bank. Second, it altered the operation of deposit insurance. Since its founding in 1934, the FDIC has maintained a Deposit Insurance Fund, a pool of assets meant to prevent bank runs by insuring the deposits of member banks and finance the resolution of failed banks. The FDIC maintains funds in the Deposit Insurance Fund by charging insurance premiums, or assessments, to banks whose depositors it insures. Specifically, Dodd-Frank required two changes in the methodology for calculating these premiums that provided direct relief to small banks with more traditional business models by making large banks bear more of the costs of deposit insurance.

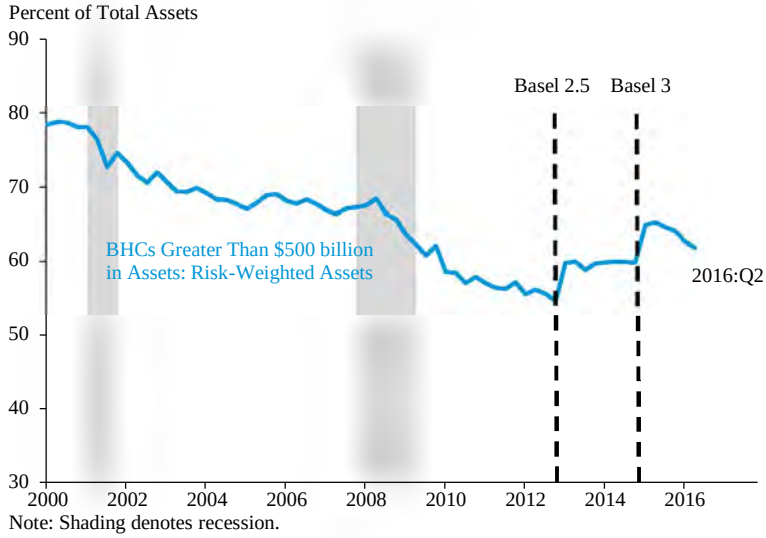
The first change required by the Dodd-Frank Act expanded the deposit insurance assessment base. When this change took effect in spring 2011, total assessments for small banks with less than $10 billion in assets fell by a third — an annualized decrease of almost $1.4 billion. The second change required by Dodd-Frank raised the minimum Designated Reserve Ratio—the Deposit Insurance Fund balance over total estimated insured

Figure 6-11
Losses for Large U.S. Banks, 2007–2011



Source: Bloomberg; Treasury Department calculations.

Figure 6-12
Average Risk-Weighted Assets, Largest U.S. BHCs, 2000–2016



Note: Shading denotes recession.
Source: Federal Reserve Bank of New York; Haver Analytics.

Box 6-3: The Performance of Community Banks[1]

Community banks, defined generally here as banks with less than $10 billion in assets, are an important part of the U.S. banking landscape, providing access to banking services for millions of Americans and serving as the only local source of brick-and-mortar traditional banking services for many counties, as well as key sources of credit for rural communities and small business loans.[2] The number of community bank institutions has declined steadily over the last two decades, yet the passage of Dodd-Frank in 2010 does not appear to have affected this long-term trend. Community banks face a challenging competitive and macroeconomic environment, but since Dodd-Frank was passed, the growth rate of lending has rebounded, market share has stabilized for some important types of community bank lending, profitability (measured by return on assets) has returned to pre-crisis levels for the smallest community banks, geographic coverage across counties has remained stable, and the largest community banks have been expanding their geographic reach.

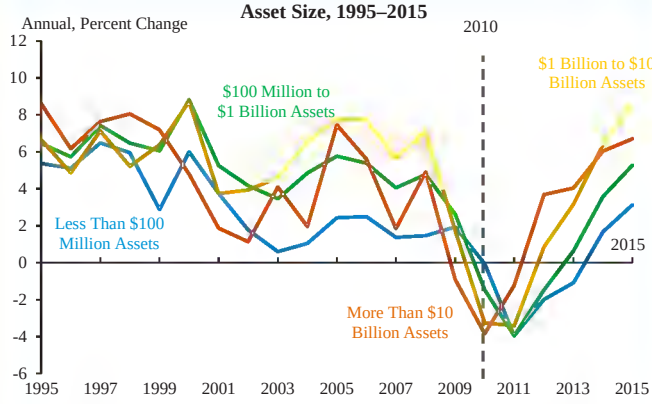
The Dodd-Frank Act is designed to prevent excessive risk-taking and protect consumers from exploitative bank lending practices. It also distinguishes between banks on the basis of size—many rules include exemptions and tailoring for financial institutions with less than $10 billion in assets—to help keep it from being an undue burden on small banks.

Economic evidence shows that community banks remain healthy and have recovered together with big banks since 2008. The annual growth rates of lending by community banks in each asset range have returned to levels seen prior to the crisis and are well above the negative rates seen following the crisis (see Figure 6-viii). Since 2008, community banks' market share of total loans has held steady at around 20 percent.

Access to community banks has remained steady since 1994 at the county level. About 99 percent of counties have a community bank office (either a main office or a brick-and-mortar branch office), something that has not materially changed since 2010. About 1 in 4 counties rely exclusively on community banks for brick-and-mortar services within county lines. The steady decline in the number of community bank institutions over the past two decades has largely been offset by an increase in the number of brick-and-mortar branch offices per main office. The

[1] For more information on Box 6-3, as well as other statistics on the health of community banks over the last two decades, please see CEA's (2016) issue brief "The Performance of Community Banks over Time."
[2] Asset size is computed in constant 2009 dollars.

Figure 6-viii
Average Loan Growth of Banking Institutions, by Asset Size, 1995–2015



Notes: Banks assets ($2009) are for the institution. Total loans ($2009) are total loans and lease financing receivables, net of unearned income. Due to merger and acqusition activity, we exclude loan growth rates greater than 25 percent and less than -25 percent.
Source: FDIC (June, Qtr 2) Call Report Data. CEA Calculations

number of brick-and-mortar branch offices per main office has also increased slightly since 2010.

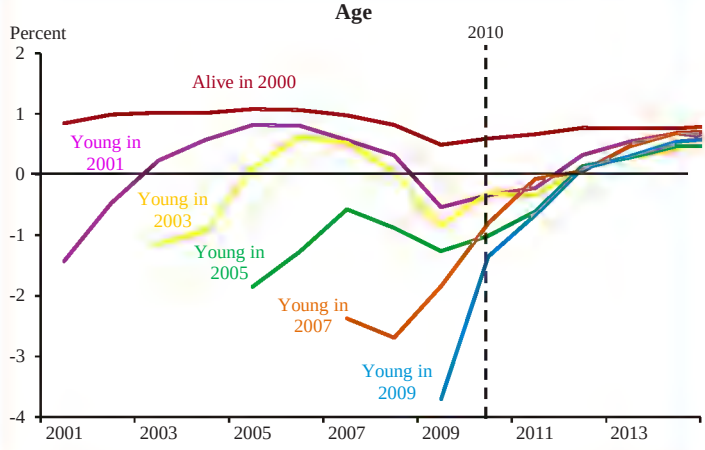
The decline in the number of community bank institutions in recent years reflects decreased entry rather than increased exit. The number of exits each year has been roughly steady since 2004. In most years, mergers with other community banks are the most common reason for exit. These merged banks are living on as community banks, but as part of a larger parent group. Entry began falling in 2006 and has been nearly zero since 2010.

Recent research suggests that macroeconomic conditions likely explain much of the drop in bank entry in recent years (Adams and Gramlich 2016). All new bank entry (both *de novo* and branch expansion by incumbent banks) has fallen considerably since 2006. The profitability of new entrants is typically lower on average than an established bank of comparable size. For younger banks, a larger proportion of their loans were originated in the current macroeconomic environment, which includes low equilibrium interest rates.[3] This depresses profit margins on traditional lending activity. The profitability of the youngest community banks fell precipitously relative to incumbent banks between 2001 and 2009, but by 2015 all cohorts have achieved a level of profitability roughly equal to or exceeding what they earned prior to the financial crisis (see Figure 6-ix). Although not shown here, the same holds true for community banks with assets between $100 million and $1 billion.

[3] See CEA (2015b) report "Long-Term Interest Rates: A Survey" for a discussion of factors contributing to the decline of the equilibrium interest rate.

Figure 6-ix

Return on Assets of Banking Institutions with Less than $100M Assets, by Age



Notes: A bank is "Young in 2001" if it received a charter in 2000 or 2001. A bank is alive in 2000 if it had a charter in 2000. Top 1%, bottom 1% ROA for all banks excluded from average.
Source: FDIC (June, Qtr 2) Call Reports; CEA Calculations.

The Dodd-Frank Act has helped to remove some cost disadvantages for community banks. Dodd-Frank has forced large and complex banks and BHCs to better internalize the costs that their failure may have upon the broader financial system, and therefore has helped to reduce any funding cost advantages that such banks may have held in the past. Moreover, banking agencies continue to take steps to lessen and simplify the regulatory burden on community banks, while directing the burden on those banks whose riskiness Dodd-Frank has sought to reduce.

In implementing the provisions of Dodd-Frank, the Administration has taken important steps to ensure that regulatory requirements are implemented in an efficient manner. The banking agencies have begun and are continuing to tailor regulatory requirements to reflect the different level of financial risk that community banks pose. Some steps include allowing for longer exam cycles for smaller banks that are well capitalized, streamlining the regulatory reports that community banks must file, and continuing to develop a simpler and shorter regulatory reporting procedure for community banks. Furthermore, the banking agencies continue to consider the written and oral comments made by community banks in the banking agencies' nationwide meetings, working to reduce unnecessary regulatory burden under the Economic Growth and Regulatory Paperwork Reduction Act. The Administration strongly supports these ongoing efforts by the banking agencies to fairly tailor the regulatory requirements for community banks and avoid any unnecessary and inefficient burdens.

deposits—from 1.15 percent to 1.35 percent. The FDIC issued a final rule increasing the reserve ratio in March 2016 and paid for the increase by levying a surcharge on top of regular assessment fees for banks with more than $10 billion in assets, effectively requiring large banks to bear the full cost.

Have Big Banks Become Safer?

Recent research by Sarin and Summers (2016) documents that most regulatory measures of major banks such as capital levels or liquidity suggest banks are safer; however, market-based risk measures that reflect bank equity volatility and default probability seem to suggest that, though risk has decreased since its crisis peak, it is not in fact lower than the period prior to the crisis. This is consistent with evidence from sources like the NYU Volatility Lab, discussed below, that use market measures of risk and finds that, while risk in the financial system is down considerably from the crisis, based on market measures, it is not lower than prior to the crisis.

It may be the case that either risk was mispriced or markets lacked the information necessary to price the risk of individual banks before the crisis. If either is the case, better information concerning the risks the banks face could make them appear riskier today relative to the pre-crisis period, when we had a poorer understanding of banks' risk. Another explanation for this finding is that banks may simply be worth less because of the present macroeconomic environment, regulations that limit banks' ability to take risky positions, and loss of the implicit TBTF guarantee.

A central argument of the Sarin and Summers paper, and work like it, is that the franchise value of banks has fallen. Markets value bank assets and their business models as being worth less over the past few years than they were before the crisis. Consequently, one would expect the bank to appear riskier based on market metrics. Hence, a comparison of market-based measures pre- and post-crisis reflects the impact of financial reform on bank safety and soundness and the impact on banks' profitability. The rules that made banks better capitalized almost certainly made banks safer and better able to withstand future crises; however, constant vigilance is necessary to make sure that, in a changing environment, risks are adequately managed.

Systemic Risk and Identifying Sources of Risk in the System

The crisis revealed the impact that the failure, or threatened failure, of even a single financial institution can pose to the larger financial system. Financial reform has helped make the financial system more secure by identifying firms that pose such a risk and subjecting them to additional regulatory oversight and other mitigation strategies. In part, it has accomplished this by improving the coordination of regulatory oversight such that

regulators can take a more holistic view of the financial system and properly identify and act on sources of risk to the system.

Individual bank failures can have negative impacts on their customers and the communities that they serve. Deposit insurance is meant to protect depositors and mitigate run-risk while FDIC resolution is meant to mitigate the impact of a bank failure on customers and communities. Regulation also seeks to minimize the impact of a bank failure on the financial system more broadly.

Promoting financial stability requires identifying potential sources of risk to the financial system. One issue the crisis revealed was the patchwork nature of U.S. financial supervision. While regulators may have been able to consider the safety of a particular institution, they often lacked the perspective to consider systemic issues.[9] The Dodd-Frank Act established a new body to fill this regulatory gap, the Financial Stability Oversight Council (FSOC). The FSOC has a clear mandate that creates for the first time collective accountability for identifying risks and responding to emerging threats to financial stability. It is a collaborative body chaired by the Secretary of the Treasury that brings together the expertise of the Federal financial regulators, an independent insurance expert appointed by the President, and state regulators. Dodd-Frank also established the Office of Financial Research (OFR) to support the FSOC by looking across the financial system to measure and analyze risk, perform essential research, and collect and standardize financial data.

Shadow Banking and Regulatory Gaps

Since its establishment by the Dodd-Frank Act, the FSOC has worked to identify non-bank financial institutions that are systemically risky to

[9] The U.S. financial regulatory apparatus consists of numerous agencies, each of which has a distinct, though quite closely related, jurisdiction. A useful way to organize these agencies is to categorize them into prudential bank regulators and market regulators. Prudential bank regulators focus on specific financial institutions and ensure compliance with applicable risk management and prudential rules. Within this category, the Federal Reserve Board regulates all banks that are part of the Federal Reserve System and regulated BHCs. It also sets reserve requirements, serves as the lender of last resort to banks, and assesses the overall soundness of bank and BHC balance sheets, often in concert with other regulators. The Federal Deposit Insurance Corporation (FDIC) provides deposit insurance for depositors and regulates state banks that are not Federal Reserve System members. The Office of the Comptroller of the Currency (part of the Treasury Department) regulates national banking institutions and seeks to foster both safety and competition within the national banking system. The main market regulators are the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC). The SEC regulates securities exchanges, brokers, dealers, mutual funds and investment advisers among other market participants. It enforces securities laws and regulates the buying and selling of securities and securities-based derivatives. The CFTC specifically regulates futures, commodity, options, and swap markets, including the exchanges, dealers, and other intermediaries that constitute these markets.

U.S. financial stability, subjecting each designated company to enhanced prudential standards and supervision by the Federal Reserve. While any financial institution that performs maturity transformation faces run-risk, in traditional banking the risk is mitigated through the use of deposit insurance and the Federal Reserve's availability as a lender of last resort. On the other hand, many non-bank financial institutions engage in financial intermediation and therefore maturity and liquidity transformation, without explicit public-sector guarantees, access to liquidity from the Federal Reserve, or regulatory oversight.

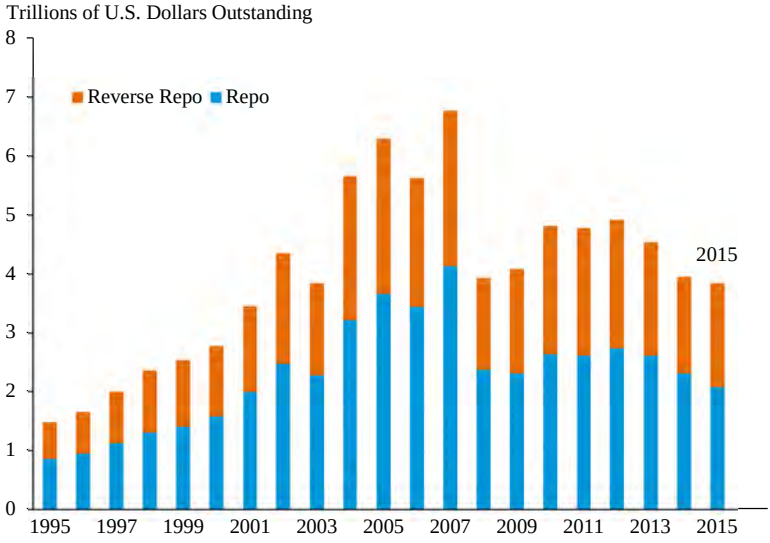
Such non-bank financial institutions gather funds from those wishing to invest, typically by issuing commercial paper, engaging in repurchase agreements (repo), or issuing debt instruments.[10] Money market mutual funds (MMFs) or other types of investment funds, often purchase these debt instruments on behalf of investors. Institutions engaged in such activities include large securities dealers, finance companies, and asset managers who use such funds to invest in other assets that have longer maturity, less liquidity, or both.

As discussed above, the size of the shadow-banking sector grew much faster than the traditional banking sector in the decade leading up to the financial crisis. Following the crisis, the sector shrank to the level seen earlier in the 2000s and continued to decrease in the following years. Two other important components of the shadow-banking sector, repo and commercial paper, grew rapidly in the years prior to the crisis before falling in the years following the crisis and ensuing recession. Figure 6-13 shows the repo market is well below its size in the years immediately preceding the crisis. As Figure 6-14 shows, the commercial paper market has stabilized at a level well below its peak in recent years. By adding additional oversight of the sector, Dodd-Frank has reduced the likelihood of shadow-banking entities being the source of financial instability.

As part of its mandate to identify risks to financial stability, in July 2013 the FSOC designated four non-bank firms as Non-Bank Systemically Important Financial Institutions. These firms became subject to heightened prudential requirements and supervision by the Federal Reserve Board. This additional regulatory scrutiny, along with pressure from investors and analysts, has led some firms to consider actions that will reduce their

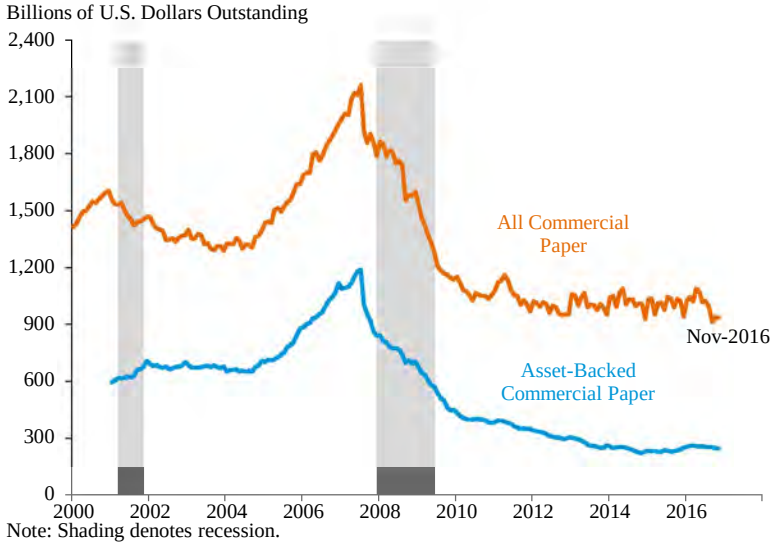
[10] A repurchase agreement, or repo, is a type of short-term loan where the "borrower" sells securities to the "lender" with an agreement to buy them back at a future date at a slightly higher price. This is similar to a collateralized loan except ownership of the collateral passes between the borrower and lender. The difference in the selling price and the buyback price represents the interest on the loan and is referred to as the 'repo rate'.

Figure 6-13
Repo and Reverse Repo, 1995–2015



Source: Federal Reserve Bank of New York.

Figure 6-14
Commercial Paper, 2000–2016



Note: Shading denotes recession.
Source: Federal Reserve Board.

systemic footprint. In April 2015, one of these firms, General Electric Capital Corporation (GE Capital), announced that it would be selling off most of its financing arm to "create a simpler, more valuable company," and committed to working with the FSOC and the Federal Reserve to "take the actions necessary to de-designate GE Capital as a Systemically Important Financial Institution" (General Electric 2015). These actions resulted in the FSOC rescinding the "systemically important financial institution" designation for GE Capital on June 28, 2016.

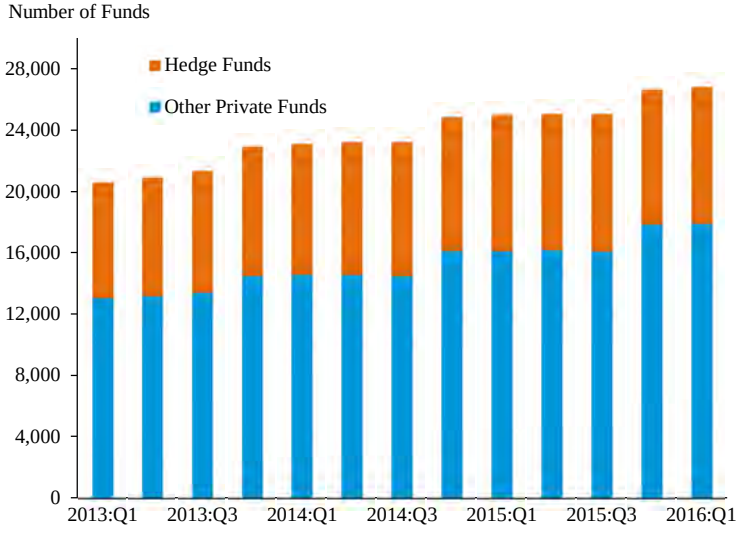
Private funds can contribute to systemic risk in similar ways to other large financial institutions.[11] Losses at a large private fund may result in default to creditors and the financial institutions with which the fund does business. In addition, private funds often employ high levels of leverage. Although leverage is not a perfect proxy for risk, there is ample evidence that the use of leverage, in combination with other factors, can contribute to risks to financial stability. These risks are likely to be greater if an elevated level of leverage is employed; borrowing counterparties are large, highly interconnected financial institutions; counterparty margining requirements are limited or lax and positions are infrequently marked to market; the underlying assets are less liquid and price discovery is poor; or other financial institutions with large positions are involved in similar trading strategies.[12]

In 2011, the Securities and Exchange Commission (SEC) and the Commodities Futures Trading Commission (CFTC) adopted new Form PF, required by the Dodd-Frank Act to help the SEC, CFTC, and the FSOC monitor hedge funds and other private funds, and identify potential systemic risks associated with their activities. The SEC makes available a summary report each quarter of the information reported on Form PF. As seen in Figure 6-15, the number of private funds reported on Form PF has risen from just over 20,000 to more than 26,000 including almost 9,000 hedge fund filings. In addition to using these reports to identify systemic risks within the United States, the SEC has provided certain aggregated, non-proprietary Form PF data to the International Organization of Securities Commissions (IOSCO) on large hedge funds to provide it with a more complete overview of the global hedge fund market.

[11] Private Funds are excluded from the definition of an investment company and are, therefore, not registered under the Investment Company Act of 1940. Private funds may be excluded from the definition of an investment company by having fewer than 100 shareholders or only being open to "qualified purchasers" (such as institutional investors or high-net worth individuals) as defined by the SEC. Examples of private funds include hedge funds and private equity funds.

[12] See Financial Stability Oversight Council Update On Review of Asset Management Products and Activities at (https://www.treasury.gov/initiatives/fsoc/news/Documents/FSOC%20Update%20on%20Review%20of%20Asset%20Management%20Products%20and%20Activities.pdf)

Figure 6-15
Private Funds Reporting to Form PF, 2013–2016



Source: Securities and Exchange Commission (SEC).

Money market mutual funds (MMFs) are a particular type of mutual fund that invests in debt securities with short maturities and very low credit risk. These funds typically maintain a net asset value (NAV) of $1 even when the actual value is slightly above or slightly below that value. As MMF shares may be redeemed at $1 each on demand, the funds are still engaged in maturity transformation. The funds face run-risk if the value of the fund portfolio is thought to be less than $1, particularly because there is an advantage to being the first to redeem. In 2010, the SEC adopted rules that make structural and operational reforms to address risks of investor runs in money market funds, while preserving the benefits of the funds. The purpose of these rules was to reduce the interest rate, credit and liquidity risks of money market fund portfolios.

In 2012, as part of its efforts to identify and address systemic risks to financial stability, the FSOC issued proposed recommendations for how the SEC might address the risks to financial stability that money market mutual funds (MMFs) continue to present. In 2014, the SEC finalized MMF reforms that required structural and operational changes that address risks of investor runs in MMFs during times of financial stress but preserved the benefits of such funds for investors and companies. Changes included requiring a floating NAV for institutional prime money market funds, which allows the daily share prices of these funds to fluctuate along with changes in the market-based value of fund assets and provides non-government money

market fund boards new tools – liquidity fees and redemption gates – to address run-risk.[13] Figure 6-16 shows the weighted-average maturity of MMFs have declined by roughly ten days since the new regulations became effective, increasing liquidity and reducing the sensitivity of net asset value to changes in interest rates.[14]

Measures of Systemic Risk

The FSOC's mandate includes identifying risks and responding to emerging threats to financial stability, often referred to as systemic risk. Scholars have proposed several different measures of systemic risk, each of which measures an aspect of the tendency for the performance of financial institutions to move together when the market is under stress. ΔCoVaR measures the difference between the value at risk (VaR) for the financial system when an institution is in distress and the VaR of the financial system when the firm is in its median or typical state (Adrian and Brunnermeier 2014).[15] The higher the ΔCoVaR, the more systemic risk is endemic within the financial system. The distress insurance premium (DIP) is calculated as the insurance premium that protects against the expected losses of a hypothetical portfolio of the liabilities of all large banks (Huang, Zhou, and Zhu 2011). Additionally, the Systemic Expected Shortfall (SES) estimates how likely a certain institution is to be undercapitalized when the financial system as a whole is undercapitalized (Acharya et al., 2016). Figure 6-17 shows the measures have receded since the financial crisis but remain above levels prior to the crisis.

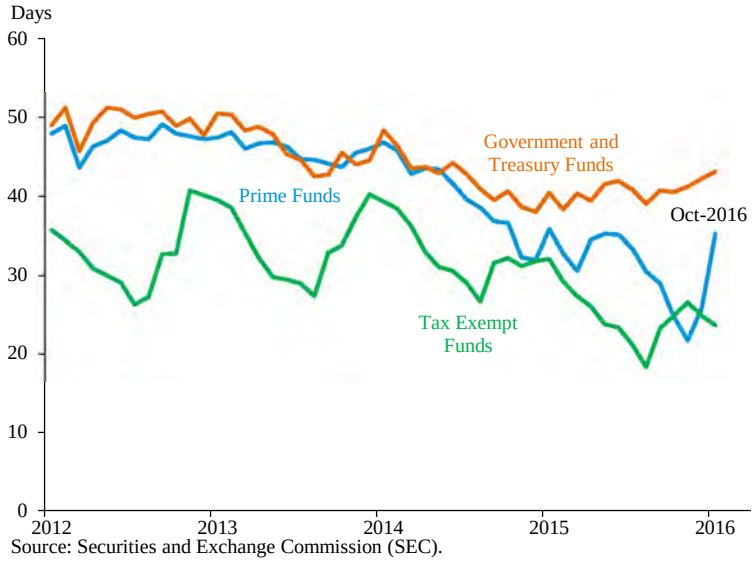
SRISK, measured by the New York University Volatility Laboratory, translates systemic expected shortfall for the banking system into a dollar figure in a simulated period of financial stress. This shortfall may be interpreted as the amount of capital required to absorb a large negative shock. As shown below, the level of SRISK has come down since the financial crisis and is approaching pre-crisis levels. Similar to the systemic risk measures above,

[13] "Fees and redemption gates" refer to the fund board's ability to impose liquidity fees or to suspend redemptions temporarily, also known as "gate," if a fund's level of weekly liquid assets falls below a certain threshold. This provides the ability to stop temporarily a run on the mutual fund.

[14] Many institutions withdrew funds from prime MMFs as the effective date for new SEC rules that mandated a floating share price for institutional MMFs approached in October 2016. In anticipation of additional withdrawals from these prime MMFs, managers kept an unusually high portion of the portfolio in cash, reducing the weighted-average maturity. This is evident in the rapid decrease in average maturity of these funds toward the end of the period in the figure.

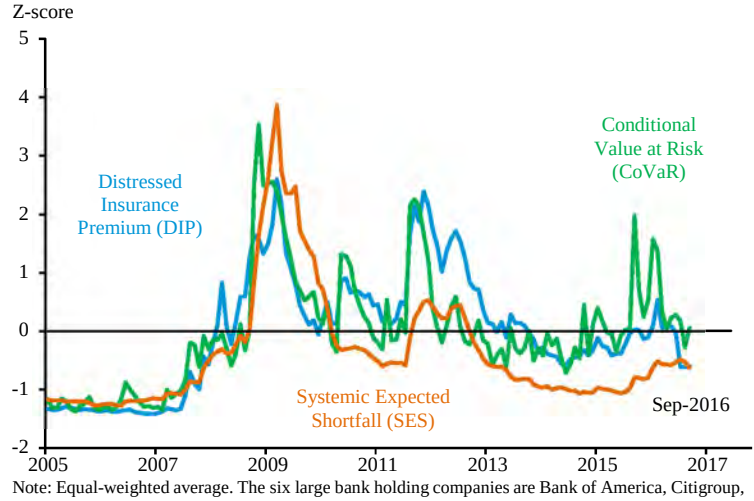
[15] VaR is a measure of the likelihood of a big loss. If the 1 month 1% VaR is $10 million, then there is only a 1 percent chance that there will be a loss greater than or equal to $10 million over the month.

Figure 6-16
Weighted-Average Maturity of MMFs, 2012–2016



Source: Securities and Exchange Commission (SEC).

Figure 6-17
Measures of Joint Distress of Largest U.S. BHCs, 2005–2016



Note: Equal-weighted average. The six large bank holding companies are Bank of America, Citigroup, Goldman Sachs, JPMorgan Chase, Morgan Stanley, and Wells Fargo. Z-score represents the distance from the average, expressed in standard deviations.
Source: U.S. Department of the Treasury, Office of Financial Research.

Figure 6-18 shows that the SRISK measure has receded since the financial crisis but remains just above the level prior to the financial crisis.

Resolving Failure

Under the Dodd-Frank Act, bankruptcy is the first, and preferred, option to resolve a failing financial institution and protect the financial stability of the United States. To that end, the Act requires systemically important financial institutions to periodically submit living wills to the Federal Reserve and the FDIC that detail a process for their orderly resolution under the bankruptcy code in the event of material financial distress or failure. If the banks' plans are determined not to be credible and the banks do not remedy those shortcomings in the allotted period of time, the regulators may require the banks to take certain actions to simplify their structures, including divestment of certain assets or operations. As a result, banks have increased their focus on their resolvability.

The Federal Reserve and FDIC finalized rules relating to living wills in October 2011. The latest round of evaluations by the agencies, completed in April 2016, examined each living will of the eight systemically important domestic banks. The agencies jointly determined that five of the eight institutions' living wills were "not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code," and issued split determinations on two institutions' living wills (FRB 2016). Only one bank, Citigroup, did not fail both the Fed and FDIC's evaluations. Those banks receiving joint negative determinations were given until October 2016 to address the specified deficiencies. If these firms do not mitigate the deficiencies by the October deadline, the agencies may jointly impose stricter prudential requirements, which may include measures to restrain the growth of these firms. The two banks that received split determinations must address their plans' shortcomings by the next filing deadline of July 1, 2017. While the 2016 determinations revealed that much work remains, it was also a step forward from the previous round of feedback given in August 2014 that had identified broad shortcomings across 11 banking institutions evaluated.

The Dodd-Frank Act also created a new resolution mechanism, the Orderly Liquidation Authority (OLA), that could be used to resolve a failing firm while limiting systemic risk and imposing all losses on the firm's creditors. Together with financial reforms that are intended to increase the safety and soundness of individual financial firms, these reforms are intended to lower the risk to the broader financial system should a particular firm fail, thus lowering the necessity of a bail-out. The DFA also restricts the Federal Reserve's emergency lending powers, making it harder for the Fed to lend to a particular insolvent firm or remove toxic assets during a financial crisis.

Figure 6-18
Systemic Risk (SRISK), 2005–2016

Source: New York University Volatility Laboratory.

Ending the Problem of Too-Big-To-Fail

Another component of systemic risk has been the view that some firms may be too large to fail without threatening the whole financial system. If these firms are indeed "too big to fail" (TBTF) it gives them a substantial advantage as their counterparties in transactions will know they are less likely to fail than similar firms without an implicit government guarantee. (See Box 6-4 on the TBTF premium.) The implicit guarantee may also make these firms more willing to take large risks as both the owners and managers of these firms do not truly face the risk of downside scenarios as they may feel they can count on the government to bail them out. The existence of TBTF firms can also be a source of risk because their counterparties may be wrong about which firms are TBTF. For example, some assumed the government would never allow a firm like Lehman Brothers to fail and were left exposed when Lehman declared bankruptcy.

The reforms of the last six years that the implementation of Basel III and Dodd-Frank Act put in place included a number of measures to address the risks posed by TBTF. First and foremost, these reforms have subjected the largest and most complex financial institutions to enhanced supervision designed to require these firms' equity and debt holders to bear the costs of the firms' failures. These enhanced supervisions increase in stringency based upon size and other risk factors. The most stringent rules apply

Box 6-4: Have We Ended "Too-Big-To-Fail"?

A financial institution that is "too-big-to-fail" (TBTF) is so large and interconnected with the financial system that market participants believe the government will intervene to prevent its failure. One of the goals of recent financial reform is to eliminate TBTF by making systemically risky banks less likely to fail, reducing the government's ability to aid insolvent firms, and reducing the damage a failure would cause so that such firms could be allowed to fail. Major credit rating agencies have cited financial reform and the reduced likelihood of a government bailout when downgrading the credit ratings of major U.S. banks. For example, in November 2013, Moody's lowered the so-called government support component of its credit ratings for global systemically important banks. In December 2015, the credit rating agency Standard & Poor's downgraded eight of the largest U.S. banks by a notch, saying it believes the banks are less likely to receive a government bailout if they find themselves in financial trouble. While ratings are not necessarily reflective of general market expectations, these actions suggest that financial reform has been successful in reducing TBTF.

A widely studied measure of TBTF is whether certain institutions are able to borrow more cheaply because of the perception that they will ultimately be bailed out if they fail. It was clear that many large financial firms were able to borrow more cheaply both shortly before and during the Financial Crisis because market participants did not believe that such institutions would be allowed to fail. Several more recent estimates of this funding advantage find it to be much reduced or eliminated. Although financial reforms have likely had an impact on TBTF, the improved macroeconomic atmosphere may make any existing funding advantage very difficult to detect, so a definitive measure of whether the TBTF advantage still exists may not be apparent until another crisis appears.

The costs of TBTF go beyond the direct costs of bail-outs. TBTF creates incentives that many consider socially harmful. Investors are willing to provide their funds to a TBTF bank without evaluating the safety and soundness of their investment because they believe that the government will bail them out should the bank get into trouble. This allows managers to engage in risky investment behavior, with the bank keeping the gains should those investments pay off but with taxpayers bearing the loss in the event of a near failure. These institutions also enjoy a TBTF discount on their funding costs, allowing them to borrow at lower interest rates than similar institutions that are not considered by investors to be TBTF. This discount is anticompetitive as it gives large or more systemically connected firms an advantage over smaller or new institutions.

In the absence of another financial crisis, it is difficult to definitively prove that financial reform has reduced or eliminated TBTF. Much has changed from the pre-crisis to the post-crisis period. First, today's macroeconomic environment is more benign than during the crisis, suggesting that the difference in the probability of default with and without an expected bail-out is small. This may make it more difficult to find evidence of changes in TBTF. Second, Sarin and Summers (2016) provide evidence that market-based measures of risk are not lower during the post-crisis period, perhaps because financial reform has lowered the franchise value of banks. This may impact funding costs in the post-crisis period making it difficult to detect a reduction in TBTF. Finally, financial reform has mandated increases in capital and liquidity that may impact funding costs. Nevertheless, one approach to evaluating the effectiveness of the reforms on reducing or eliminating TBTF is to analyze the borrowing costs of large banks. A firm's borrowing cost should reflect the firm's credit risk. A financial institution that the market views as TBTF should enjoy a lower cost of borrowing than an otherwise identical institution.

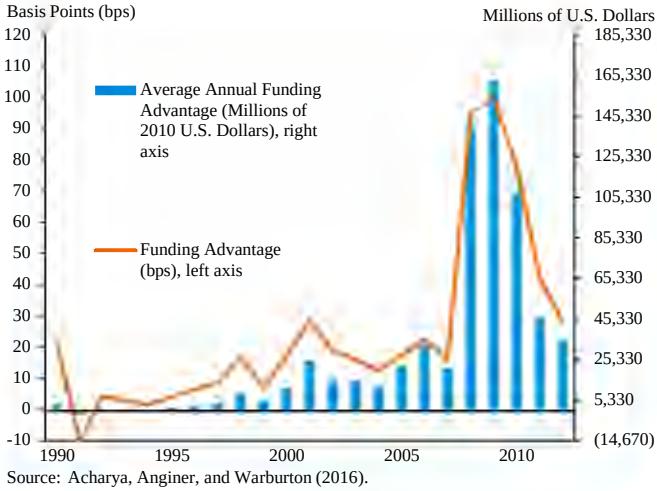
It is important to distinguish between TBTF and a bank's size. A bank that is TBTF will likely be big, but not every large bank will be TBTF. There is evidence that larger banks benefit from economies of scale (Hughes and Mester 2013, Wheelock and Wilson 2016). Large banks have global reach and more diversified services, and can provide financial products and services that small banks cannot offer (Bernanke 2016). The tradable debt of larger financial institutions tends to be more liquid. Each of these factors would likely reduce the borrowing cost of a large bank for reasons other than TBTF.

Scholars have taken several approaches to measure the TBTF premium. One approach uses a statistical technique to see if a bank's cost of borrowing varies with its size or designation of being "systemically important" after controlling for other variables related to credit risk. Examples include GAO (2014); Acharya, Anginer and Warburton (2016); and Balasubramnian and Cyree (2014). A second approach compares the market price of a contract that protects a bond holder from losses should the bond issuer default, known as a credit default swap (CDS), with the theoretical fair value of such a contract. An example of a study that uses such an approach is IMF (2014). A third approach compares the credit rating of a firm as a stand-alone enterprise with one that includes the possibility of government support. The difference between these two ratings may be interpreted as an indication of the size of the TBTF premium. Examples of studies using such an approach include IMF (2014) and Ueda and Weder di Mauro (2013).

Scholars using each of these methodologies have generally shown that the TBTF premium was positive but low in the 20 years before the crisis, illustrated by Figure 6-x (Acharya, Anginer, and Warburton 2016). During the financial crisis the TBTF subsidy spiked to approximately 100 basis points (bps). By 2012, the estimated subsidy had declined to roughly 25 bps. This illustrates an important point: the TBTF premium varies with time as market expectations change, especially regarding the likelihood of a government bailout. During a financial crisis, the probability of a financial firm's failure increases as does the probability that the government will rescue a TBTF firm, increasing the difference between the borrowing costs of a TBTF and a comparable non-TBTF financial firm.

While Acharya, Anginer, and Warburton (2016) are skeptical about the effects of post-crisis regulation on TBTF, several studies find that since the crisis, the TBTF premium either has effectively disappeared or has decreased to levels comparable with those pre-crisis. Balasubramnian and Cyree (2014) found the funding cost advantage of banks subject to the Federal Reserve's Comprehensive Capital Analysis and Review declined from 244 bps in the six-month period preceding passage of the Dodd-Frank Act to a statistically insignificant 6 bps in the six-month period following the law's passage. GAO (2014) uses 42 different econometric models to estimate the TBTF premium each year from 2006 to 2013. They find that while systemically important banks enjoyed

Figure 6-x
TBTF Premium, United States, 1990–2012



Source: Acharya, Anginer, and Warburton (2016).

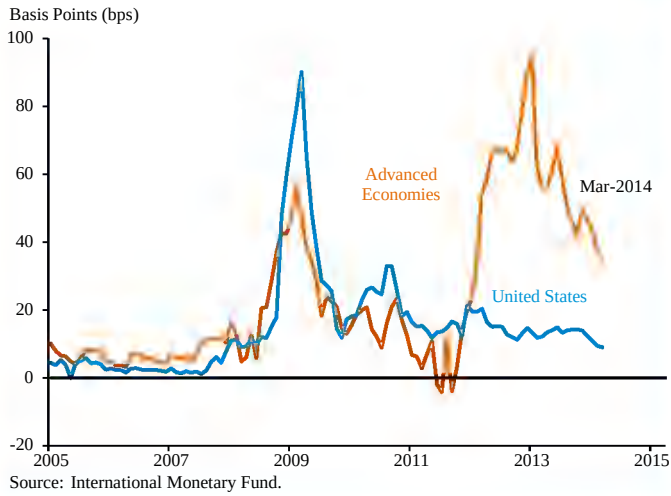
lower funding costs in 2007-09, "such funding cost differences may have declined or reversed in recent years."

Using the CDS approach, IMF (2014) finds that the TBTF premium rose from near zero bps in 2005 to over 50 bps during the crisis. As of 2013, the premium had declined to around 15 bps, an improvement since 2009 but not yet as low as levels in 2005 through 2007 and still indicative of a funding advantage. The United States appears to have been more successful than other advanced economies in narrowing the TBTF premium, though; the advanced economy average as measured by CDS spreads is approximately 40 bps as of the start of 2014, well above the level in the U.S. (as shown in Figure 6-xi).

The credit ratings-based approach also shows that the TBTF premium for systemically important institutions fell from a high of 30 bps to 15 bps, close to but still about 9 bps above the level in 2005. The ratings approach can also decompose the TBTF premium into effects from the probability that a firm becomes distressed and the expectation of bail-out when that firm is in distress. Using ratings for systemically important firms that are sub-investment grade, IMF (2014) finds that, despite a marked decline from crisis levels, the TBTF premium in 2013 was more than 10 bps above its level in 2005. Ratings, however, are slow to adjust to market conditions and suffer from conflicting views among different credit rating agencies.

Figure 6-xi

TBTF Premium for GSIBs, CDS Estimation, 2005–2014



Source: International Monetary Fund.

Overall, the funding advantage of global systemically important banks has declined since the crisis. While measures of the TBTF premium still vary across the academic literature, several studies have found that the premium as of 2013 was either statistically insignificant or significantly narrower than the levels during, and in, the three years after the financial crisis. Further, while the benign financial and macroeconomic conditions of the post-crisis period could be partially driving this decrease in the TBTF premium, studies such as IMF (2014) and Balasubramnian and Cyree (2014) that examine changes in borrowing costs around announcements of policy reforms find that they have driven up borrowing costs for systemically important institutions, suggesting that policy changes have had at least some effect in narrowing the TBTF premium.

to systematically important financial institutions and global systemically important banks (G-SIBs), which have become designated under recent reforms. Such a designation in no way guarantees a bailout or codifies a firm as TBTF, but rather adds rules to minimize the risk that the institution will fail and adds additional responsibilities so that it is possible for the institution to fail without endangering the broader system.

These enhanced rules include significantly higher standards for capital, stress-testing, liquidity, loss-absorbing capability, and resolution. In particular, the establishment of the OLA is meant to allow such firms to be resolved without taxpayer support and without endangering the rest of the financial system.

Transparency, Accountability, and Protecting Consumers and Investors

Beyond the broad measures needed to make financial institutions safer and to limit systemic risk, the crisis highlighted a number of issues of transparency and fairness within the financial system. As noted previously, information asymmetries may mean that financial professionals and firms likely have substantial information advantages relative to their customers or investors. This may require regulation that can improve the transparency of the actions of those financial firms, and the accountability of those firms to their investors, or simply to protect consumers from bad behavior.

Protecting consumers is warranted both to preserve their confidence in the financial system and because consumers ill-informed concerning financial products may be more likely to take on inappropriate loans and increase risk in the system more broadly. The Administration took numerous steps

through the Dodd-Frank Act and other measures to improve the information available in the financial system through reforms to derivatives markets, credit rating agencies, investor accountability, and through the creation of a new Consumer Financial Protection Bureau.

Improving Transparency and Oversight of Derivatives

Increased transparency in the financial system promotes investor protection and better enables market participants to price assets, risk, and other relevant inputs to financial decisions. Part of the cause of the financial crisis was a lack of critical information about counterparties. As the crisis unfolded, the potential exposures of large financial institutions to other financial institutions that were either known or suspected to be near bankruptcy led to a general unwillingness to enter into any additional transactions. This contributed to the seizing up of credit markets.

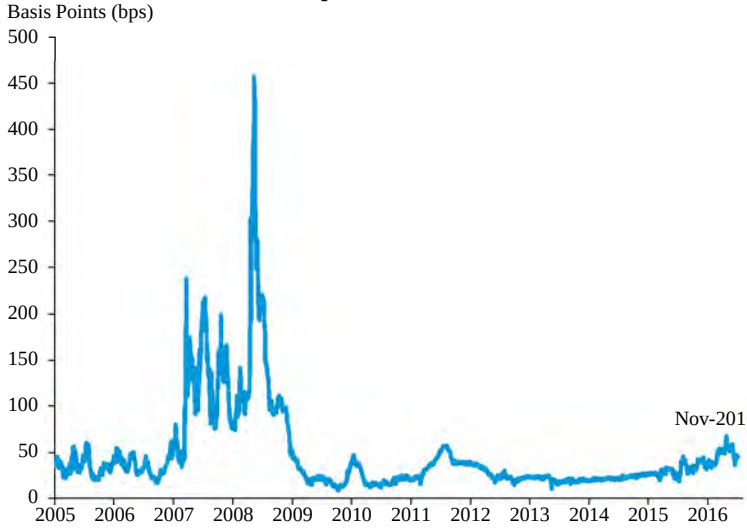
A number of measures showed how acute the problem was in late 2008. When there is fear of counter-party risk, banks will charge one another more than the safe interest rate to lend in overnight markets. One such measure of perceived credit risk in the interbank market is the TED spread, which is the difference between the three-month London Interbank Offered Rate (LIBOR)[16] and the three-month yield on U.S. Treasury bills. Figure 6-19 shows the TED spread for the years 2007 through October 2016. The TED spread jumped in the summer of 2007 when stress in the markets began to show and then again after Lehman Brothers' collapse in September 2008. An important part of making the system more stable was improving transparency among firms so that they could lend to one another more freely.[17]

One important way in which financial institutions had financial exposure to each other was through over-the-counter (OTC) derivative contracts. Just ahead of Lehman's collapse, the Federal Reserve Bank of New York was collecting information on the exposures created by Lehman's more than 900,000 derivative contracts. The volume of outstanding contracts and the

[16] LIBOR is an average of the rates at which large banks in London are willing to lend to each other in dollars. Collected by survey, LIBOR has been the focus of investigations of manipulation by individuals within the participating banks who were responsible for responding to the survey in cooperation with traders.

[17] The LIBOR increase in 2016 is likely due to money market reform rather than increased credit risk of large banks. New SEC rules for money market mutual funds that as of Oct. 14, 2016 mandated a floating share price for institutional MMFs that invest in commercial paper and bank CDs had driven the increase. As that date approached, many institutions withdrew from those funds in favor of those funds that only invest in government securities and whose NAV will not float. The effect was a reduction in funds that provide a source of short-term funding for banks, pushing up rates such as LIBOR.

Figure 6-19
TED Spread, 2005–2016



Source: Federal Reserve Board.

difficulty in creating a complete picture of such exposures highlighted the need for better data.

Derivatives are financial instruments whose values are determined by reference to other "underlying assets," and include forwards, futures, options, and swaps. These instruments are useful to investors and businesses seeking to hedge risks. For example, an airline may need to hedge its exposure to oil price fluctuations or a pension fund may need to hedge its exposure to interest rate changes. Derivatives often create leverage because changes in the value of the underlying asset can be magnified many times in the value of the derivative contract. Thus, while they can be used to hedge against risks, derivatives can also be used to increase exposure to risky assets and can concentrate risk rather than dispersing risk among many market participants. Many derivatives have standardized terms, are traded on exchanges, and are cleared through central counterparties (CCPs). Exchange trading and central clearing create a record of prices and transactions that can be used by the public in the price discovery process and by regulators to measure the exposures of market participants. Central clearing also helps mitigate counter-party credit risk.

Prior to the financial crisis, one category of derivatives, swaps, was not standardized and was traded over-the-counter.[18] The trading volume and outstanding notional value of these swaps, particularly the type known as a credit default swap, grew rapidly prior to the financial crisis and formed a complex network of exposures among large financial institutions.[19,20] Only the two parties to the transaction were typically aware that the transaction had occurred, resulting in an opaque market in which there was little transparency around either prices or exposures. The lack of transparency in exposures could result in a concentration of risk in particular financial institutions as occurred with AIG just prior to the financial crisis. As Figure 6-20 shows the rapid growth in several types of OTC derivatives in the years leading up to the financial crisis.[21]

The Dodd-Frank Act took a number of steps to reform the OTC market in derivatives, including the reporting of all swap trades to a trade repository, the public reporting of certain trade information, the posting of margin against possible losses resulting from counterparty default, the mandatory clearing of standardized swap contracts through registered central counterparties, trading on exchange-like trading facilities, and registration and regulation of swap dealers and certain large market participants. These steps were intended, among other purposes, to reduce the opaque nature of the derivatives market, to improve price transparency and to reduce systemic risk.

Under Dodd-Frank, swap and security-based swap dealers and major swap and security-based swap participants are required to register with and be subject to supervision by the CFTC and SEC. As of November 2016, more than 100 swap dealers were provisionally registered with the CFTC. The SEC estimates that as many as 50 security-based swap dealers, many of

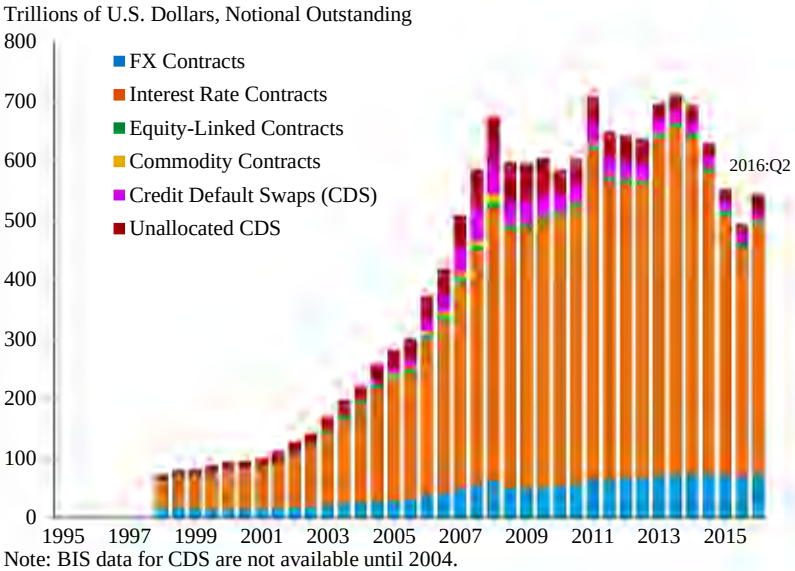
[18] A swap is an agreement between two parties to exchange sequences of cash flows for a set period of time. Types of swaps include interest rate, foreign exchange, and credit default. For example, in an interest rate swap one party pays a fixed amount and the counterparty pays an amount determined by a variable interest rate such as LIBOR.

[19] A credit default swap (CDS) is a particular type of swap designed to transfer the credit exposure of a fixed income security from the buyer to the seller. The CDS buyer makes periodic payments to the seller, who, in the event of default, pays the buyer the difference between the face value and the defaulted value of the security. CDS are often used by buyers to hedge the credit risk of bond positions and by sellers to create positions that are similar to holding the underlying bond. Dodd-Frank reforms have ensured that most such transactions are required to have collateral posted to insure performance of the contract.

[20] The notional value of a swap contract is the nominal or face value and is used to calculate payments made on the instrument. With respect to CDS, the notional value represents the face value of the debt security whose credit risk is transferred from buyer to seller of the CDS.

[21] It is important to look at global trading activity for several reasons. These include the fact that a sizeable fraction of these transactions are between parties in different jurisdictions and many participants in these transactions, particularly dealers, have a global presence and the jurisdiction in which they book the transaction is often a matter of choice.

Figure 6-20
Global OTC Derivatives Market, 1998–2016



Note: BIS data for CDS are not available until 2004.
Source: Bank of International Settlements (BIS).

which are already registered with the CFTC as swap dealers, and five major security-based swap participants will be required to register when the SEC's Registration Rules for Security-Based Swap Dealers and Major Security-Based Swap Participants go into effect.

Clearing through CFTC-registered derivatives clearing organizations is now required for most interest rate and index credit default swaps.[22,23] Mandatory clearing of single-name CDS and other security-based swaps through SEC-registered clearing agencies in not yet in effect, though many single-name CDS are accepted for clearing through CCPs on a voluntary

[22] After a trade is executed between a buyer and a seller, the CCP steps between the two counterparties and becomes the buyer to the seller and the seller to the buyer. Thus the CCP assumes the credit risk that used to be borne by the original counterparties. This can reduce risk in a number of ways including standardizing collateral requirements for all participants, allowing for the regulation of risk management practices, and promoting trade compression which reduces the total amount of trades outstanding. For example, if firm A buys a certain CDS (buys protection) from firm B on Monday and then firm A sells the same contract (sells protection) to firm C on Tuesday, because both trades have the CCP as the counterparty, they would "compress" resulting in no position for firm A.

[23] Participants in an interest rate swap exchange fixed interest rate payments for a floating rate interest payment. An index CDS is a portfolio of CDS on individual entities that comprise the index.

basis.[24] One of the advantages of central clearing is the increased ability of market participants to reduce their total exposure through trade compression – the canceling of equal and offsetting positions – that reduces the total amount of derivative positions outstanding. Figure 6-21 shows the rapid increase in trade compression in interest rate swaps as rules requiring their mandatory clearing came into effect.

Twenty-three swap execution facilities are now registered with the CFTC and the application of one additional swap execution facility is pending. The SEC estimates that as many as 20 security-based swap execution facilities will register with the SEC when its applicable rules become effective, many of which will also be registered with the CFTC. According to information compiled by the International Swaps and Derivatives Association (ISDA), in the first 10 months of 2016, 55 percent of total interest rate derivative notional value and 76 percent of total CDS notional value takes place on swap execution facilities, the exchange-like electronic trading platforms required by Dodd-Frank.

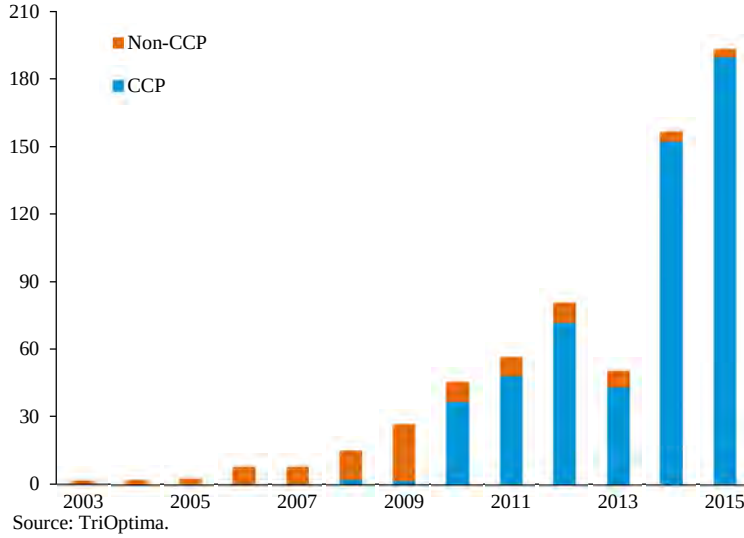
The Dodd-Frank Act improved the ability of regulators to oversee this market by requiring that all swap transactions be reported to registered swap data repositories (SDRs) and that summary information be periodically reported to the public. As of the fall of 2016, there are four SDRs provisionally registered with the CFTC and the SEC estimates that two SDRS will be registered with it when its rules become effective. In addition, there are many more trade repositories registered and operating overseas, including six registered with the European Securities and Market Authority, making a previously opaque market significantly more transparent.

Credit Rating Agencies

Credit rating agencies play an important role in the financial system. When a bank makes a loan, the bank is responsible for assessing the credit quality of the borrower and monitoring the performance of the loan. In a capital market, borrowers seek to raise funds by issuing bonds or other debt obligations to numerous investors. In this case, investors must either make their own determinations as to the borrower's creditworthiness, which is made more difficult given the information asymmetries between the borrower and the investors, or rely on third parties to perform this function. This is the role of credit rating agencies: they rate the creditworthiness of borrowers and the probability of default of bonds and other debt instruments, and provide surveillance on borrower's performance.

[24] A single-name CDS is a contract that pays the difference between the face value of a particular bond and the market value of that bond when the issuer defaults.

Figure 6-21
Interest Rate Derivative Compression Volume, 2003–2015
Trillions of U.S. Dollars



Source: TriOptima.

Over time, the credit rating agencies became essential parts of the financial systems. Many regulations referred to specific credit ratings, many investment funds limited themselves to holding only assets with a certain minimum rating, and ratings were a crucial part in determining what collateral was permissible in a number of transaction types, including repo transactions. In exchange for adhering to various reporting requirements, the SEC provides interested and eligible credit rating agencies with a Nationally Recognized Statistical Rating Organization (NRSRO) designation. The designation is particularly important because a variety of State and Federal laws and regulations reference NRSRO ratings.

One concern that emerged from the crisis was the problems with the incentives of the ratings agencies themselves. Although investors are the primary users of ratings, issuers hire and pay most rating agencies. The so-called issuer-pay compensation model raises conflicts of interest issues and can lead to "rating shopping." If an issuer believes a credit rating agency is likely to rate its debt lower than other agencies, the issuer would be less likely to hire that rating agency. This structure provided incentives for credit rating agencies to inflate ratings, and is compounded by the highly concentrated nature of the industry.

The Dodd-Frank Act created the Office of Credit Ratings within the SEC to oversee and conduct annual examinations of each NRSRO. The

findings from the NRSRO examinations are described in annual public reports published by the SEC. The examinations have shown a number of improvements, but have also identified continuing concerns, including those about the management of conflicts of interest, internal supervisory controls, and post-employment activities of former staff of NRSROs.

To improve transparency over the ratings process, the Dodd-Frank Act required enhanced public disclosure of NRSROs' credit rating procedures and methodologies, certain business practices, and credit ratings performance. According to the SEC, in 2014, "there [was] a trend of NRSROs issuing unsolicited commentaries on solicited ratings issued by other NRSROs, which has increased the level of transparency within the credit ratings industry" (SEC 2014). The SEC reported that this trend continued in 2015. In addition, some NRSROs have issued unsolicited commentaries on an asset class, rather than a specific transaction.

The Dodd-Frank Act eliminated references to credit ratings in certain Federal laws and required all Federal agencies to remove references to credit ratings from their regulations. To that end, the financial regulators adopted rule changes that removed references and, where appropriate, substituted alternative standards of creditworthiness.

Improved Accountability to Shareholders

The financial crisis led to policy concerns about a possible link between excessive financial firm risk taking and executive compensation practices. For example, a financial executive considering a very risky investment might weigh the potential personal benefit if the investment pays off against the personal loss if the investment fails. If the benefit, say a very large bonus, is more valuable to the executive than the potential loss, perhaps the risk of getting fired, then the executive has an incentive to make the risky investment. The best interest of the shareholders or the risks to either the firm or the financial system might only be of secondary importance to the executive.

Policymakers were concerned about what economists call "misaligned incentives" in 2008, one of the motivations for the Troubled Asset Relief Program subjecting recipients to various executive pay restrictions and corporate governance requirements. Soon after, the Federal Reserve issued guidelines for reviewing banks' pay structures to identify any compensation arrangements that provide incentives to take excessive risk.

In accordance with requirements in the Dodd-Frank Act, the SEC adopted rules in 2011 that require public companies subject to the Federal proxy rules to provide shareholder advisory 'say-on-pay,' 'say-on-frequency,' and 'golden parachute' votes on executive compensation. Say-on-pay refers

to a shareholder advisory vote on executive compensation, say-on-frequency refers to the frequency of say-on-pay votes, and golden parachute to advisory votes on compensation arrangements and understandings in connection with merger transactions. In 2015, 2,157 Russell 3000 companies had a say-on-pay vote, providing shareholders with the information they need to monitor potential abuses and an opportunity for shareholders to voice their opinion concerning steep increases in executive compensation packages. Sixty-one Russell 3000 companies (2.8 percent) had shareholders reject their 2015 say-on-pay vote.

In accordance with requirements in the Dodd-Frank Act, the SEC adopted rules in 2012 directing the national securities exchanges and national securities associations to prohibit the listing of any equity security of an issuer that does not comply with new compensation committee and compensation adviser requirements. To conform their rules to the new requirements, national securities exchanges that have rules providing for the listing of equity securities filed proposed rule changes with the SEC. The Commission issued final orders approving the proposed rule changes in January 2013.

Sponsors of asset-backed securities are now required to provide consistent, asset-level information to investors, improving clarity regarding the risks associated with these securities. Sponsors are also now required to retain a portion of the credit risk associated with the assets collateralizing the securities, better aligning the behavior of originators, securitizers, and investors, and addressing many of the perverse incentives that contributed to the financial crisis.

Wall Street reform recognized that markets require transparency to work properly. By shining a light on hidden business structures and increasing information for all participants, Wall Street reform has helped to realign incentives so that markets work for everyone.

Protecting Consumers

Consumers often know less about the investment or financial service they are considering than the financial industry professional with which they are doing business. Protecting consumers from this problem of asymmetric information by providing consistent and rigorous consumer protections is important to preserve consumer confidence in the financial system. If the consumer believes he or she cannot get a fair deal then the consumer is less likely to take advantage of the many beneficial financial services that are available for financing major purchases as well as saving for college or retirement.

Prior to the crisis, enforcement of laws meant to protect consumers from predatory practices was divided among multiple agencies. The Dodd-Frank Act created the Consumer Financial Protection Bureau (CFPB) "to ensure that important fair lending, debt collection, consumer credit, and other borrower protections were updated in response to quickly changing markets and consistently enforced nationwide" (U.S. House of Representatives, 2015). The financial crisis revealed that laws meant to protect consumers from predatory practices are meaningless if they are not enforced, and that consumers needed a government agency focused on their needs and experiences.

As of November 2016, the CFPB has returned $11.7 billion to more than 27 million harmed consumers —including homeowners, students, seniors, and service members. As of July 2016, millions of consumers have also taken advantage of the Bureau's financial resources at consumerfinance.gov and 930,700 complaints have been submitted to a database for collecting consumer complaints against service providers that have proved otherwise unresponsive.

The CFPB has been establishing and enforcing clear rules of the road and consumer protections to prevent the kinds of predatory behavior that contributed to the financial crisis. The CFPB protects consumers of a wide range of financial products and services, including mortgage loans, credit cards, student loans, car loans, and deposit products. The CFPB is developing landmark consumer protections for products often targeted to the unbanked and underbanked, such as prepaid accounts, payday loans, and car title loans. The CFPB also protects consumers with respect to other industry activities, such as debt collection and credit reporting.

In the lead up to the financial crisis, abusive lending practices and poor underwriting standards resulted in risky mortgages that hurt borrowers across the country. Wall Street reform addresses abusive practices in mortgage markets, including by improving disclosure requirements, curbing unfair servicing practices, restricting compensation practices that created conflicts of interest, and establishing protections for high-cost mortgage loans. In addition, mortgage lenders are required to make reasonable, good faith determinations that a borrower is able to repay her mortgage loan. More than 16 million mortgages are covered by the CFPB's Ability-to-Repay rule's protections and that number grows every month. Reforms also protect service members from deceptive mortgage advertising practices, predatory lending schemes, and hidden fees for automatic bill pay services.

Additional Investor Protections

The SEC's Whistleblower Office, created by the Dodd-Frank Act, became fully operational in 2011. In fiscal year 2014, the SEC received over 3,600 tips, covering a variety of securities law violations including those relating to corporate disclosures, financial statements, security offering fraud, market manipulation, investment adviser fraud, and broker-dealer rule compliance. Whistleblowers that provide the SEC with original information that leads to a successful enforcement action with monetary sanctions exceeding $1 million are eligible to receive an award ranging from 10 to 30 percent of the amounts collected in the action. As of November 2016, 34 whistleblowers have received awards with the total exceeding $110 million, with the highest award being over $30 million.

The Dodd-Frank Act enhanced the CFTC's ability to prosecute manipulation by prohibiting, among other things, manipulative and deceptive devices that are intentionally or recklessly employed, regardless of whether the conduct in question was intended to create, or did create, an artificial price. This authority provides the CFTC with more flexibility to go after reckless manipulation and fraud. The first case brought by the CFTC using this authority was against Panther Energy Trading LLC in 2013 for engaging in the disruptive practice of "spoofing" by using a computer algorithm to illegally place and quickly cancel bids and offers in futures contracts without ever intending to buy or sell those contracts. The CFTC also used this authority to bring charges against Navinder Singh Sarao for his role in contributing to the May 6, 2010 Flash Crash and in 2013 against JPMorgan Chase Bank in connection with its "London Whale" swaps trades.

As required by the Dodd-Frank Act, the SEC established the Office of the Investor Advocate, charged with identifying investor protection concerns and proposing to the SEC and Congress any administrative or legislative changes necessary to mitigate those concerns. Similarly, the Dodd-Frank Act also established the Investor Advisory Committee (IAC) comprised of the Investor Advocate, a representative of state securities commissions, a representative of the interests of senior citizens, and no fewer than 10 and not more than 20 members appointed by the SEC to represent the interests of various types of individual and institutional investors. The IAC may submit findings and recommendations for review and consideration by the Commission, which must promptly issue a public statement assessing those findings or recommendations and disclosing the action, if any, the SEC intends to take. Since its inception, the IAC has issued 14 recommendations covering: shortening the trade settlement cycle in U.S. financial markets, the definition of an accredited investor, impartiality in the disclosure of preliminary voting results, crowdfunding, decimalization,

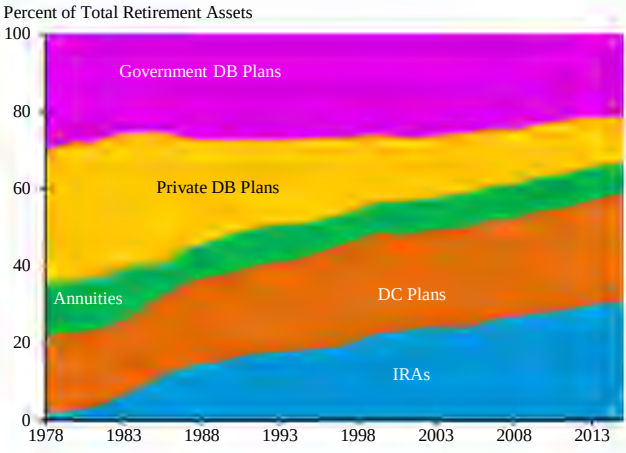
Box 6-5: Addressing the Problem of Conflicted Investment Advice for Retirement Savings

In April 2016, the Department of Labor (DOL) finalized a rule that substantially expanded the number of providers of financial advice required to adhere to a fiduciary standard, which requires them to put their clients' best interest before their own profits. The rule makes considerable progress in upholding consumer protections in the retirement savings marketplace.

Individuals saving for retirement usually make use of one or more of three major types of retirement plans. First, defined benefit (DB) plans provided by many public and private employers promise specified payments to the retiree that depend on characteristics of their work history, such as age, years of service and salary of the employee. The employer that sponsors the plan is typically responsible for making contributions to the plan adequate to finance the promised payments. If investment returns are less than expected, the plan sponsor is required to make up the difference. Another type of employer-sponsored plan is the defined contribution (DC) plan, such as a 401(k), which pays a retiree an amount based on how much the beneficiary and employers have contributed in his or her working years and the investment return earned on those contributions. The beneficiary typically has several investment options to choose from within the plan but bears the risk of lower retirement income if the investment returns are less than expected. Lastly, Individual Retirement Accounts (IRA) are savings accounts composed solely of an individual's contributions during his or her working years.

IRAs require individuals to make all investment decisions. In terms of investing retirement savings, employer-sponsored defined benefit (DB) plans generally delegate retirement savings of all participants to investment professionals who must serve the best interests of their clients. Employer-sponsored defined contribution (DC) plans typically give employees a list of investment options from which to choose. While IRAs offer individuals the most freedom to invest their retirement assets, it also means they must interact directly with those who provide investment products and investment advice. This has become more important as IRA assets have grown from 2 percent to 31 percent of all retirement assets from 1978 to 2015 (Figure 6-xii) During this period, the investment landscape has become much more complex and as a result, financial advice has become increasingly important to individual's investment strategies. One survey found that roughly half of households that own a traditional IRA have a retirement strategy created with the help of an investment adviser (Holden and Schrass 2015).

Figure 6-xii
U.S. Retirement Assets by Type, 1978–2015



Source: Investment Company Institute.

A growing body of academic and industry literature shows that such investment advice is not always in the best interest of clients. Table 6-i shows that savers may obtain advice from one of two main types of investment professionals: registered investment advisers (RIA), who have a fiduciary duty to clients; and broker-dealers, who are required to give only "suitable" investment advice. In addition, only registered investment advisers may give holistic advice on a client's investments, whereas broker-dealers primarily transact in financial markets and may provide only incidental advice to clients (SEC 2011).

Compensation structures for professionals who give financial advice often introduce conflicts of interest. Some investment advisers receive conflicted payments, which is compensation that depends directly on the actions taken by the advisee, such as trading shares of a company or selling shares of a fund. Certain types of mutual funds share a higher proportion of their revenues with advisers that sell them, or pay advisers relatively high fees per share that they sell to clients. These types of compensation structures incentivize advisers to steer investors into such products even if they are not optimal for a client's investment needs. Alternative compensation schemes such as an hourly rate or a yearly management fee charged as a percentage of assets provide payments that depend less on investment decisions and provide less opportunities for conflict of interest. Advisers not subject to a fiduciary standard may direct clients into funds that while meeting a "suitability" standard, are not in the best interests of the client.

Table 6-i
Sources of Investment Advice

Adviser	Description	Legal Standard
Registered Investment Advisers (RIAs)	Receives compensation in exchange for giving investment advice. May also manage a portfolio for clients.	Fiduciary duty to client, including a duty of loyalty and a duty of care. Must serve the best interest of the client.
Broker Dealers (brokers)	Makes trades for a fee or commission. A broker makes trades for a client's account, while a dealer makes trades for his or her own account.	Recommendations must be suitable for a client's investment profile taking into account factors such as age, income, net worth, and investment goals.
Other Potential Sources	Examples include friends, family, bankers, insurance agents, accountants, and lawyers.	Standards vary.

A substantial body of academic literature shows that conflicted advice leads to lower investment returns.[1] In previous work, CEA estimated that savers receiving conflicted advice earn returns roughly one percentage point lower than they would have otherwise and these losses amounted to $17 billion annually.[2]

The Employee Retirement Income Security Act (ERISA), enacted in 1974, regulates the provision of financial advice to retirement investors. Prior to the finalization of the new rule in 2016, the rules governing retirement advice had not changed meaningfully since 1975 despite the significant changes in the retirement savings marketplace. Starting in 2009, DOL started a reform effort to combat the problems stemming from conflicted investment advice. It proposed a new fiduciary rule in 2015, and after receiving stakeholder comment, adopted a revised rule in April 2016.

In its new rule, the DOL extends the fiduciary duty broadly to financial professionals giving investment advice for retirement plans subject to ERISA, including broker-dealers. The new rule requires that financial advisors who receive commissions and other transaction-based payments provide advice that is in the best interest of the client and commit to a set of policies and procedures that ensures that the advisor meets this standard. The intent of the rule is to protect retirement investors and ensure that the advice they receive is in their best interest. Though this

[1] See, among others, Bergstresser, Chalmers, and Tufano (2009), Del Guercio and Reuter (2014), and Christofferson, Evans, and Musto (2013).
[2] For more information on the costs of conflicted investment advice, see CEA's (2015a) report "The Effects of Conflicted Investment Advice on Retirement Savings."

rule does not ban such "conflicted payments," it does stipulate that those institutions still receiving such transaction-based compensation must have clients sign a best interest contract exemption, which pledges that the adviser will act in the client's best interest.

While the rule will only apply to transactions beginning in April 2017, the effects will become evident sooner as investment advisers adjust their business practices to comply with the new regulations. Analysts anticipate that the effects will be large. Morningstar estimates that the rule will require that accounts with more than $800 billion of defined contribution plan assets that are receiving some form of advice be checked for compliance. In addition, wealth management firms will need to justify that over $200 billion of IRA rollovers are in the clients' best interest. Commentators envision that the plan will place the highest costs on independent broker-dealers, formerly obliged only to offer suitable investment advice. Registered investment advisors (RIAs) will bear smaller costs given they are already under a fiduciary standard. The additional liability of a best interest contract exemption will likely incentivize broker-dealers to switch to fee-based compensation structures. Since fee-based compensation may make small accounts less profitable, advisers could decide either to drop small retirement accounts or shift them into automated advice accounts —so called "robo-advisors." While the results of these regulations will become more apparent in the coming year, the initial commitment of some firms toward lower fee, passive products, should then lower costs to consumers, consistent with the original intent of the DOL rule.

legislation to fund investment adviser examinations, broker-dealer fiduciary duty, data tagging, and target date mutual funds.

International Cooperation

The U.S. financial system does not exist in a vacuum. Massive volumes of capital flow between U.S. financial markets and those abroad. Over the course of a month, foreign residents buy and sell trillions of dollars' worth of U.S. assets to or from U.S. residents. European banks were major borrowers from U.S. money market funds and subsequently major investors in U.S. asset markets. Foreign domiciled financial institutions play sizable roles in many aspects of U.S. financial markets. In addition, U.S. financial firms compete for business in financial markets around the world with firms regulated by other countries' rules. Reforming the U.S. financial system and regulatory architecture alone would be insufficient to ensure the safety of the U.S. financial system if there were not important steps to ensure the global

financial system and the systems of those of our partners were also better regulated.

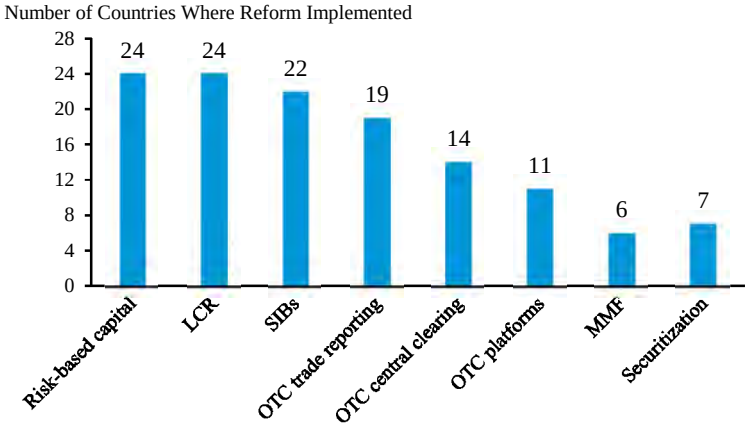
In September 2009, the G-20 met in Pittsburgh to discuss, among other things, the measures the member nations had taken to address the global crisis and the additional steps necessary to build a stronger international financial system. The international financial reform agenda that came from the Pittsburgh and subsequent G-20 meetings aimed to ensure a "race to the top" to raise the quality of regulation and thereby the safety of the international financial system as well as level the playing field across major and emerging financial centers. To this end, G-20 leaders called for the establishment of the Financial Stability Board (FSB) to serve a key role in promoting the reform of international financial regulation and to promote financial stability and endorsed its original charter at the Pittsburg meeting. The Dodd-Frank Act is fully consistent with — and in a number of areas surpasses —the G-20 recommendations. Initiatives proposed in Pittsburgh and subsequent G-20 meetings include: 1. Strengthening bank capital and liquidity; 2. Reducing the risk posed by large systemically important financial institutions; 3. Making derivatives markets safer and more transparent; 4. Establishing higher capital margins for non-centrally cleared derivatives; and 5. Identifying parties to financial transactions.

Consistency of regulatory approach across jurisdictions is important because so much financial activity occurs between financial institutions located in different jurisdictions. To the extent that financial market activity can move to the jurisdiction with the weakest regulation and with the interconnected nature of the world economy, a financial crisis that begins in one country can quickly spread to others. A consistent regulatory approach across countries makes the financial system in every country safer.

The FSB produces a semiannual report that tracks the progress of regulatory reform around the world.[25] As seen in Figure 6-22, within the 24 FSB member jurisdictions, progress in implementing banking regulation reform has been widespread with considerable progress having been made in the reform of OTC derivative markets. Other initiatives have not yet been implemented beyond a few jurisdictions though progress continues.

[25] The Financial Stability Board (FSB) is an international body that monitors and makes recommendations about the global financial system. It was established after the 2009 G-20 London summit in April 2009. The FSB includes representatives from 24 countries plus The World Bank, International Monetary Fund, Bank for International Settlements, Organization for Economic Cooperation and Development, European Central Bank, European Commission, Basel Committee on Banking Supervision, International Association of Insurance Supervisors, International Organization of Securities Commissions, International Accounting Standards Board, Committee on the Global Financial System, and Committee on Payments and Market Infrastructures.

Figure 6-22
International Financial Regulation:
Implementation of G20 Financial Regulatory Reforms



Note: LCR stands for liquidity coverage ratio. SIBs refers to requirements made by each country on domestic systemically important banks. MMF refers to money market fund reforms. MMF and securitization reform both fall under reform to the shadow banking system.
Source: Financial Stability Board 2016.

The United States has made substantial progress in implementing the priority reforms identified by the FSB. The United States has fully implemented reforms in nearly all of the priority areas and is making progress in others. Many major advanced economies with large financial systems that are highly interconnected with the U.S. financial system —in particular the United Kingdom and the euro area —are also making substantial progress.

U.S. Financial Markets in 2016

Seven years after the end of the financial crisis, the purpose of financial reform remains the same: to reduce as much as possible the likelihood of another financial crisis and the incalculable costs that it would inflict on the economy, the financial markets, and society. The recovering economy and implementation of financial reform have been accompanied by strong performance of a wide variety of financial market indicators. Not only have financial markets recovered from the losses suffered during the crisis, but banks are healthier and stronger, regulators are on the lookout for systemic risk, once-opaque derivative markets are safer and more transparent, credit ratings agencies are subject to more effective oversight and increased transparency, and investor protections have been strengthened.

A variety of measures show the renewed health of the financial markets. Equity prices and housing prices have rebounded, rebuilding

Box 6-6: The JOBS Act

While it was an imperative to correct the market failures and excesses in the pre-2008 financial system, an important aspect of financial regulatory reform is ensuring funds can be channeled to entrepreneurs who have productive uses for capital. In April of 2012, the President signed into law the Jumpstart Our Business Startups (JOBS) Act, a bipartisan bill that enacts many of the President's proposals to encourage startups and support the nation's small businesses. The Act allows for "crowdfunding", expands "mini-public offerings," and creates an "IPO on-ramp", all of which allow for easier funding of small businesses while maintaining important investor protections.

As implemented by the Securities and Exchange Commission, "crowdfunding" allows startups and small businesses to raise up to $1 million annually from many small-dollar investors through web-based platforms, democratizing access to capital. Investor protections include a requirement that crowdfunding platforms must be registered with a self-regulatory organization and regulated by the SEC. In addition, investors' annual combined investments in crowdfunded securities are limited based on an income and net worth test. SEC rules implementing the crowdfunding portion of the JOBS Act became effective in May 2016 making it possible for entrepreneurs across the country to raise small-dollar investments from ordinary Americans.

Prior to the JOBS Act, the existing "Regulation A" exemption from certain SEC requirements for small businesses seeking to raise less than $5 million in a public offering was seldom used. The JOBS Act raises this threshold to $50 million, streamlining the process for smaller innovative companies to raise capital consistent with investor protections. The SEC rules implementing this portion of the Act became effective in the summer of 2015.

The JOBS Act makes it easier for young, high-growth firms to go public by providing an incubator period for a new class of "Emerging Growth Companies." During this period, qualifying companies will have time to reach compliance with certain public company disclosure and auditing requirements after their initial public offering (IPO). Any firm that goes public already has up to two years after its IPO to comply with certain Sarbanes-Oxley auditing requirements. The JOBS Act extended that period to a maximum of five years, or less if during the on-ramp period a company achieves $1 billion in gross revenue, $700 million in public float, or issues more than $1 billion in non-convertible debt in the previous three years.

Additionally, the JOBS Act changed some existing limitations on how companies can solicit private investments from "accredited inves-

tors," tasked the SEC with ensuring that companies take reasonable steps to verify that such investors are accredited, and gave companies more flexibility to plan their access to public markets and incentivize employees.

Taken together, the components of the JOBS Act has the potential to enable entrepreneurs and small businesses to raise capital not previously available to them, increasing overall levels of capital formation in the economy.

Americans' net wealth. Measures of volatility or financial market stress are all largely contained as well. Finally, there is evidence – from firm loans to home mortgages – that capital is being channeled towards productive uses. Implementation of the Jumpstart Our Business Startups (JOBS) Act (see Box 6-6) has made it easier for entrepreneurs and small businesses to raise capital and grow. Performance in financial markets is driven by economic fundamentals as well as factors related to the markets themselves. The fact that markets have been up does not mean that the Dodd-Frank Act has been a success any more than would declining markets represent a failure of financial reform. But the recovery of markets and their ability to serve the core roles they play in the economy is an indicator of the success of the financial rescue and reform efforts in this Administration.

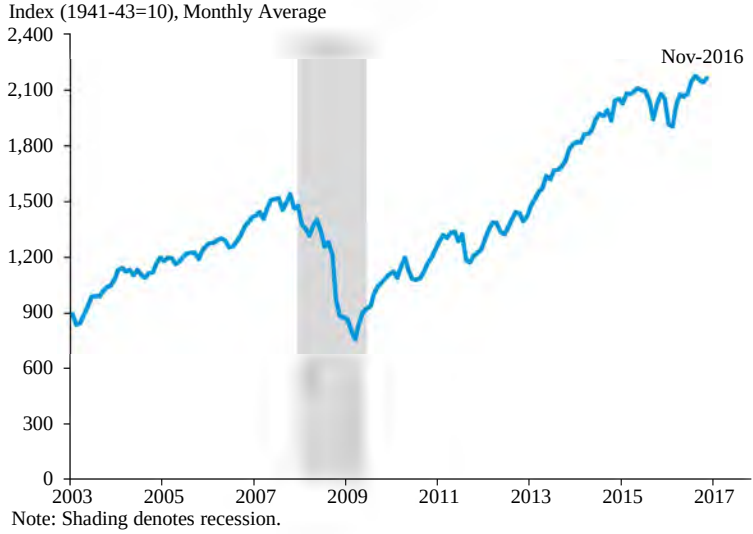
General Measures of Financial Sector Health

The stock market has more than recovered from the losses suffered during the financial crisis. One broad measure of U.S. stock market performance, the S&P 500 index, fell from a peak of over 1,500 in Fall 2007 to a trough below 700 in March 2009, a decline of more than 50 percent. Since then the market has recovered all of that loss and risen above 2,150 in Fall 2016 (Figure 6-23).

Forward-looking measures of equity market volatility are relatively low. Derived from options on the S&P 500 index, the VIX is a measure of expected volatility over the life of the option. The VIX, also referred to as the "fear index", is well below the crisis peak of over 60 percent (Figure 6-24). As of November 2016, the VIX was at 15.2 percent, which is below its 17-year pre-crisis average of almost 19 percent.

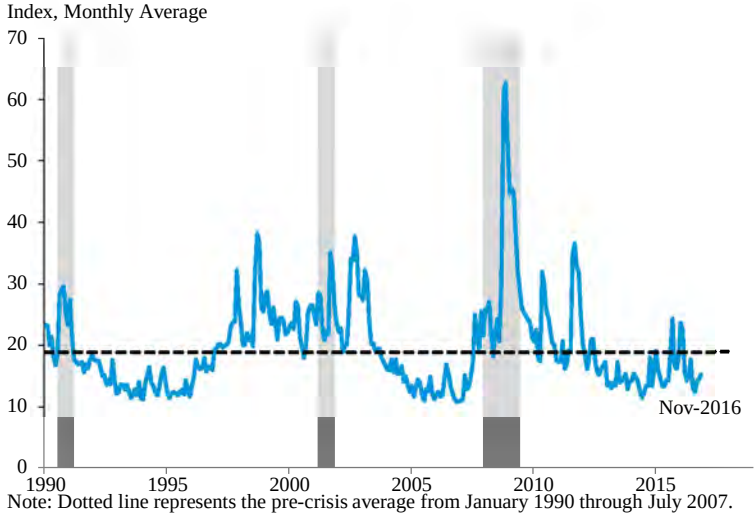
Measures of bond market health have also recovered from the financial crisis. The bond market analogue of the VIX, the Merrill Lynch Option Volatility Estimate (MOVE) Index, is a yield curve weighted index of the implied volatility on 1-month Treasury. The MOVE has fallen from its

Figure 6-23
S&P 500, 2003–2016



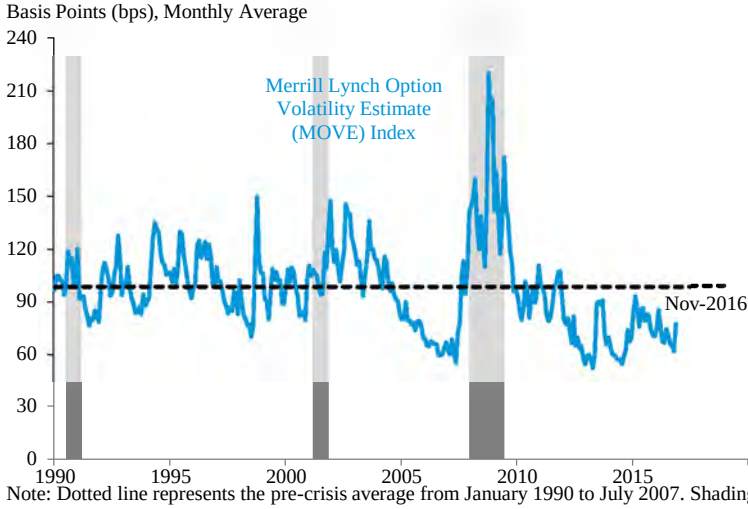
Note: Shading denotes recession.
Source: Standard & Poors.

Figure 6-24
VIX, 1990–2016



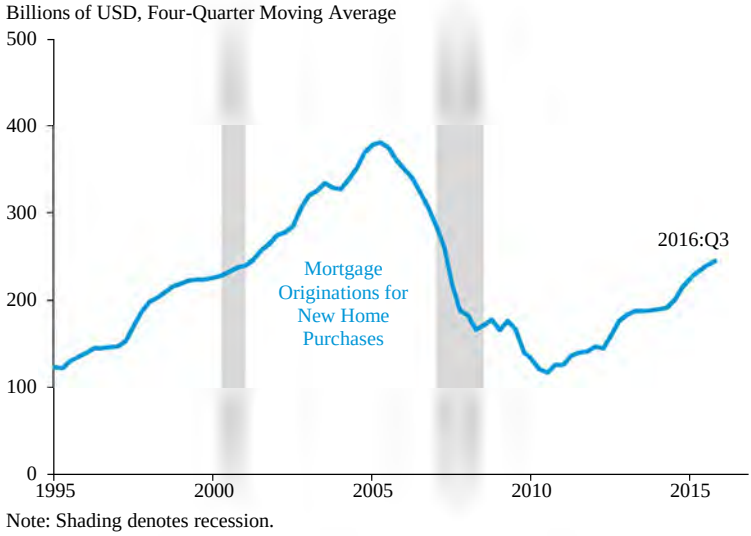
Note: Dotted line represents the pre-crisis average from January 1990 through July 2007.
Shading denotes recession.
Source: Wall Street Journal.

Figure 6-25
Fixed Income Implied Volatility, 1990–2016



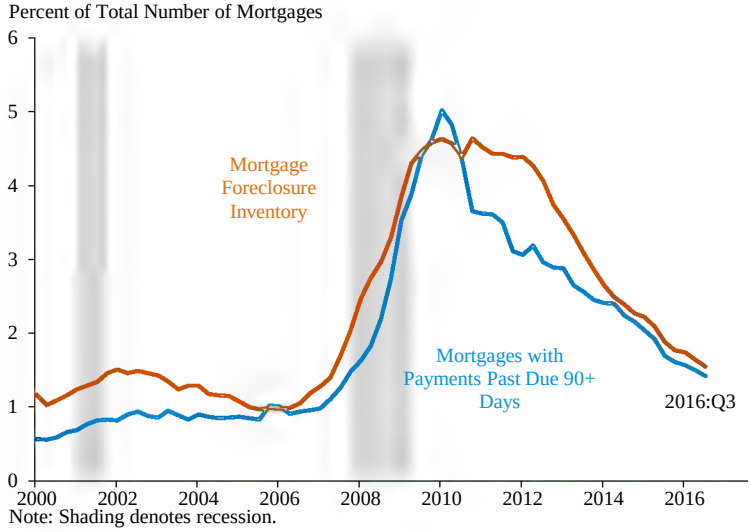
Note: Dotted line represents the pre-crisis average from January 1990 to July 2007. Shading denotes recession.
Source: Bank of America Merrill Lynch.

Figure 6-26
Mortgage Originations, 1995–2016



Note: Shading denotes recession.
Source: Mortgage Bankers Association.

Figure 6-27
Mortgage Delinquency and Foreclosure, 2000–2016



Note: Shading denotes recession.
Source: Mortgage Bankers Association.

Figure 6-28
U.S. Corporate Bond Issuance, 2000–2016

Note: Shading denotes recession. Figures include investment grade and high yield, convertible bonds, MTNs, and Yankee Bonds. Issuance number for 2016 is annualized based on issuance through September 2016.
Source: SIFMA.

peak above 200 in the fall of 2008 to below 80 in Fall 2016, a level below the 17-year pre-crisis average of approximately 100 (Figure 6-25).

Measures of housing-market health, the sector in which the financial crisis began, have also improved. The Case-Shiller national index of house prices has regained almost all of the ground it lost during the crisis (Figure 6-4).

Mortgage lending has stabilized. The four-quarter moving average of mortgage originations for new home purchases fell from a pre-crisis peak of $381 billion in 2006:Q1 to a trough of $117 billion in 2011:Q2 (Figure 6-26). Since then, mortgage originations have risen steadily to $245 billion in 2016:Q3.

For existing loans, the fraction of mortgages with payments more than 90 days past due or in foreclosure continues to fall from the peak during the crisis. Mortgage payments more than 90 days past due have fallen steadily from a peak of 5.0 percent in 2010:Q1 to 1.4 percent in 2016:Q3. The fraction of mortgages in foreclosure has also fallen steadily from a peak of 4.6 percent in 2010:Q4 to 1.6 percent in 2016:Q3 (Figure 6-27). Both measures of troubled mortgages, suggest substantial progress since the crisis.

One of the most important functions of capital markets is to facilitate the formation of capital for business. Businesses have raised record amounts in the capital markets as corporate bond issuance has risen above pre-crisis levels (Figure 6-28).

Conclusion

The financial crisis revealed a number of fault lines in the U.S. financial system. Banks were inadequately capitalized, did not have enough liquidity, and took too many risks. Non-bank financial firms faced many of the same risks as banks, but lacked the same regulatory supervision or protection against runs. In addition, gaps in the regulatory architecture meant that financial regulators lacked a holistic view of the risks in the system.

The Administration has taken numerous steps to make the financial system safer, most of all through the Dodd-Frank Act, which has helped correct a number of market failures that arose in financial markets during the crisis. It helps generate safety and soundness of financial markets by requiring that banks hold more capital, have adequate liquidity, and do not take excessive risk because they have access to government deposit insurance or access to emergency liquidity provision from the Federal Reserve. Dodd-Frank takes steps to limit systemic risk by bringing unregulated parts of the financial system that were effectively performing banking functions without the necessary backstops or regulation under a regulatory umbrella.

It created the FSOC to consider risks to the overall financial system and better coordinate regulatory action. And it took steps to limit the problem of financial institutions that are too-big-to-fail by imposing additional regulatory requirements on such institutions and creating an architecture that would allow these systemically significant institutions to be unwound if they were to fail. Finally, Dodd-Frank improved the transparency, accountability, and consumer protections in our financial system. These measures will help consumers and investors engage with the financial system in a way that is beneficial to them.

Although implementation of Basel III and Dodd-Frank go a long way toward reforming the financial system, there are important issues that remain unresolved. These include reform of government sponsored enterprises Fannie (Federal National Mortgage Association) and Freddie (Federal Home Loan Mortgage Corporation) in a manner that ensures they do not return to a status as private entities that operate for profit but with implicit public guarantees, and ensuring that a sufficient resolution framework exists for systemically important insurance companies and systemically important financial companies with worldwide operations. And as the financial system evolves over time, the regulatory architecture will need to evolve as well to ensure that a financial crisis like the one from 2007 to 2009 does not wreak havoc on the economy in the future.

CHAPTER 7

ADDRESSING CLIMATE CHANGE

Introduction

Addressing climate change and transitioning to a clean energy system is one of the greatest and most urgent challenges of our time. If left unchecked, greenhouse gas (GHG) emissions threaten future national and global welfare and economic output. The impacts of climate change are real and being felt today. Fifteen of the sixteen warmest years on record globally have occurred between 2000 and 2015, and 2015 was the warmest year on record. Although it is difficult to link specific weather events to climate change, some extreme weather events have become more frequent and intense, consistent with climate model predictions. The number of weather events that have led to damages in excess of $1 billion has been increasing in recent years due to both climate change and economic development in vulnerable areas.

Without proactive steps to reduce greenhouse gas emissions and slow the climate warming already being observed, future generations will be left with—at a minimum—the costly burden of facing the impacts of a changed climate on our planet, and potentially with catastrophic climate impacts. From an economic perspective, the causes of global climate change involve a classic negative environmental externality. The prices of goods and services in our economy do not reflect their full costs because they do not incorporate the costs of the impacts of greenhouse gas emissions associated with their production and consumption. Policies that internalize these costs will improve social welfare while reducing the odds of catastrophic climate events. In addition to the costs incurred to date, delaying policy action can increase both future climate change damages and the cost of future mitigation.

Addressing the environmental externalities from climate change involves changing the long-run trajectory of our economy toward a more

energy efficient and lower greenhouse gas-emitting path. Since President Obama took office, substantial strides have been made toward achieving this goal. Between 2008 and 2015, the U.S. energy system has shifted considerably toward cleaner energy resources. Energy intensity, which refers to energy consumed per dollar of real gross domestic product (GDP), declined by 11 percent from 2008 to 2015, following a pattern of steady decline over the past four decades. Carbon intensity, the amount of carbon dioxide emitted per unit of energy consumed, has declined by 8 percent from 2008 to 2015, and carbon dioxide emitted per dollar of GDP has declined by 18 percent over this period. In fact, U.S. carbon dioxide emissions from the energy sector fell by 9.5 percent from 2008 to 2015, and in the first 6 months of 2016 they were at the lowest level in 25 years. These trends, in combination, are favorable for climate change mitigation, and all have occurred while the economy recovered from the Great Recession. The economy has grown by more than 10 percent since 2008, and by more than 13 percent from its recession low point in 2009.

Since mitigating climate change serves a public good benefiting all countries, it also involves working with other countries to reduce greenhouse gas emissions worldwide. In addition to mitigation, addressing climate change involves building resilience to current and future impacts, developing adaptation plans and preparing for the changing frequency and severity of extreme events. Steps taken by the United States, along with extensive outreach to other countries, subsequently helped pave the way for the 2015 Paris Agreement in which more than 190 countries committed to take concrete steps to reduce greenhouse gas emissions. The Paris Agreement establishes a long-term, durable global framework with the aim of keeping climate warming to well below 2 degrees Celsius.

Given that the impacts of climate change are already being felt today and, that even with aggressive mitigation, impacts will continue into the future, the optimal response to climate change includes not only mitigation, but also adaptation. Building resilience to the current and future impacts of climate change is akin to insuring against the uncertain future damages from climate change. In parallel with domestic mitigation and global cooperation, Administration policies have also promoted resilience.

This chapter reviews the economic rationale for the Administration's efforts on climate change and the transformation of the energy system. It provides an overview of a selection of the most important policy efforts and then examines the key economic trends related to climate change and energy, many of which have already been influenced, and will be increasingly influenced going forward by policy measures under the Administration's 2013 Climate Action Plan. These trends include increases in electricity

generation from natural gas and renewable energy resources, improvements in energy efficiency, and shifts in transportation energy use. The chapter also analyzes the sources of these trends, by decomposing emissions reductions in the power sector as attributable to lower-carbon fossil-fuel resources and renewable energy generation, as well as by decomposing emissions reductions in the entire economy as attributable to lower energy intensity, lower carbon intensity, and a lower than expected level of GDP due to economic shocks, primarily the Great Recession. Understanding the driving forces behind these trends allows for an assessment of how the multitude of policy mechanisms utilized in this Administration have helped the United States pursue a more economically efficient path that addresses environmental and other important externalities.

Consistent with long-standing policy, the Administration has worked to ensure that regulations that affect carbon emissions and other climate-related policies are undertaken in an efficient and cost effective manner. Rigorous regulatory impact analyses demonstrate that economically efficient mechanisms were used to achieve climate goals. Policies put in place since 2008 will generate substantial net benefits. The first-ever carbon pollution standards for power plants would reduce greenhouse gas emissions significantly and, depending on the methods states use to comply, could generate net benefits of $15 billion to $27 billion just in 2025. Greenhouse gas standards for light-duty cars and trucks are also estimated to have sizable net benefits. The first-ever national greenhouse gas and fuel economy standards for commercial trucks, buses, and vans should generate hundreds of billions of dollars in net benefits over the life of the vehicles affected by the rule.

Other policies will either make energy cleaner or reduce energy use. The Administration extended tax credits for wind and solar projects, first in the 2009 American Recovery and Reinvestment Act (the Recovery Act) and again in 2015. The Recovery Act included substantial funding for both energy efficiency and renewables development (CEA 2016c). In addition, stronger energy efficiency standards for residential and commercial appliances, and many others, are projected to generate substantial net economic benefits to the U.S. economy.

The long time horizons for these policies, reinforced by the Administration's substantial investments in research and development for clean energy technologies, will continue to spur innovation and ensure that recent energy-sector shifts will have a durable impact on the economy and the climate.

The Administration's climate policies go well beyond what is discussed in this chapter. Rather than provide a comprehensive review of implemented and planned policies, this chapter focuses on the economics

of domestic actions to reduce greenhouse gas emissions and transition to cleaner sources of energy. Additional Federal policies and programs are assessed in other Administration documents.[1] The chapter also draws on analyses from energy and climate chapters in prior *Economic Reports of the President* (CEA 2013, 2015a).

The Economic Rationale for Climate Action

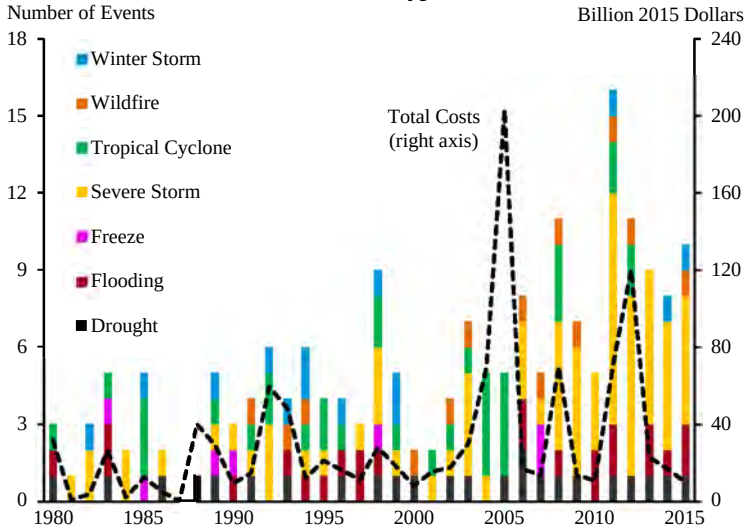
Climate change is not just a future problem—the costly impacts of changing weather patterns and a warming planet are being felt now (U.S. Global Change Research Program 2014). Fifteen of the sixteen warmest years on record globally have occurred between 2000 and 2015, and the 2015 average temperature was the highest on record (NOAA 2016a). Each of the first 8 months in 2016 set a record as the warmest respective month globally in the modern temperature record, dating to 1880; in fact, August 2016 marked the 16th consecutive month that the monthly global temperature record was broken, the longest such streak in 137 years of recordkeeping (NOAA 2016b). Not only are temperatures rising on average, but heat waves—which have detrimental human health impacts—have also been on the rise in Europe, Australia, and across much of Asia since 1960 (IPCC 2013). Among extreme weather events, heat waves are a phenomenon for which the scientific link with climate change is fairly robust. For example, studies suggest that climate change doubled the likelihood of heat waves like the one that occurred in Europe in 2003, which is estimated to have killed between 25,000 and 70,000 people, and that deadly heat in Europe is 10 times more likely today than it was in 2003 (Christidis et al. 2015; Stott 2004; Robine et al. 2008; D'Ippoliti et al. 2010).

Wildfires and certain types of extreme weather events such as heavy rainfall, floods, and droughts with links to climate change have also become more frequent and/or intense in recent years (Department of State 2016b; U.S. Global Change Research Program 2014). As illustrated in Figure 7-1, the annual number of U.S. weather events that cause damages exceeding $1 billion has risen dramatically since 1980, due both to climate change and to increasing economic development in vulnerable areas (NOAA 2016c).[2] An intense drought that has plagued the West Coast of the United States since 2013 led to California's first-ever statewide mandatory urban water restrictions (California Executive Department 2014).

[1] For discussion of clean energy investments under the American Recovery and Reinvestment Act, see CEA (2016c). For additional reviews of the Administration's climate policies, see DOE (2015), EPA (2015a), and Department of State (2016b).

[2] Regional economic development can increase the magnitude of damages from weather-related events because economic growth increases the assets (and population) at risk.

Figure 7-1
Billion-Dollar Event Types, 1980–2015



Source: National Oceanic and Atmospheric Administration.

As atmospheric levels of carbon dioxide have increased, the amount of carbon dioxide dissolved in the ocean has risen all over the world, increasing ocean acidification and threatening marine life. Further, over the past 100 years, the average global sea level has risen by more than 8 inches, leading to greater risk of erosion, flooding, and destructive storm surges in coastal areas (U.S. Global Change Research Program 2014).

Growing research also links climate change with diminished health and labor productivity in the United States, due to both temperature and pollution increases (EPA 2015a; Crimmins 2016). For example, recent research finds that when daily maximum temperatures exceed 85 degrees Fahrenheit, U.S. labor supply is reduced by as much as one hour a day (relative to the 76- to 80-degree range) for outdoor industries such as construction and farming (Graff Zivin and Neidell 2014). Studies also suggest strong links between warming and mortality—an additional day of extreme heat (above 90 degrees Fahrenheit) can lead to an increase in annual age-adjusted U.S. mortality rates of around 0.11 percent relative to a day in the 50- to 60-degree range (Deschênes and Greenstone 2011).[3] Warmer temperatures can also lead to higher urban levels of ozone, an air pollutant that affects

[3]This study and the others cited here analyze inter-annual weather variation to estimate climate impacts. As such, they may overstate climate impacts, because less-costly adaptation activities may be available over longer time horizons in response to permanent climate changes than are available in response to short-term weather shocks.

people and vegetation (U.S. Global Change Research Program 2014). For example, in the California agricultural sector, a decrease in ozone concentration by 10 parts per billion can lead to a more than 5-percent increase in worker productivity (Graff Zivin and Neidell 2012). These studies represent just a small selection of the growing body of evidence on the economic costs of climate change.

Based on the current trajectory and the results of climate science research, the economic costs from warmer temperatures and changing weather patterns are expected to grow in the coming years. Increased temperatures due to climate change could lead to a 3-percent increase in age-adjusted mortality rates and an 11-percent increase in annual residential energy consumption (as demand for air conditioning increases) in the United States by the end of the century (Deschênes and Greenstone 2011). Average U.S. corn, soybean, and cotton yields may decrease by 30 to 46 percent by 2100, assuming no change in the location and extent of growing areas, and assuming that climate warming is relatively slow (Schlenker and Roberts 2009).[4] Extreme heat is also expected to affect labor productivity and health: by 2050, the average American will likely see the number of 95-degree Fahrenheit days more than double relative to the last 30 years, and labor productivity for outdoor workers may fall by as much as 3 percent by the end of the century (Risky Business Project 2014). Within the next 15 years, assuming no additional adaptation, higher sea levels and storm surges will increase the estimated damage costs from coastal storms by $2 billion to $3.5 billion annually in the United States, and these costs are projected to increase to $42 billion annually by the end of the century (Risky Business Project 2014). Based on emissions trajectories in 2014, by 2050 existing U.S. coastal property worth between $66 billion and $106 billion could be at risk of being inundated, with the Eastern and Gulf coasts particularly affected (again, assuming no additional adaptation) (Risky Business Project 2014).

The impacts of climate change will also affect the U.S. Federal Budget. For example, an increase in the frequency of catastrophic storms, along with rising seas, will require more disaster relief spending, flood insurance payments, and investments to protect, repair, and relocate Federal facilities. Changing weather patterns and extreme weather events will affect American farmers and thus expenditures on Federal crop insurance and disaster payments. Health impacts of climate change will increase Federal health care expenditures. An increase in wild-land fire frequency and intensity

[4] Like the studies on human health, economic estimates of the agricultural impacts of climate change are based on inter-annual weather variation and may overstate climate impacts, if less costly adaptation activities are available over long time horizons in response to permanent climate change.

will strain Federal fire suppression resources. In addition to these likely increases in expenditures, climate change is expected to reduce economic output and diminish Federal revenue. A recent report by the U.S. Office of Management and Budget projects that the combined detrimental impacts of climate change on Federal revenues and expenditures by 2100 could easily exceed $100 billion annually, when the estimates are expressed in terms of their equivalent percentage of current U.S. GDP (OMB 2016).

Addressing Externalities

The impacts of climate change present a clear economic rationale for policy as a means to both correct market failures and as a form of insurance against the increased risk of catastrophic events. Climate change reflects a classic environmental externality. When consumers or producers emit greenhouse gases, they enjoy the benefits from the services provided by the use of the fuels, while not paying the full costs of the damages from climate change. Since the price of goods and services that emit greenhouse gases during production does not reflect the economic damages associated with those gases, market forces result in a level of emissions that is too high from society's perspective. Such a market failure can be addressed by policy. The most efficient policy would respond to this market failure by putting an economy-wide price on the right to emit greenhouse gases. In the absence of a uniform carbon price to regulate emissions, however, other climate policy mechanisms can improve social welfare by pricing emissions indirectly. For example, putting in place emission limits and incentivizing low-carbon alternatives can make carbon-intensive technology relatively more expensive, shifting demand toward less carbon-intensive products, and thus reducing emissions. Energy efficiency standards can reduce energy use, implicitly addressing the external costs of emissions and resulting over-consumption of energy. Gasoline or oil taxes help to directly address the external costs due to emissions from the combustion of oil.

Correcting Other Market Failures

Some policies to address the climate change externality have an additional economic benefit from addressing other market failures. For example, reducing carbon dioxide emissions through lower carbon electricity generation often also reduces the emissions of local and regional air pollutants that cause damage to human health, a second environmental externality.

There are also innovation market failures where some of the returns from investment in innovation and new product development spill over to other firms from the firm engaged in innovation. For example, there is substantial evidence that the social returns from research and development

investment are much higher than the private returns due to some of the knowledge spilling over to other firms.[5] Though in principle these positive spillovers can be good for society, they prevent the innovating firms from capturing the full returns to their investments in technological innovation, resulting in less than the efficient level of investment. While not specific to the energy area, the failure to internalize the positive spillovers to research into technologies that would reduce carbon emissions is compounded by the failure to take into account the external cost of carbon emissions.

Other market failures that may be partly addressed by climate-oriented policies include information market failures due to inadequate or poor information about new clean energy or energy-efficient consumer technologies, and network effects (such as, a situation where the value of a product is greater when there is a larger network of users of that product) that consumers do not consider in their decisions on the purchase of new clean energy technologies. While not market failures, per se, vulnerability to supply disruptions and the potential macroeconomic effects of oil price shocks provide additional reasons to invest in clean transportation technologies. These factors, taken together, can lead to an underinvestment in research, as well as underinvestment in energy efficiency and deployment of clean energy, and can provide additional economic motivations for policy. For example, energy efficiency standards may help address information market failures that hamper consumers' ability to understand the energy costs of different product choices, and policies promoting clean transportation infrastructure may reduce vulnerability to oil supply disruptions.

Insurance against Catastrophe

Despite a large body of research on how human activities are changing the climate, substantial uncertainty remains around the amount and location of damages that climate change will cause. This is because there are cascading uncertainties from the interplay of key physical parameters (such as the exact magnitude of the global temperature response to the atmospheric buildup in greenhouse gases), the local and regional manifestations of global climate change, the vulnerabilities of different economic sectors, and the adaptation measures that could decrease impacts. For example, climate scientists have developed probability distributions of the sensitivity of the climate to increases in the concentration of greenhouse gases in the atmosphere, and there is some small, but non-zero probability of very high

[5] See Jaffe and Stavins (1994) or Gillingham and Sweeney (2012) for more on innovation market failures in the context of clean energy.

climate sensitivity.[6] With the possibility of significant climate sensitivity, coupled with the possibility of high future greenhouse gas emissions, the risk of irreversible, large-scale changes that have wide-ranging and potentially catastrophic consequences greatly increases. The term "tipping point" is commonly used to refer to a "critical threshold at which a tiny perturbation can qualitatively alter the state of development of a system" (Lenton et al. 2008). When it comes to climate, at a tipping point, a marginal increase in emissions could make a non-marginal—and potentially irreversible—impact on damages. Hypothetical climate tipping points could lead to catastrophic events like the disappearance of Greenland ice sheets and associated sea level rise, or the destabilization of Indian summer monsoon circulation.

It is impossible to know precisely how likely or how costly these low-probability, high-impact events, or "tail risks" are, but we do know that the associated costs and impacts on human society would be very substantial and that their likelihood increases with higher atmospheric concentrations of greenhouse gases. Economists have been increasingly interested in understanding how these tail risks should be incorporated into policy choices. A series of papers by Martin Weitzman lay out an analytical framework for understanding policy under conditions with catastrophic fat tail risks (such as the risk of a catastrophe that has more probability weight than it would in a normal distribution).[7] Weitzman's analysis points out that, under certain conditions, the expected costs of climate change become infinitely large.[8] While there has been an active debate in the literature on the conditions under which Weitzman's findings may apply, his work both underscores the importance of understanding tail risks, and provides an economic rationale for taking early action to avoid future, potentially very large risks.[9] Just as individuals and businesses routinely purchase insurance to guard against risks in everyday life, like fire, theft, or a car accident, and just as conservative safety standards guard against catastrophic failures at major infrastructure like nuclear plants and highway bridges, climate policy can be seen as protection against the economic risks—small and large—associated with climate change.

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[6] According to the IPCC, equilibrium climate sensitivity is likely in the range 1.5°C to 4.5°C (high confidence), extremely unlikely less than 1°C (high confidence), and very unlikely greater than 6°C (medium confidence) (IPCC 2013).

[7] For example, a Student's t-distribution is a fat-tailed distribution.

[8] Weitzman's "Dismal Theorem" is presented and discussed in several papers: Weitzman (2009), Weitzman (2011), and Weitzman (2014). Further analyses of the "theorem" include Newbold and Daigneault (2009), Nordhaus (2009), and Millner (2013).

[9] In fact, Weitzman's conditions are not necessary for there to be an economic motivation: there is a broader economic motivation for a precautionary policy with a sufficiently risk averse or loss averse decision-maker.

Delaying Action on Climate Change Increases Costs

When considering climate change policy from an economic perspective, it is critical to consider not just the cost of action but also the cost of inaction. Delaying climate policies may avoid or reduce expenditures in the near term, but delaying would likely increase costs substantially in the longer run. The economic literature discusses two primary mechanisms underlying the substantial increase in costs from delayed action.

First, if delay leads to an increase in the ultimate steady-state concentration of greenhouse gases, then there will be additional warming and subsequent economic damages in the long run. Using the results of a leading climate model, CEA (2014) estimates that if a delay causes the mean global temperature to stabilize at 3 degrees Celsius above preindustrial levels instead of 2 degrees, that delay will induce annual additional damages of approximately 0.9 percent of global output. (To put that percentage in perspective, 0.9 percent of output in the United States in 2015 alone was over $160 billion.) The next degree increase, from 3 degrees to 4 degrees, would incur even greater *additional* costs of approximately 1.2 percent of global output. It is critical to note that these costs would be incurred year after year.

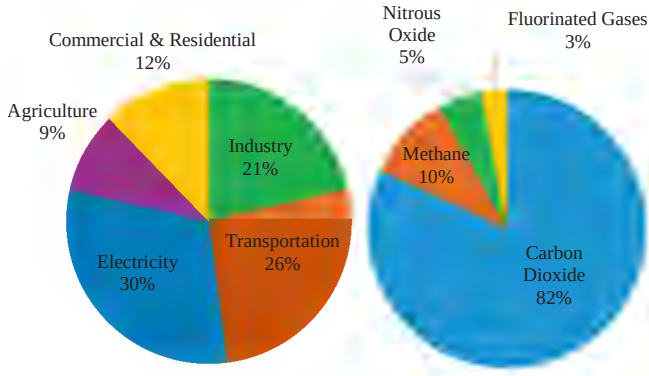
Second, if the delayed policy aims to achieve the same carbon target as a non-delayed policy, then the delayed policy will require more stringent actions given the shorter timeframe. More stringent actions will generally be more costly, though technological innovation can make future mitigation cheaper than it is today, lowering the future cost of low-carbon technologies needed to meet the target. In addition, since investment in innovation responds to policy, taking meaningful steps now sends a long-term signal to markets that the development of low-carbon technologies will be rewarded. At the same time, this signal creates a disincentive for investing in new high-carbon infrastructure that would be expensive to replace later on. CEA (2014) estimates the costs of delaying the achievement of a specific target—by these calculations, if the world tries to hit the goal stated in Paris of less than a 2-degree increase in the global mean surface temperature relative to pre-industrial levels, but waits a decade to do so, the cost of limiting the temperature change would increase by roughly 40 percent relative to meeting the goal without the decade delay.[10]

Administration Climate Policies

Since President Obama took office in 2009, the Administration has undertaken numerous steps toward both mitigating climate change and

[10] These estimates, as further described in CEA (2014), are developed from a meta-analysis of research on the cost of delay for hitting a specific climate target.

Figure 7-2
Greenhouse Gas Emissions by Type and Sector in 2014



Source: Environmental Protection Agency.

responding to its effects. Greenhouse gas emissions in the United States amounted to 6,870 million metric tons of carbon dioxide equivalents in 2014 (the most recent inventory), and these emissions are spread over several sectors, as shown in the left chart of Figure 7-2.[11] In 2014, carbon dioxide emissions made up 82 percent of total greenhouse gas emissions; methane, 10 percent; nitrous oxides, 5 percent; and fluorinated gases, 3 percent (right chart of Figure 7-2) (EPA 2016a). The electricity sector in 2014 generated the largest share of emissions—nearly a third—which together with the fact that some of the least-expensive marginal emissions reductions opportunities are in the power sector (Kaufman, Obeiter and Krause 2016) motivate the Clean Power Plan and clean energy investments (discussed below). Transportation follows with 26 percent of emissions, motivating a variety of efficiency and innovation policies in the transportation sector.[12]

The Administration's steps to address greenhouse gases cover nearly all sectors and gases. These steps help reduce emissions both now and in the longer term by promoting low-carbon electricity generation, dramatically improving energy efficiency for many products, facilitating the transition to a cleaner transportation system, reducing emissions of high-potency greenhouse gases, and bolstering our land-sector sink (the capacity of land

[11] These are gross greenhouse gas emissions. Note that the Administration's multi-year GHG reduction targets are based on GHG emissions, net of carbon sinks.
[12] The most recent EPA GHG annual inventory is from 2014. In March 2016, the rolling 12-month average emissions estimates from the U.S. Energy Information Administration suggested that transportation emissions had exceeded those from electric power generation for the first time since 1979.

uses and land management activities to remove carbon dioxide from the atmosphere). In parallel, they have also promoted resilience, with a variety of programs focused on adapting to a changing climate. This section highlights just a few of the Administration's many climate and energy initiatives. The next section discusses outcomes.

Supporting Growth of Renewable Energy

President Obama has made substantial investments in renewable energy supported by Federal policies that promote research, development, and deployment of renewable energy. These policies help address the underinvestment in renewable energy due to environmental externalities as well as the underinvestment in R&D due to knowledge spillovers. The Administration signaled its strong support for clean energy from the beginning by making a historic $90 billion investment in clean energy in the American Recovery and Reinvestment Act. The macroeconomic demand shock of the Great Recession required a bold policy response that included stimulus spending along with tax cuts and aid to affected individuals and communities. The Administration's decision to focus an important part of that spending (about an eighth of the total) on clean energy was a vital step in pushing the economy toward a cleaner energy future, and a foundational step for supporting continued progress throughout the President's eight years in office.

The Recovery Act extended and expanded the Production Tax Credit (PTC) and the Investment Tax Credit (ITC), critical policies directly focused on renewable energy. These policies provide subsidies for renewable energy production and installation to help address the unpriced externalities that place renewable energy at a disadvantage. In December 2015, the Administration secured a five-year extension of the PTC and ITC, signaling to developers that renewable energy continues to be an area worthy of greater investment (Bailey 2015).

The Recovery Act also created two new programs to support renewable energy generation: a set of loan guarantees for renewable energy project financing (the 1705 Loan Guarantee Program) and cash grants for renewable energy projects (the 1603 Cash Grant Program). The 1705 program supported construction of the first five solar PV projects over 100 MW in the United States. The 1603 program provided $25 billion to support total installed renewable energy capacity of 33.3 GW (CEA 2016c). The Act also included funding for energy efficiency projects, clean transportation, grid

modernization, advanced vehicles and fuels, carbon capture and storage, and clean energy manufacturing.[13]

Since its actions to mitigate the Great Recession, the Administration has undertaken a set of efforts to help ensure that renewable energy is accessible to all Americans and underserved communities, in particular. Launched in July 2015, the National Community Solar Partnership, part of the Administration's SunShot initiative, is fostering innovation in financing and business models and spreading best practices to facilitate adoption of solar systems in low- and moderate-income (LMI) communities.[14] The U.S. Department of Housing and Urban Development is facilitating Property Assessed Clean Energy (PACE) financing to make it easier and more affordable for households to finance investments in solar energy and energy efficiency. The Administration has set a goal to bring 1 gigawatt (GW) of solar to low- and moderate-income families by 2020, and the U.S. Department of Agriculture has awarded almost $800 million to guarantee loan financing and grant funding to agricultural producers and rural small businesses (USDA 2016). USDA programs focusing on renewable energy have resulted in support for the construction of six advanced biofuel production facilities, more than 4,000 wind and solar renewable electricity generation facilities, and more than 100 anaerobic digesters to help farm operations capture methane to product electricity (Vilsack 2016). The Administration has also set a goal for the U.S. Department of the Interior to approve 20,000 MW of renewable energy capacity on public lands by 2020, and has set ambitious annual goals for the U.S. General Services Administration to purchase minimum percentages of its electricity from renewable sources, reaching 100 percent in 2025; both of these update and expand on earlier such goals in the Energy Policy Act of 2005 (EOP 2013, EOP 2015). The Administration has also expanded opportunities to join the solar workforce with programs like the Solar Instructor Training Network, AmeriCorps funding, and Solar Ready Vets to help reach the goal of training 75,000 workers to enter the solar industry by 2020.

[13] See CEA (2016c) for more on the impacts of these policies and more detail on clean energy support provided by ARRA. Some funded programs were extended or had greater take-up than anticipated, so the total allocation of ARRA-related clean energy programs will be more than $90 billion; CEA calculations indicate that just under $90 billion of ARRA clean energy-related dollars had been spent by the end of 2015.

[14] The SunShot initiative in the U.S. Department of Energy, launched in 2011, has the goal of making solar electricity cost competitive with conventional forms of electricity generation by 2020.

Carbon Pollution Standards for Power Plants

In August 2015, the President and the EPA announced the finalization of the Clean Power Plan (CPP)—the first-ever national carbon pollution standards for existing power plants. This historic action by the United States to address environmental externalities from carbon dioxide emissions focuses on the power sector, the source of just under a third of all greenhouse gas emissions and the largest source of U.S. carbon dioxide emissions in 2014 (EPA 2015c).

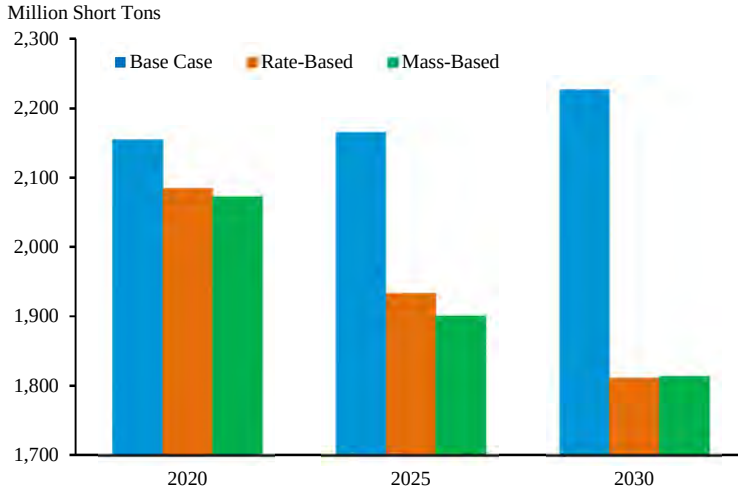
Consistent with the framework set out in the Clean Air Act, the CPP sets emission performance rates for fossil fuel-fired power plants based on the best system of emission reduction the EPA found was available, considering cost, energy impacts, and health and environmental impacts. The CPP translates those rates into state-specific goals and provides states with broad flexibility to reach the goals. For example, a state can choose a mass-based standard, which limits the total number of tons of carbon dioxide from regulated plants and can be achieved with a cap-and-trade system or another policy approach of the state's choice. As an alternative, the state can comply with a rate-based standard, whereby the state requires regulated sources to meet a specified emissions rate (the amount of emissions generated per unit of electricity produced) through a number of policy approaches. This flexibility allows states to choose cost-effective approaches to reducing emissions that are tailored to meet the state's own policy priorities.[15] Further, for greater economic efficiency gains, the CPP permits emissions trading across states; affected electric generation units (EGUs) can trade emissions credits with EGUs in other states with compatible implementation plans (EPA 2015c).

When the CPP is fully in place,[16] CO_2 emissions from the electric power sector are projected to be 32 percent below 2005 levels by 2030, resulting in 870 million tons less carbon pollution in 2030, equivalent to the annual emissions of 166 million cars (EPA 2015b, 2015c). Not only will the CPP help mitigate climate change, but it will also protect the health of American families by reducing asthma attacks in children and preventing premature deaths and non-fatal heart attacks by reducing emissions of other harmful air pollutants, and will help to provide an incentive for further

[15] From an economic perspective, the mass-based approach may be preferable because it does not create incentives to expand electricity production to facilitate compliance and does not require verification of demand reductions due to energy efficiency policies and investments (Fowlie et al. 2014).

[16] Implementation of the CPP has been stayed by the Supreme Court. The Administration is confident that it will be upheld in court as it is consistent with Supreme Court decisions, EPA's statutory authority, and air pollution standards that EPA has put in place to address other air pollution problems.

Figure 7-3
Clean Power Plan Projected Carbon Dioxide Emissions



Source: Environmental Protection Agency.

innovation to lower the costs of low-carbon energy (EPA 2015b). Given the combined effects of changes in average retail electricity rates and lower electricity demand, EPA projects that average electricity bills will decline by 3-4 percent in 2025, and by 7-8 percent in 2030, due to the CPP (EPA 2015c). Figure 7-3 shows the projected emissions reductions under the CPP. The base case bars refer to a world with all other current policies, while the rate-based and mass-based bars indicate what carbon dioxide emissions from the power sector are projected to be under the CPP if all states opt for each type of plan.

The rigorous benefit-cost analysis performed for the CPP projects that it would generate substantial net benefits to the U.S. economy. Given the flexibility afforded states in compliance with the CPP's emissions guidelines, estimates of benefits and costs are not definitive—both benefits and costs will depend on the compliance approaches states actually choose. Using Federal estimates of the social cost of carbon dioxide (SC-CO2), discussed further below, along with estimates of the co-benefits from the CPP's reductions in health damages from fine particulate matter and ozone, the CPP's regulatory impact analysis projects net benefits to the U.S. economy in 2020 of $1.0 billion to $6.7 billion, depending on the compliance approaches states choose. Net benefit estimates increase significantly in later years, with

a projected range of $16 billion to $27 billion in 2025, and $25 billion to $45 billion in 2030 (EPA 2015c).[17]

Improving Energy Efficiency and Conservation

Improved energy efficiency reduces emissions and, by correcting environmental externalities or information market failures, can also improve economic efficiency. Administration initiatives have already succeeded in improving energy efficiency in millions of homes around the country, reducing energy costs, and cutting energy use by the Federal Government, with greater improvements expected in future years. Technological shifts have aided greatly in efficiency improvements. For example, LED lighting has seen a nearly 90 percent decrease in cost per kilolumen since 2008. The costs of lithium-ion battery packs for electric vehicles have fallen from above $1,000/kWh in 2007 to under $410/kWh in 2014, with estimates for leading manufacturers coming in as low as $300/kWh (Nykvist and Nilsoon 2015; DOE 2015).

In the President's first term, the departments of Energy and Housing and Urban Development completed energy efficiency upgrades in over 1 million homes, saving families on average more than $400 each on their heating and cooling bills in the first year alone (EOP 2016). The President also launched the Better Buildings Challenge in 2011, a broad, multi-strategy initiative to improve energy use in commercial, industrial, residential, and public buildings by 20 percent by 2020 (DOE 2016b). More than 310 organizations have committed to the Better Buildings Challenge, and the partners have saved over 160 trillion Btus of energy from 2011 to 2015, leading to $1.3 billion in reduced energy costs (DOE 2016d).

Since 2009, the Department of Energy's Building Technologies Office has issued 42 new or updated energy efficiency standards for home appliances, which are projected to save consumers more than $540 billion on their utility bills through 2030, and to cut carbon dioxide emissions by 2.3 billion metric tons (DOE 2016a). The products covered by standards represent about 90 percent of home energy use, 60 percent of commercial

[17] The regulatory impact analysis for the CPP reports estimates in constant 2011 dollars. In 2015 dollars, the net benefits to the U.S. economy would be $1.1 to $7.1 billion in 2020, $17 to $27 billion in 2025, and $26 to $47 billion in 2030. The CPP applies to existing power plants. In October 2015, the EPA issued final carbon pollution standards for newly constructed, modified, or reconstructed fossil-fuel-fired power plants. Due to projected market conditions (particularly the expectation of continued low natural gas prices, which make it likely that any new plants would comply with the rule's requirements even if it were not in place), analyses performed by the EPA and the U.S. Energy Information Administration (EIA) indicate that the new source standards will have negligible impacts on emissions, as well as negligible economic benefits and costs. Should gas prices rise significantly, the rule is projected to generate significant net benefits (EPA 2015d).

Box 7-1: Quantifying the Benefits of Avoided Carbon Emissions

Benefit-cost analysis is the well-known approach to determining whether any given policy will provide net benefits to society. Benefit-cost analysis of a policy that yields reductions of greenhouse gas emissions requires an estimate of the benefits of those reductions. The question is non-trivial, as estimating the impact of marginal increases in emissions requires calculations over long time spans and distributions of climate sensitivities and socioeconomic outcomes. To take on this task, the Obama Administration established a Federal Interagency Working Group (IWG) in 2009 to develop estimates of the value of damages per ton of carbon dioxide emissions (or, conversely, the benefits per ton of emissions reductions). The resulting social cost of carbon dioxide (SC-CO2) estimates, developed in 2009-10, provide consistent values based on the best available climate science and economic modeling, so that agencies across the Federal Government could estimate the global benefits of emissions reductions. Before these estimates were available, impacts of rules on greenhouse gas emissions had been considered qualitatively, or had been monetized using values that varied across agencies and rules. Creating a single SC-CO2 was an important step in ensuring that regulatory impact analysis of Federal actions reflects the best available estimates of the benefits of reducing greenhouse gas emissions.

The IWG updated the original 2010 SC-CO2 estimates in May 2013 to incorporate refinements that researchers had made to the underlying peer-reviewed models. Since then, minor technical revisions have been issued twice—in November 2013 and in July 2015. Both of

Table 7-i

Social Cost of CO_2, 2010–2050 (in 2007 Dollars Per Metric Ton of CO_2)

Discount Rate Year	5% Average	3% Average	2.5% Average	High Impact (95^{th} Pct at 3%)
2010	10	31	50	86
2015	11	36	56	105
2020	12	42	62	123
2025	14	46	68	138
2030	16	50	73	152
2035	18	55	78	168
2040	21	60	84	183
2045	23	64	89	197
2050	26	69	95	212

Source: Interagency Working Group (2016).

these resulted in insignificant changes to the overall estimates released in May 2013. The IWG also sought independent expert advice from the National Academies of Sciences, Engineering, and Medicine (NAS) to inform future updates of the SC-CO2 estimates. In August 2016, the IWG updated its technical support document to incorporate January 2016 feedback from the NAS by enhancing the presentation and discussion of quantified uncertainty around the current SC-CO2 estimates. The NAS Committee recommended against a near-term update of the estimates. Also in August 2016, the IWG issued new estimates of the social costs of two additional GHGs, methane (CH_4) and nitrous oxide (N_2O), applying the same methodology as that used to estimate the SC-CO2 (IWG 2016a).

To estimate the SC-CO2, SC-CH4, and SC-N2O, three integrated assessment models (IAMs) are employed. IAMs couple models of atmospheric gas cycles and climate systems with aggregate models of the global economy and human behavior to represent the impacts of GHG emissions on the climate and human welfare. Within IAMs, the equations that represent the influence of emissions on the climate are based on scientific assessments, while the equations that map climate impacts to human welfare ("damage functions") are based on economic research evaluating the effects of climate on various market and non-market sectors, including its effects on sea level rise, agricultural productivity, human health, energy-system costs, and coastal resources. Estimating the social cost of emissions for a given GHG at the margin involves perturbing the emissions of that gas in a given year and forecasting the increase in monetized climate damages relative to the baseline. These incremental damages are then discounted back to the perturbation year to represent the marginal social cost of emissions of the specific GHG in that year.

The estimates of the cost of emissions released in a given year represent the present value of the additional damages that occur from those emissions between the year in which they are emitted and the year 2300. The choice of discount rate over such a long time horizon implicates philosophical and ethical perspectives about tradeoffs in consumption across generations, and debates about the appropriate discount rate in climate change analysis persist (Goulder and Williams 2012; Arrow, et al. 2013; Arrow, et al. 2014). Thus, the IWG presents the SC-CO2 under three alternative discount rate scenarios, and, given the potential for lower-probability, but higher-impact outcomes from climate change, a fourth value is presented to represent the estimated marginal damages associated with these "tail" outcomes (IWG 2015, IWG 2016b). All four current estimates of the SC-CO2, from 2010 to 2050, are below.

Sources: IWG (2013, 2015, 2016a, 2016b), Goulder and Williams (2012), Arrow et al (2013, 2014).

building use, and 30 percent of industrial energy use, which taken cumulatively, represented around 40 percent of total primary energy use in 2015.[18] By 2030, the cumulative operating cost savings from all standards in effect since 1987 will reach nearly $2 trillion, with a cumulative reduction of about 7.3 billion tons of CO_2 emissions (DOE 2016a).

Pricing the external costs from greenhouse gas emissions would increase the likelihood of consumers adopting these options on their own, but when the greenhouse gas-emitting energy is underpriced, then programs to help move consumers toward a more energy-efficient outcome can improve economic efficiency. Each of these standards has been subject to rigorous benefit-cost analysis, and each has economic benefits in excess of costs. This demonstrates that such standards not only reduce GHG emissions, but do so in an economically efficient way. For example, new rules for commercial air conditioning and heating equipment sold between 2018 and 2048 are projected to have net economic benefits of $42 billion to $79 billion (DOE 2016c).[19]

Addressing Transportation Sector Emissions

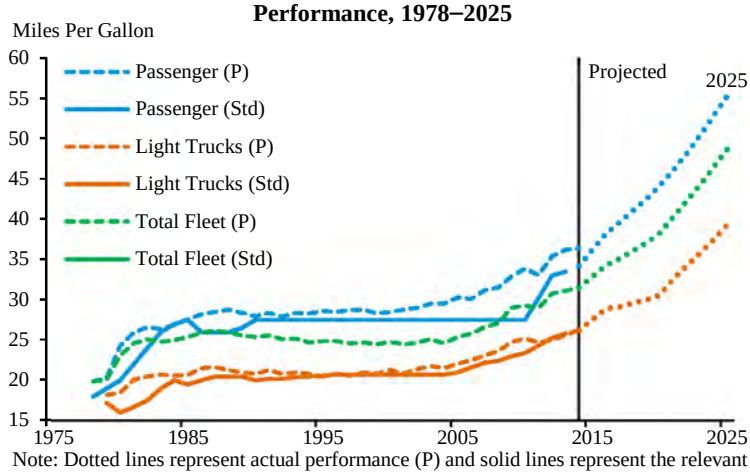
Since 2009, President Obama has implemented policies that reduce emissions from the transportation sector—one of the largest sources of U.S. greenhouse gas emissions (EPA 2016a). Again, these policies can help internalize environmental externalities and address information market failures. Through improvements to the fuel economy of gasoline- and diesel-powered cars and trucks, and the technological progress that has been made on hybrid and electric drivetrains, the transportation sector has made substantial improvements to date, and the Administration has put policies in place to increase the likelihood that these improvements will continue for years to come. In addition, the Administration has continued to implement rules on Renewable Fuel Standards in ways that reduce the carbon intensity of our transportation sector.

Under this Administration, the EPA and the National Highway Traffic Safety Administration have issued GHG emission and fuel economy standards for light-duty passenger vehicles and the first-ever GHG and fuel economy standards for medium- and heavy-duty trucks. The latest set of standards for passenger vehicles will reduce new vehicle GHG emissions by nearly a half and approximately double the average new vehicle fuel economy

[18] Calculation based on total energy use by sector from the EIA's Monthly Energy Review (MER), Table 2.1.

[19] The net benefits of these new rules are represented in 2014 dollars. In 2015 dollars, these rules are expected to have slightly higher net benefits that round to the same figures ($42 to $79 billion).

Figure 7-4
Corporate Average Fuel Economy Standards and Performance, 1978–2025



Note: Dotted lines represent actual performance (P) and solid lines represent the relevant fuel economy standard (Std). Projections are based on the CAFE MY 2017–2025 standards and assume that fuel economy performance meets the standards.
Source: National Highway Traffic Safety Administration.

(NHTSA 2012). Combined, the Phase 1 and Phase 2 GHG and fuel economy standards for light-duty vehicles are projected to reduce GHG emissions by 6 billion metric tons over the lifetime of vehicles sold from 2012 to 2025 (EPA 2012). Building on the first-ever GHG and fuel economy standards for new medium- and heavy-duty vehicles built between 2014 and 2020, issued in 2011, EPA and NHTSA finalized "Phase 2" standards in 2016 that will further raise fuel economy for these vehicles through 2027. Combined, the Phase 1 and Phase 2 heavy-duty vehicle standards are expected to reduce GHG emissions by 2.5 billion metric tons over the lifetime of vehicles sold from 2014 to 2029 (EPA and NHTSA 2016).

Achieving these goals will require a variety of innovations and investments by automobile firms that have been challenging thus far because emissions carry no price, consumers often undervalue fuel efficiency, and vehicle purchasers are not always the entities paying for the fuel.[20] These investments may unlock new technologies to further reduce transportation emissions. For example, firms with innovative low-emissions technologies may sell compliance credits or license technology to other firms, given the flexibility provisions in the vehicle emissions standards, providing an

[20] The lack of investment may be due to multiple market failures including from the unpriced positive externalities from innovation (Bergek, Jacobsson, and Sandén 2008).

Box 7-2: Investing in Clean Energy Research and Development

Research and development in clean energy is essential to climate change mitigation because improved technologies will reduce the cost of producing and distributing clean energy. The research and development (R&D) market failure from imperfect appropriability of innovations—in which innovations spill over to other firms and the innovative firm cannot fully capture the returns—is particularly important in early stage R&D because the private return to basic innovation is relatively low and the social return is high. The gap between social and private returns to clean energy innovations is magnified by the additional environmental externalities that private firms do not internalize (Nordhaus 2011). Since many clean energy technologies are in fledgling stages and require foundational developments, the R&D market failure leads to significant underinvestment in R&D for those technologies, suggesting a role for policy.

The Obama Administration has made significant investments in clean energy R&D. The American Recovery and Reinvestment Act directed a substantial amount of its $90 billion in clean energy funding to research and development. This included funding for the Advanced Research Projects Agency – Energy (ARPA-E) program, which funds clean energy projects that are in early innovation stages and have high potential societal value. ARPA-E's first projects were funded by the Recovery Act, and it has since sponsored over 400 energy technology projects. The Recovery Act set a precedent for continued investment in clean energy R&D; subsequent fiscal budget proposals have included significant funding to continue such programs.

The 2013 Climate Action Plan structured the Administration's continuing commitment to investment in clean energy R&D. Consistent with the goals of the Plan, the DOE's Office of Energy Efficiency and Renewable Energy (EERE) launched the SunShot Initiative, which funds solar energy R&D. The EERE Wind Program funds R&D activity in wind energy technologies, including offshore and distributed wind. EERE's Geothermal Technologies Office conducts research on geothermal systems in order to lower the risks and costs of geothermal development and exploration. Additionally, EERE supports R&D in cleaner transportation technologies through a variety of programs: the Hydrogen and Fuel Cells Program funds basic and applied research to overcome the technical barriers of hydrogen production, delivery and storage technologies as well as fuel cell technologies. The Bioenergy program supports R&D in sustainable biofuels, with a focus on advanced biofuels that are in earlier stages of development but can take advantage of existing transportation infrastructure by providing functional substitutes for crude oil, gasoline,

diesel fuel and jet fuel. The Vehicles Technologies Office funds R&D to encourage deployment of electric cars by developing advanced batteries, electric drive systems and lightweight vehicles. These efforts combined represent billions of dollars invested in clean energy R&D.

Public investment in R&D helps correct for private underinvestment due to market failures and moves investment toward efficient levels, allowing for cost reductions in clean energy use. Clean energy technology costs have declined significantly since 2008, and the Administration's R&D investments supported this trend. More importantly, these investments will help to ensure that positive trends in clean energy penetration and greenhouse gas emissions reductions continue into the future, since the economic benefits of R&D—particularly in early stage innovations—accrue over a very long time horizon.

Source: Nordhaus (2011).

incentive for innovation.[21] Figure 7-4 shows fuel economy standards over time, including the major increase since 2008, and further increases projected through 2025.

In March 2012, the Administration launched "EV Everywhere," an electric vehicle Grand Challenge that seeks to make electric vehicles as affordable and convenient to own as gasoline-powered vehicles within the next decade (DOE 2012). Much of the focus of this initiative is to foster early-stage innovation, an endeavor that helps to address innovation market failures since the social return from such innovation is greater than the private return. EV Everywhere has already spurred dramatic technological and cost improvements in EV technology. In addition, since 2010, DOE investments through the Grand Challenge have contributed to a 50-percent reduction in the modeled high-volume cost of electric vehicle batteries, and DOE has invested in industry, national laboratory, and university projects that explore how to make EV batteries even more efficient and cost-effective (Brescher Shea 2014). Since the program's launch, hundreds of employers have joined the Workplace Charging Challenge pledging to provide charging access for their employees (DOE 2016f). These policies are examples of some of the incentives the Administration has implemented to support EVs; others include tax credits for purchase of electric vehicles, support for domestic electric vehicle battery manufacturing, and more than $6 billion in Recovery Act funds for programs to promote research and development of

[21] Economic theory and empirical evidence suggest that trading and other market-based approaches provide greater incentives for technological innovation than do prescriptive regulations that would achieve the same level of emissions reduction (Keohane 2003; Popp 2003).

advanced vehicle technologies (CEA 2016c). Much like owning a car was difficult until enough people had cars that gas stations were plentiful, the network effects of electric vehicles provide an economic case for a policy push supporting the necessary services to move the industry toward critical mass.

Reducing Emissions from High Potency Greenhouse Gases

To further help address the environmental externality from greenhouse gas emissions, the Administration has also developed policies to reduce the emissions of other potent greenhouse gases, such as hydro-fluorocarbons (HFCs) and methane. When the President launched his Climate Action Plan in June 2013, he pledged to reduce emissions of HFCs through both domestic and international leadership (EPA 2016b). Through actions like leader-level joint statements with China in 2013 and with India in 2016, the United States has led global efforts to secure an ambitious amendment to the Montreal Protocol to phase down HFCs. In October 2016, the 197 Parties to the Montreal Protocol agreed to amend the Protocol to phase down HFC use in developed countries beginning in 2019, and to freeze HFC use in developing countries in 2024, though some will wait until 2028 (UNEP 2016).

At the same time, the Administration has taken important steps to reduce HFC consumption domestically under EPA's Significant New Alternatives Policy, a Clean Air Act program under which EPA identifies and evaluates substitutes for industrial chemicals and publishes lists of acceptable and unacceptable substitutes. The Administration has also announced a suite of private-sector commitments and executive actions that are projected to reduce HFCs equivalent to more than 1 billion metric tons of carbon dioxide emissions globally through 2025.

The President has also taken steps to reduce methane emissions, which accounted for 10 percent of U.S. greenhouse gas emissions in 2014.[22] In January 2015, the Administration set a goal of reducing methane emissions from the oil and gas sector by 40 to 45 percent from 2012 levels by 2025, which would save up to 180 billion cubic feet of natural gas in 2025—enough to heat more than 2 million homes for a year. The Administration's commitment to this goal was reaffirmed and strengthened in March 2016 in a joint statement with Prime Minister Justin Trudeau of Canada, in which both countries pledged to reduce methane emissions from the oil and gas sector and to explore new opportunities for additional reductions. In May 2016, EPA finalized methane pollution standards for new and modified

[22] This is based on the U.S. EPA's emissions inventory, for which the most recent data are from 2014. More recent research suggests that U.S. methane emissions may be much higher than the estimates underlying EPA's 2014 inventory (Turner et al. 2016; Schwietzke et al. 2016).

Box 7-3: Building Resilience to Current and Future Climate Change Impacts

The Obama Administration has implemented many policies and actions to support and enhance climate resilience. For example, in 2013, the President signed an Executive Order that established an interagency Council on Climate Preparedness and Resilience and a State, Local, and Tribal Leaders Task Force made up of governors, mayors, county officials, and Tribal leaders from across the country. The Task Force developed recommendations on how to modernize Federal Government programs to incorporate climate change and support community resilience to its impacts. The Administration has responded to a number of these recommendations, for example, by implementing the National Disaster Resilience Competition that made nearly $1 billion available for resilient housing and infrastructure projects to states and communities that had been impacted by major disasters between 2011 and 2013. Government agencies have also provided additional support for Federal-Tribal Climate Resilience and support for reliable rural electric infrastructure. In addition, the Administration developed and launched a Climate Data Initiative and Climate Resilience Toolkit to improve access to climate data, information, and tools. A new Resilience AmeriCorps program was also established; through this program, AmeriCorps VISTA members are recruited and trained to serve low-income communities across the country by developing plans and implementing projects that increase resilience-building capacity.

The Department of Transportation (DOT) now includes improving resilience to the impacts of climate change as a primary selection criteria for its Transportation Investment Generating Economic Recovery (TIGER) grants, which provide $500 million in Federal funds to improve transportation infrastructure while generating economic recovery and enhancing resilience in communities (DOT 2016). Similarly, the newly created FASTLANE grant program includes improving resilience to climate impacts as a primary selection criterion. In 2014, USDA created Climate Hubs in partnership with universities, the private sector, and all levels of government to deliver science-based information and program support to farmers, ranchers, forest landowners, and resource managers to support decision-making in light of the increased risks and vulnerabilities associated with a changing climate.

President Obama has also used executive action to establish a clear, government-wide framework for advancing climate preparedness, adaptation, and resilience, and directed Federal agencies to integrate climate-risk considerations into their missions, operations, and cultures. As of 2016, 38 Federal agencies have developed and published climate

adaptation plans, establishing a strong foundation for action (Leggett 2015). These plans will improve over time, as new data, information, and tools become available, and as lessons are learned and actions are taken to effectively adapt to climate change through agencies' missions and operations.

The Administration is developing government-wide policies to address shared challenges where a unified Federal approach is needed. For example, the Federal Government is modernizing its approach to floodplain management through the establishment of the Federal Flood Risk Management Standard (pursuant to E.O. 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input), in part to ensure that Federally funded projects remain effective even as the climate changes and flood risk increases. To promote resilience to wildfire risks, E.O. 13728, Wildland-Urban Interface Federal Risk Mitigation, directs Federal agencies to take proactive steps to enhance the resilience of Federal buildings to wildfire through the use of resilient building codes. E.O. 13677, Climate Resilient International Development, promotes sound decision making and risk management in the international development work of Federal agencies. Pursuant to E.O. 13677, the Department of the Treasury, the U.S. Agency for International Development, the Millennium Challenge Corporation, the State Department, the U.S. Department of Agriculture, and other Federal agencies with international development responsibilities have established guidelines and criteria to screen projects and investments against potential climate impacts, with a goal of making these investments more climate resilient.

In March 2016, the President signed a Presidential Memorandum: Building National Capabilities for Long-Term Drought Resilience with an accompanying Action Plan. Drought routinely affects millions of Americans and poses a serious and growing threat to the security of communities nationwide. The Memorandum lays out six drought-resilience goals and corresponding actions, and permanently establishes the National Drought Resilience Partnership (NDRP) as an interagency task force responsible for coordinating execution of these actions. These actions build on previous efforts of the Administration in responding to drought and are responsive to input received during engagement with drought stakeholders, which called for shifting focus from responding to the effects of drought toward supporting coordinated, community-level resilience and preparedness.

Sources: DOT 2016, Leggett 2015.

sources in the oil and gas sector, and the agency has taken the first steps toward addressing existing sources under forthcoming standards. EPA regulations promulgated in July 2016 will substantially reduce emissions of methane-rich gases from municipal solid waste landfills.

Promoting Climate Resilience

Even with all of the efforts to reduce emissions, the impacts of climate change are already occurring and will continue into the future. From an economic perspective, optimal responses to climate change would balance the costs of mitigation, the costs of adaptation, and the residual damages of climate change. Moreover, ideally, policies to encourage climate resilience would be informed by research on the degree of anticipated private investment in adaptation, and any anticipated gaps in such investment based on market failures or other factors. Relative to research on climate change damages and the impacts of mitigation, economic research on resilience is less developed, however, making it difficult to quantify the impacts of specific policies.

The economic literature suggests that some impacts of climate change, particularly the rise in extreme temperatures, will likely be partly offset by increased private investment in air conditioning (Deschênes 2014; Deschênes and Greenstone 2011; Barreca et al. 2016), and that movement to avoid temperature extremes, either spending more time indoors in the short run, or relocating in the long run, could also reduce climate impacts on health (Deschênes and Moretti 2009; Graff Zivin and Neidell 2014). Similarly, in the agricultural sector, farmers may switch crops, install or intensify irrigation, move cultivated areas, or make other private investments to adapt to a changing climate. Farmers are likely to make at least some investments that yield net benefits in the long run, though existing evidence is mixed regarding the likely extent and impact of private adaptive responses in agriculture (Auffhammer and Schlenker 2014; Schlenker and Roberts 2009; Fishman 2012). In terms of extreme events, countries that experience tropical cyclones more frequently appear to have slightly lower marginal damages from a storm (Hsiang and Narita 2012), suggesting some adaptive response. Recent work finds no evidence of adaptation to hurricane frequency in the United States, but significant evidence exists of adaptation for other Organization for Economic Cooperation and Development (OECD) countries (Bakkensen and Mendelsohn 2016).

Private adaptation measures are costly, and the extent to which they will mitigate climate impacts is uncertain. The costs of not enhancing resilience to climate impacts, though also uncertain, may be higher. From an economic perspective, building resilience to the current and future impacts

of climate change—a critical component of the President's Climate Action Plan—is prudent planning and akin to buying insurance against the future damages from climate change and their uncertain impacts.

Progress To-Date in Transitioning to A Clean Energy Economy

In recent years, the U.S. energy landscape has witnessed several large-scale shifts, with technological advances greatly increasing domestic production of petroleum and natural gas while renewable energy sources, particularly wind and solar energy, have concurrently seen a sharp rise in production. These shifts provide important context for the progress on decreasing greenhouse gas emissions, energy intensity, and carbon intensity. For example, renewable production provides zero carbon energy, while the rise in natural gas electricity generation, a relatively lower-carbon fossil fuel, has displaced some coal-based energy generation that had higher carbon content.

In the past decade, the United States has become the largest producer of petroleum and natural gas in the world (EIA 2016). U.S. oil production increased from 5 million barrels a day (b/d) in 2008 to a peak of 9.4 million b/d in 2015, which sizably reduced U.S. oil imports. More importantly for climate outcomes, U.S. natural gas production increased from 20 trillion cubic feet (Tcf) in 2008 to 27 Tcf in 2015. Both increases were largely due to technological advances combining horizontal drilling, hydraulic fracturing, and seismic imaging.

The U.S. energy sector has simultaneously undergone a transformation toward lower-carbon energy resources. The United States has both reduced the energy intensity of its economic activity and shifted toward cleaner energy sources, both of which have reduced emissions. This section documents the progress made to date in the transition to a clean energy economy and analyzes the contribution of different factors to that transition. The analysis considers the role of increased renewable energy production that provided additional zero carbon energy; increased energy efficiency that reduced energy consumption for a given amount of economic output; domestic natural gas production that reduced gas prices relative to coal; and shocks to the economy that affected the level of GDP, most notably the Great Recession.

Reduced Growth in Greenhouse Gas Emissions

Greenhouse gas emissions, dominated by carbon dioxide emissions, grew fairly steadily until 2008 (EPA 2016a). Since 2008, both carbon dioxide

emissions and total greenhouse gas emissions have been declining (Figure 7-5). Although the economic downturn in 2008-09 certainly contributed, Figure 7-5 shows that emissions have declined since 2008, while GDP has risen after a drop in the beginning of the period. Figure 7-6 shows that the decline since 2008 in carbon dioxide emissions from the electric power sector, which made up roughly 30 percent of total emissions in 2014, has been particularly noticeable (EPA 2016a). In fact, carbon dioxide emissions from electricity generation in 2015 were the lowest since 1992, after peaking in 2007; and in the first half of 2016, carbon dioxide emissions from the U.S. energy sector were at the lowest level in 25 years (EIA 2016b).

The decline in emissions, which has continued even as the economy has recovered, largely stemmed from two major shifts in U.S. energy consumption patterns over the past decade: a decline in the amount of energy that is consumed per dollar of GDP and a shift toward cleaner energy. The amount of energy used to produce one dollar of real GDP in the United States, or the energy intensity of real GDP, has declined steadily over the past four decades and, in 2015, stood at less than half of what it was in the early 1970s (Figure 7-7). Since 2008, the energy intensity of real GDP has fallen by almost 11 percent (Figure 7-8).[23] Meanwhile, cleaner energy sources like natural gas and zero-emitting sources like renewables have increasingly displaced the use of dirtier fossil fuel sources. This shift has led to an even larger decline in carbon emissions per dollar of real GDP, which was more than 18-percent lower in 2015 than it was in 2008 (Figure 7-8).

The next subsections discuss these trends, followed by an analysis of how each trend contributed to the decline in carbon dioxide emissions.

Declining Energy Intensity

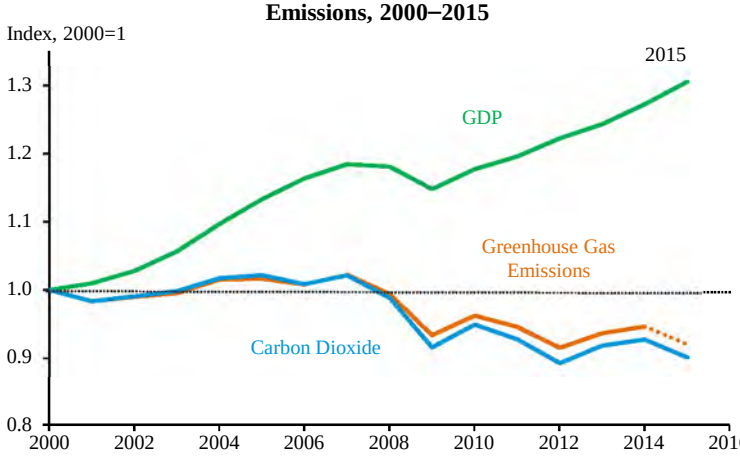
Total U.S. energy consumption has been falling—with consumption in 2015 down 1.5 percent relative to 2008. The fact that the U.S. economy is using less energy while continuing to grow reflects a decline in overall energy intensity that is due to both more efficient use of energy resources to complete the same or similar tasks and to structural shifts in the economy that have led to changes in the types of tasks that are undertaken. The continuation of these changes, which have been occurring for decades (Figure 7-7), is spurred by market forces, and the increasing efficiency in the use of energy resources is supported by energy efficiency policies.

This continual trend of declining economy-wide energy intensity was also predictable based on historical projections from the U.S. Energy

[23] The uptick in 2012 in Figure 7-8 is due to a number of early nuclear plant closures.

Figure 7-5

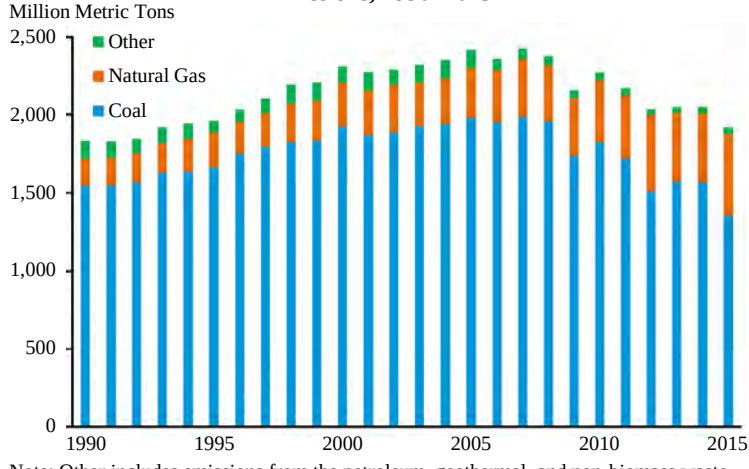
GDP and Greenhouse Gas and Carbon Dioxide Emissions, 2000–2015



Note: Total emissions from EPA is available through 2014; 2014–2015 trend is estimated using change in CO_2 emissions from the energy sector from the EIA.
Source: Environmental Protection Agency, Energy Information Administration, and Bureau of Economic Analysis.

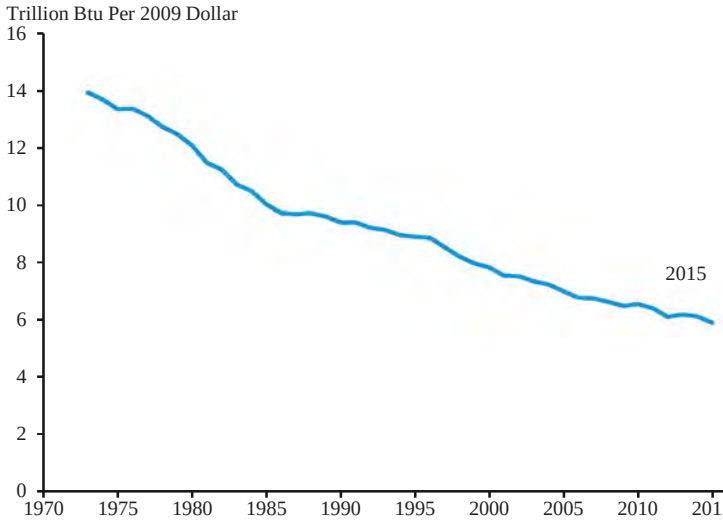
Figure 7-6

Electric Power Sector Carbon Dioxide Emissions, 1990–2015



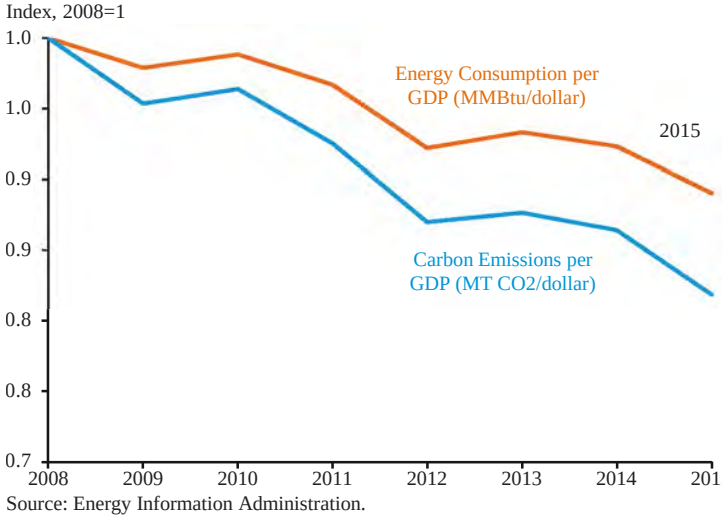
Note: Other includes emissions from the petroleum, geothermal, and non-biomass waste electric sectors.
Source: Energy Information Administration.

Figure 7-7
Energy Intensity of Real U.S. GDP, 1973–2015



Source: Energy Information Administration.

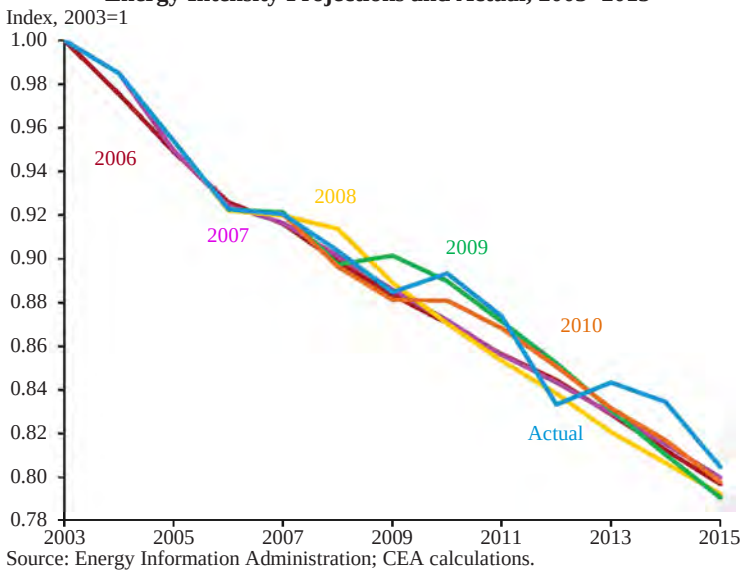
Figure 7-8
Carbon Emissions and Energy Consumption per Real U.S. GDP, 2008–2015



Source: Energy Information Administration.

Figure 7-9

Energy Intensity Projections and Actual, 2003–2015



Source: Energy Information Administration; CEA calculations.

Information Administration (EIA).[24] Figure 7-9 plots both the observed decline in energy intensity in the U.S. economy, as well as EIA projections of the decline in energy intensity going back to 2003.[25] Not only has the decline in energy intensity been relatively steady, but it has tracked closely with predictions. Changes in energy intensity come from policy as well as technological and behavioral shifts. The fact that it has been predicted to decrease over time comes from assumptions that technology will continue to develop and policies will continue to encourage efficiency. With the extensive energy efficiency policies implemented by the Administration since 2009, EIA projects energy intensity to decline another 17 percent by 2025 (EIA 2016a).[26]

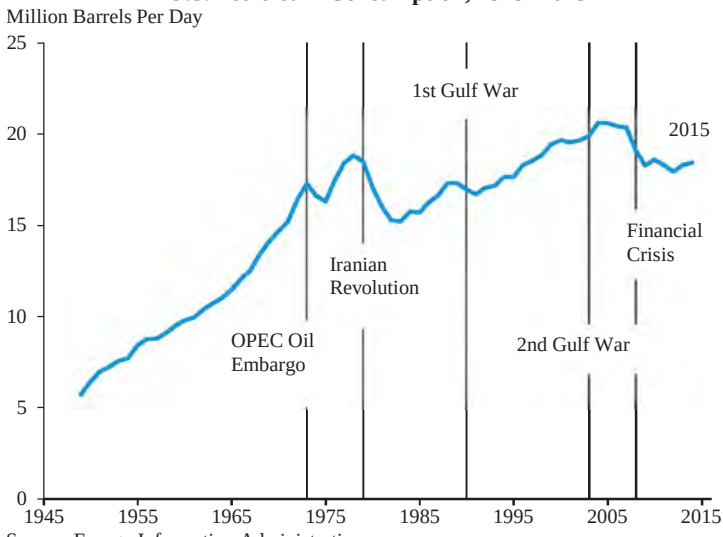
Although the aggregate energy intensity has been steadily and predictably moving downward, aggregation masks differences across sectors of the economy. One notable example is the transportation sector, which has driven a decline in U.S. petroleum consumption relative to both recent levels and past projections.

[24] EIA forecasts do include existing policies, as well as finalized policies with impacts in the future that have been projected at the time of the forecast.

[25] Figures 7-9, 7-12, 7-13, and 7-14a to 7-14c use an index, with actual U.S. energy intensity in 2003 set equal to 1.0, and actual and projected energy intensity since 2003 expressed relative to that baseline. Projections use annual (negative) growth rates for energy intensity from the 2006, 2007, 2008, 2009, and 2010 EIA Annual Energy Outlook.

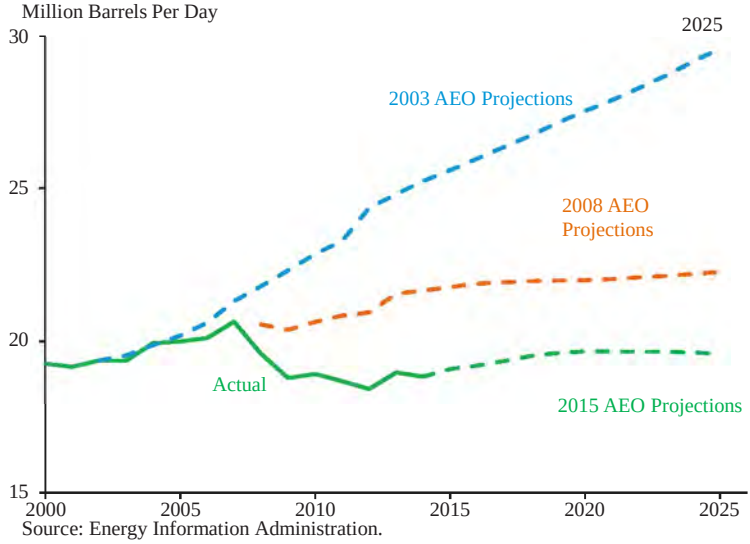
[26] Energy intensity (QBtu / GDP) metric is calculated from AEO 2016 reference case projections of annual energy use and GDP (EIA 2016a).

Figure 7-10
U.S. Petroleum Consumption, 1949–2015



Source: Energy Information Administration.

Figure 7-11
Total U.S. Petroleum Consumption, 2000–2025



Source: Energy Information Administration.

Petroleum consumption was 2 percent lower in 2015 than it was in 2008 (EIA 2016b), while the economy grew more than 10 percent over this same period. In fact, petroleum consumption peaked in 2004, and the subsequent decline over the next several years surprised many analysts (Figure 7-10). The actual consumption of oil in 2015 was more than 25 percent below EIA projections made in 2003 for consumption that year. Moreover, the surprising decline in consumption relative to past projections is expected to grow over the next decade to 34 percent in 2025 (Figure 7-11). This trend through 2014 was primarily attributed to a population that was driving less and to rising fuel economy in the light-duty fleet.[27]

With this petroleum consumption surprise, the energy intensity in the transportation sector has declined beyond that which was projected by EIA in 2003, as seen in Figure 7-12.

In contrast, the residential sector showed less of a decline in energy intensity than was projected by EIA in 2003, and even than in some later projections (Figure 7-13). The actual residential energy intensity did decline substantially—likely due in part to energy efficiency standards—but sits above the level that was projected in most prior years for 2015. This greater-than-expected energy intensity in the residential sector may be due to factors such as new electronic appliances being plugged in, a slow-down of replacement of older appliances after the economic recession began in 2008, or a shift in preference for house size or energy consumption at home.

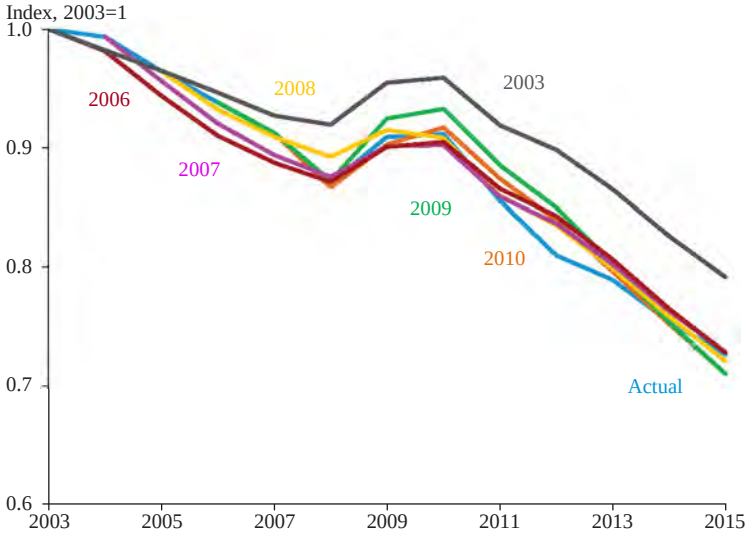
Energy intensity in the electric power and commercial sectors (Figures 14a and 14c, respectively) in 2015 tracked quite closely to prior projections. Actual 2015 energy intensity in the industrial sector (Figure 7-14b) was below what would have been predicted in 2003, though closer to later predictions.

Declining Carbon Intensity

While the energy intensity of the economy has continued a relatively steady downward trend, carbon intensity—carbon emissions per unit of energy consumed—has had a much more dramatic shift, relative to projections, in the past decade. Projections made in 2008 and in prior years showed carbon intensity holding relatively steady. However, since 2008, carbon intensity has fallen substantially and continues to fall—leading to revised projections nearly every single year. Figure 7-15a shows the observed carbon

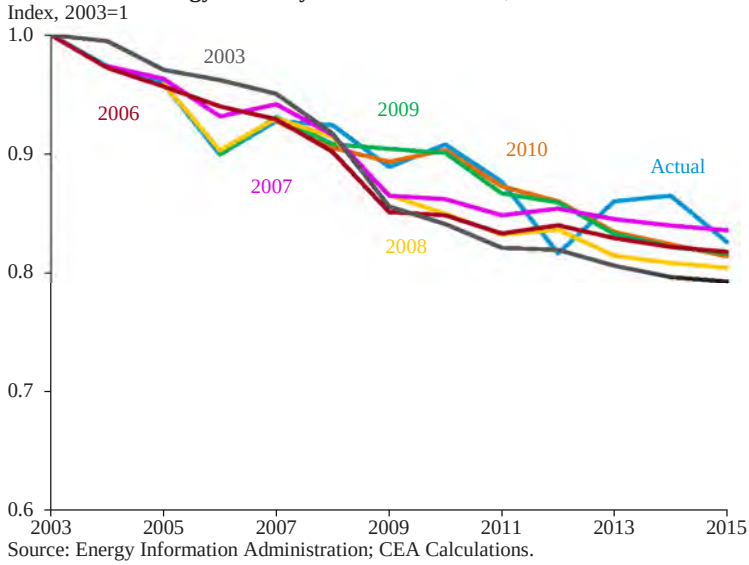
[27] See CEA (2015b) for a more detailed analysis. In 2015-16, low gasoline prices have led to significant increases in vehicle miles travelled (VMT); VMT reached a 6-month record high in the first half of 2016. Since low oil (and thus low gasoline) prices are expected to continue at least through the end of 2016 (EIA 2016), the upward trend observed in 2015 may continue in 2016.

Figure 7-12
Energy Intensity Transportation Sector, 2003–2015



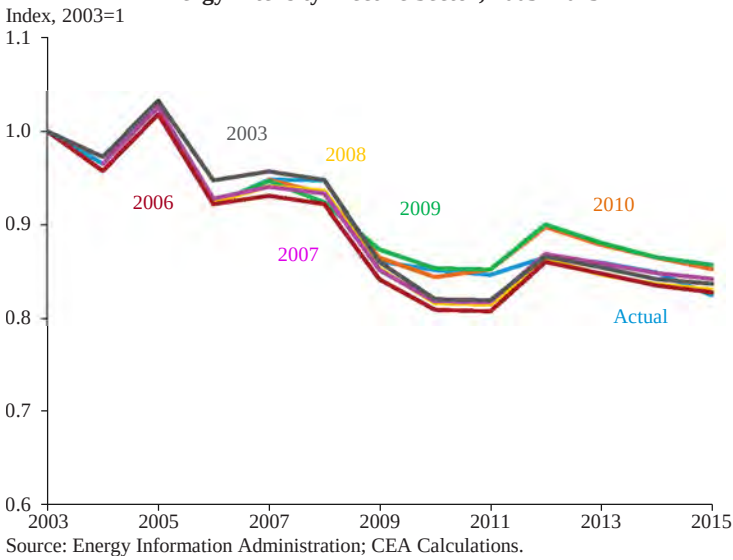
Source: Energy Information Administration; CEA Calculations.

Figure 7-13
Energy Intensity Residential Sector, 2003–2015



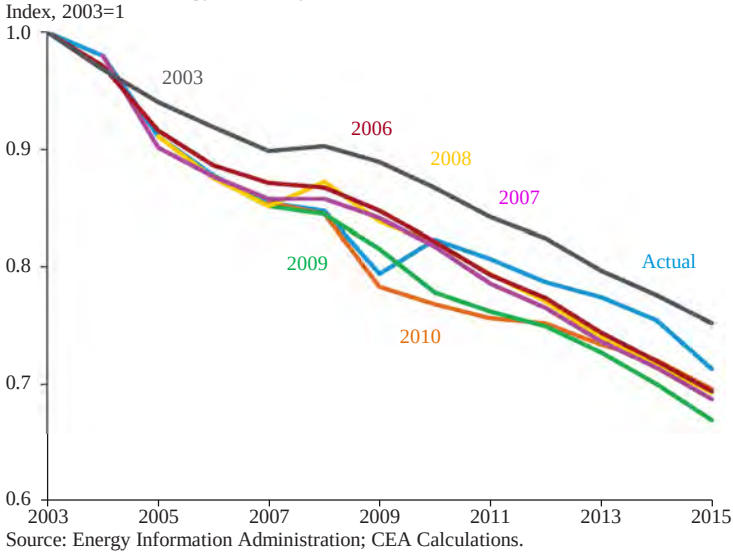
Source: Energy Information Administration; CEA Calculations.

Figure 7-14a
Energy Intensity Electric Sector, 2003–2015



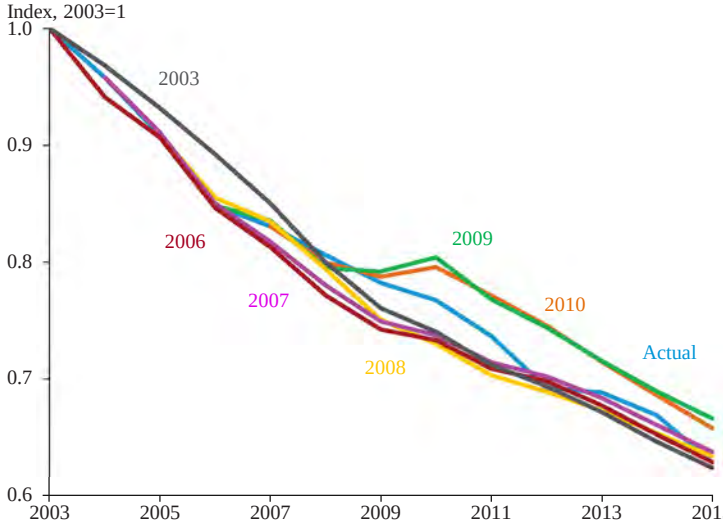
Source: Energy Information Administration; CEA Calculations.

Figure 7-14b
Energy Intensity Industrial Sector, 2003–2015



Source: Energy Information Administration; CEA Calculations.

Figure 7-14c
Energy Intensity Commercial Sector, 2003–2015



Source: Energy Information Administration; CEA Calculations.

emissions intensity of energy use in the U.S. economy, as well as several EIA projections. Beginning in 2008, these projections are all noticeably above the observed carbon intensity. Figure 7-15b shows that carbon emitted per dollar of GDP has also declined over this period, and that declines exceed predictions.

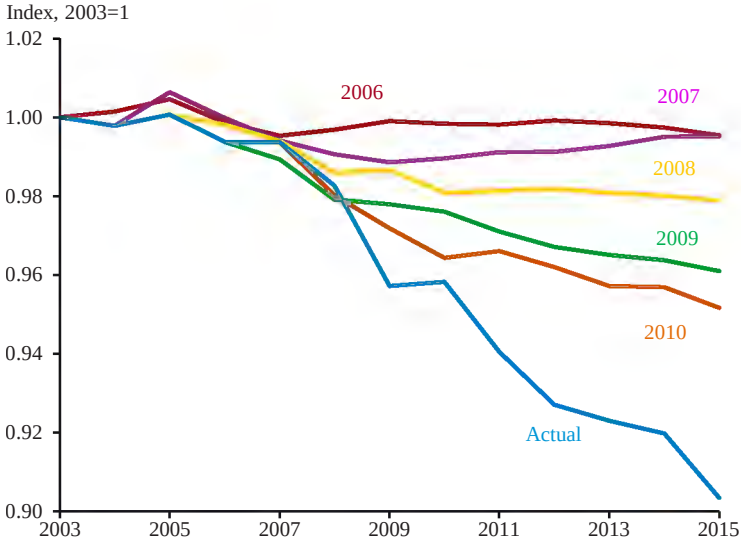
There are two primary reasons for the declining carbon intensity: a considerable shift to natural gas (a lower-carbon fossil fuel) and a remarkable growth in renewable energy, especially wind and solar.

The shift to lower carbon fossil fuels can be seen in Figure 7-16. Since 2008, coal and petroleum consumption have fallen 30 and 4 percent, respectively. Meanwhile, natural gas consumption has risen by almost 19 percent, with much of this increase displacing coal for electricity generation. This is due, in large part, to the surge in U.S. natural gas production discussed earlier. In fact, the share of electricity generation using natural gas surpassed the share produced from coal in 2015 for the first time on record (Figure 7-17). As natural gas is a much lower-carbon fuel than coal for electricity generation, this shift has contributed to lower carbon intensity.

Clean energy has undergone notable trends since 2008: electricity generation from renewable energy has increased, and costs of key clean energy technologies have fallen as there have been sizable efficiency gains in renewable energy. As seen in Figure 7-18, the share of non-hydropower renewables in U.S. electricity generation has increased from 3 percent in

Figure 7-15a

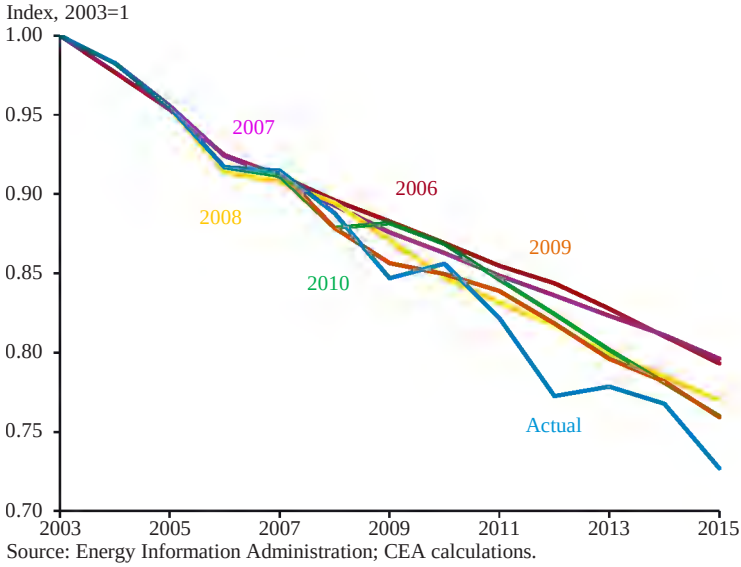
Carbon Intensity Projections and Actual, 2003–2015



Source: Energy Information Administration; CEA calculations.

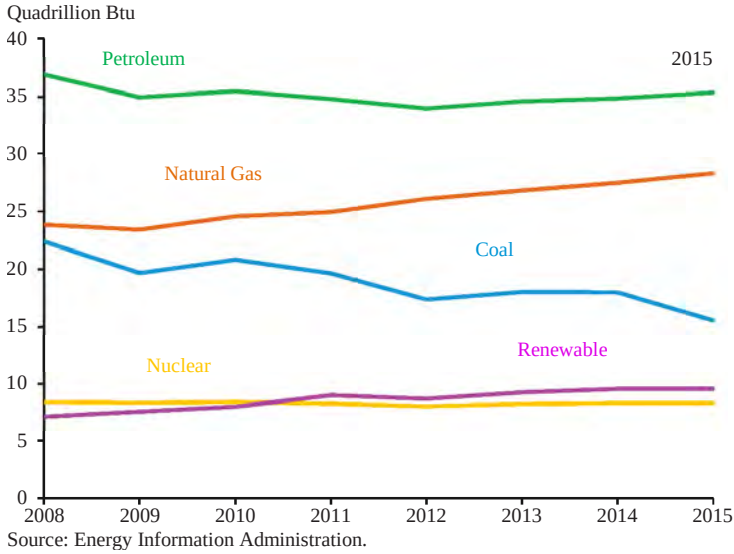
Figure 7-15b

Carbon Emissions per GDP Projections and Actual, 2003–2015



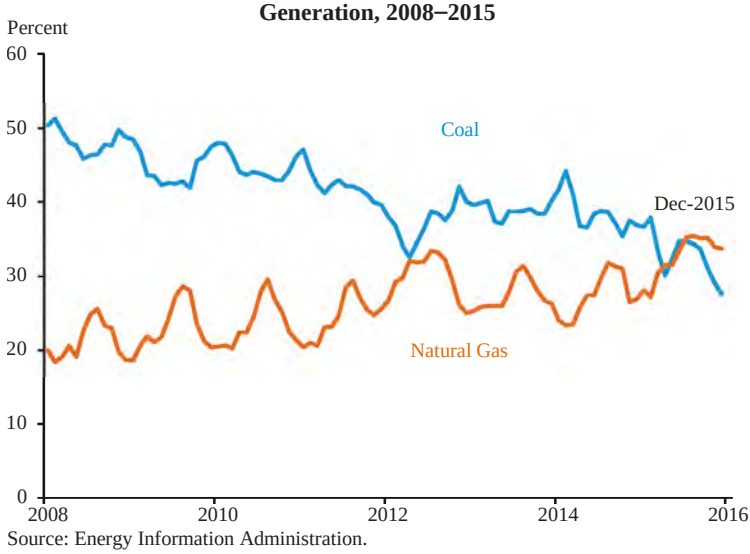
Source: Energy Information Administration; CEA calculations.

Figure 7-16
U.S. Energy Consumption by Source, 2008–2015



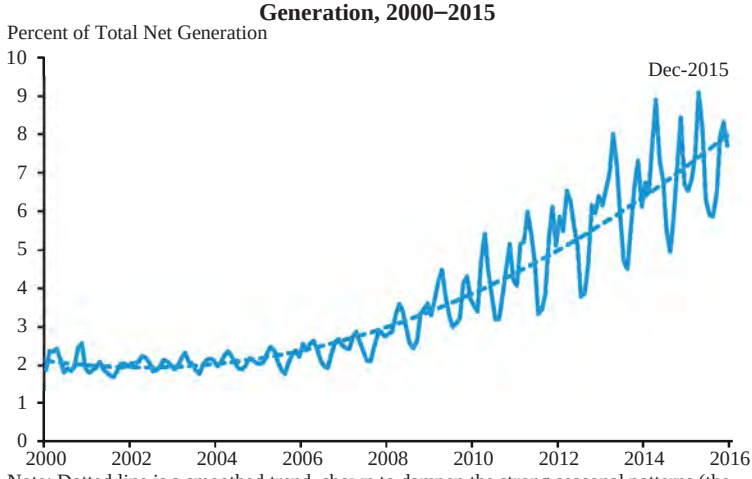
Source: Energy Information Administration.

Figure 7-17
Coal and Natural Gas Share of Total U.S. Electricity Generation, 2008–2015



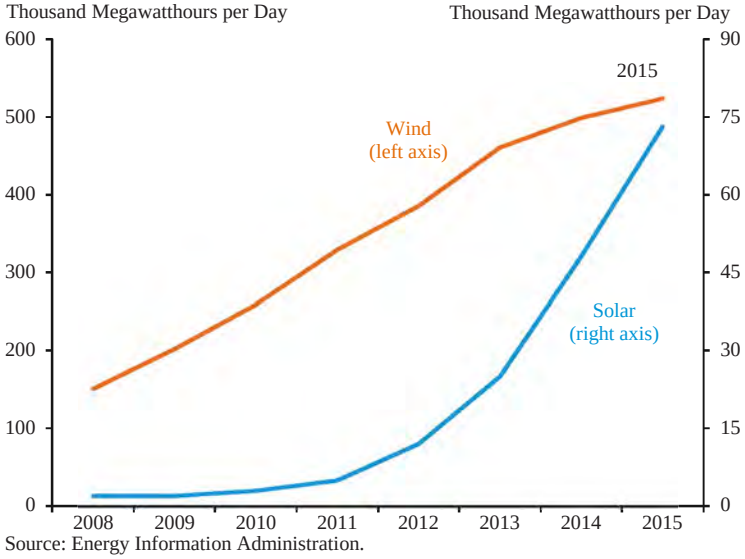
Source: Energy Information Administration.

Figure 7-18
Monthly Share of Non-Hydro Renewables in Net Electric Power Generation, 2000–2015



Note: Dotted line is a smoothed trend, shown to dampen the strong seasonal patterns (the share of non-hydro renewables drops during the winter and summer-both seasons of high power generation demand).
Source: Energy Information Administration.

Figure 7-19
Electricity Generation from Wind and Solar, 2008–2015



Source: Energy Information Administration.

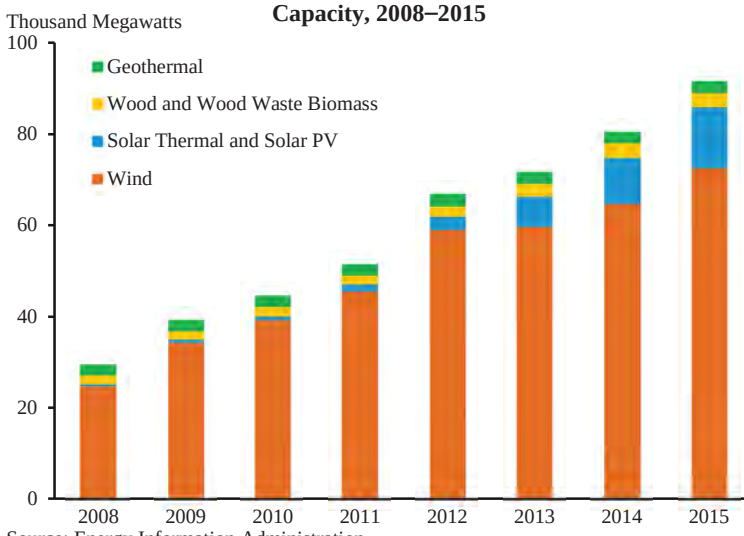
2008 to 7 percent in 2015. Figure 7-19 shows that at the end of 2015, the United States generated more than three times as much electricity from wind and 30 times as much from solar as it did in 2008. Many factors have contributed to this growth, including improved technologies and falling costs, state renewable portfolio standards, other State and local policies, and the major Federal initiatives discussed earlier.

This rapid growth in new electricity generation from renewable sources comes from rapid growth in renewable energy capacity. Electric generation capacity refers to the maximum output that a generator can produce, while electricity generation refers to the actual electricity produced. As illustrated in Figure 7-20, non-hydro renewable energy capacity in the United States more than tripled between 2008 and 2015, from less than 30 gigawatts to almost 100 gigawatts. Most of the increase was driven by growth in wind and solar capacity, and deployments in the first half of 2016 suggest a continuing trend. From January through June 2016, no new coal capacity was installed; solar, wind and natural gas added 1,883 MW, 2,199 MW, and 6,598 MW of new installed capacity, respectively, over the same period (Federal Energy Regulatory Commission 2016).

One reason for increases in renewable electricity generation and capacity is the decline in the cost of renewable energy and other notable clean energy technologies. A common metric for comparing cost competitiveness between renewable and conventional technologies is the "levelized cost of electricity" (LCOE). The LCOE can be interpreted as the per-kilowatt-hour cost (in real dollars) of building and operating a generating plant over an assumed financial life and duty cycle. Several key inputs are taken into account when calculating LCOE, including capital costs, fuel costs, fixed and variable operations and maintenance costs, financing costs, and an assumed utilization rate for each plant type (EIA 2015). Because solar and wind technologies have no fuel costs, their LCOEs are highly dependent on estimated capital costs of generation capacity and can vary substantially by region. While using the LCOE as a measure of technology cost has drawbacks, and energy project developers may not always rely on this metric when assessing project costs, it provides a helpful benchmark for understanding changes in technology costs over time.

Wind and solar LCOEs have fallen substantially since 2008. Figure 7-21 shows that the LCOE for onshore wind technologies has decreased on average by almost 40 percent from 2008 to 2014, based on unsubsidized LCOE; that is, the cost of wind electricity without considering the benefits

Figure 7-20
U.S. Non-Hydro Renewable Energy Electric Power Sector Installed Capacity, 2008–2015



Source: Energy Information Administration.

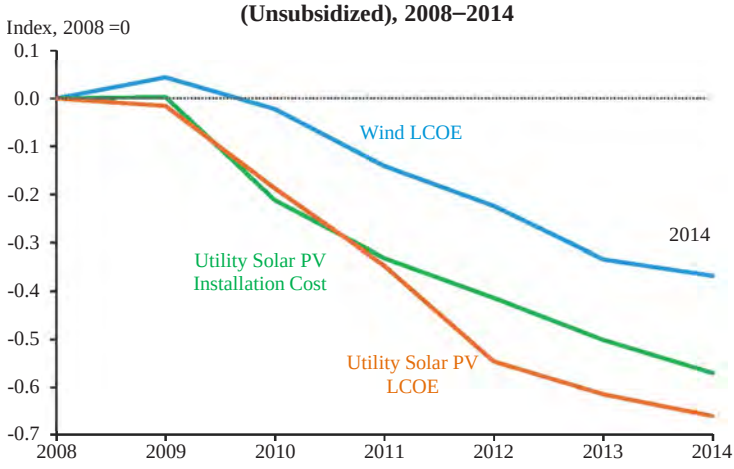
from Federal tax incentives. Installation costs for solar PV have decreased by 60 percent, and LCOE for solar has fallen by almost 70 percent. [28]

In Figures 7-21 and 7-22, the measure of LCOE does not include local, State and Federal tax credits or other incentives for renewable energy. When these incentives are also considered, the cost declines described above mean that in many locations renewable energy costs are at or below the cost of fossil fuels. Renewables are truly reaching "grid parity," which means that the cost of renewables is on par with the cost of new fossil-generated electricity on the grid. Although wind and solar have been considered more expensive forms of new generation, current ranges of unsubsidized costs are showing some wind and solar projects coming in at lower costs than some coal generation. Further, forecasts show a trend toward increasing grid parity in the future. For example, forecasts for wind and solar PV costs from the EIA and the International Energy Agency (IEA) suggest that the unsubsidized technology cost of new wind and solar will be on par with or below that of new coal plants by 2020 (Figure 7-22).[29] Moreover, there are already places

[28] LCOE for wind is estimated by average power-purchase agreement (PPA) prices plus estimated value of production tax credits available for wind, and average PPA prices for solar PV.

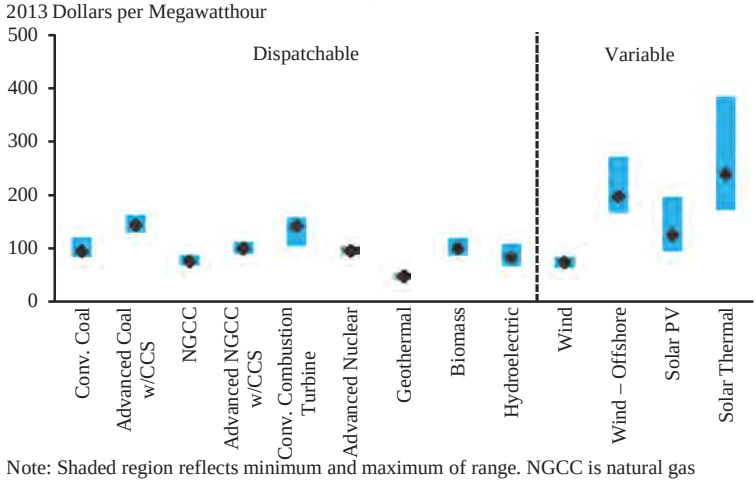
[29] The larger bounds in costs for some renewable technologies, such as solar and off-shore wind, reflect a range of potential technology options that are being considering for future commercial deployment of these developing technologies.

Figure 7-21
Change in Costs for Onshore Wind and Solar (Unsubsidized), 2008–2014



Sources: Wind: National Renewable Energy Lab, DOE (2015), Lawrence Berkeley National Laboratory (2014); Solar: Lawrence Berkeley National Laboratory (2015a), Lawrence Berkeley National Laboratory (2015b).

Figure 7-22
Total System LCOE Comparison Across Generation Technologies (Unsubsidized), 2020 Forecast



Note: Shaded region reflects minimum and maximum of range. NGCC is natural gas combined cycle. CCS is carbon capture and storage. PV is photovoltaics.
Source: Energy Information Administration.

in the United States where new wind and solar can come online at a similar or lower cost than new coal.[30] Note that EIA projections suggest that the unsubsidized LCOE for wind and solar will continue to be above that for natural gas (conventional combined cycle), on average across the United States, in 2018 and 2022 (EIA 2016a).

To better understand what is driving the declining carbon intensity, CEA estimates the portion of carbon intensity in electricity generation decline due to two factors: a reduced carbon intensity of fossil-fuel generation driven by a shift toward natural gas resources, and an increase in electric generation from renewable resources. To do so, CEA uses an analytical approach that develops estimates of counterfactual emissions holding constant the carbon intensities of the electric generating portfolio in 2008.

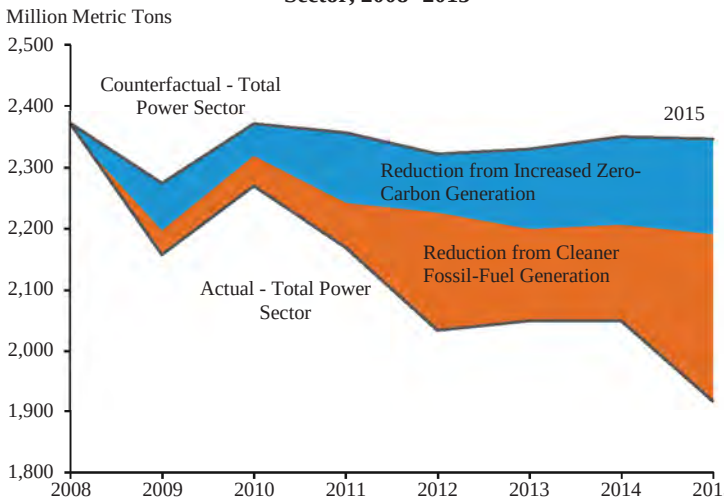
In particular, CEA first considers the case where the emissions factor associated with the portfolio of fossil-fuel electric generation; that is, the emissions per unit of energy generated from a fossil-fuel resource, in 2008 is held constant through 2015. As the emissions factor reflects the mix of resources in the fossil-fuel electric generating portfolio in 2008, this factor reflects the composition and efficiency of coal, natural gas, and petroleum generation resources in 2008. Applying this factor to the total electricity generated from fossil-fuel resources from 2009 to 2015 develops a counterfactual level of emissions had the portfolio of fossil-fuel resources remained constant in mix and efficiency over this time. Then, the difference between the quantity of emissions in the counterfactual and the observed emissions from electricity generated by fossil fuels during this time provides an estimate of emissions saved as a result of the reduction in carbon intensity of fossil-fuel electricity generation.[31] This reduction in carbon intensity is expected to stem primarily from increased natural gas generation, though would also include improvements in technical efficiency from fossil fuel resources. Much of the shift toward natural gas comes from rising supplies and falling prices of natural gas in the United States, though some may stem from policies that have aimed to account for and internalize some of the externalities of coal combustion.

Next, in a similar fashion, the analysis considers the emissions outcomes if the emissions factor from the entire portfolio of electricity generating resources in 2008 were held constant through 2015. The difference between these counterfactual emissions and total actual emissions from

[30] Wind: DOE (2015), Wiser and Bolinger (2014); Solar: Galen and Darghouth (2015), Bolinger and Seel (2015).

[31] This analytical approach holds fixed the observed kWh demand from fossil fuels and total power when estimating counterfactual emissions. To the extent that the shift to natural gas led to an increase in electricity demand, this approach would overstate the impact of coal-to-gas switching on reducing emissions.

Figure 7-23
Decomposition of Emission Reductions from Power Sector, 2008–2015



Source: Energy Information Administration; CEA Calculations.

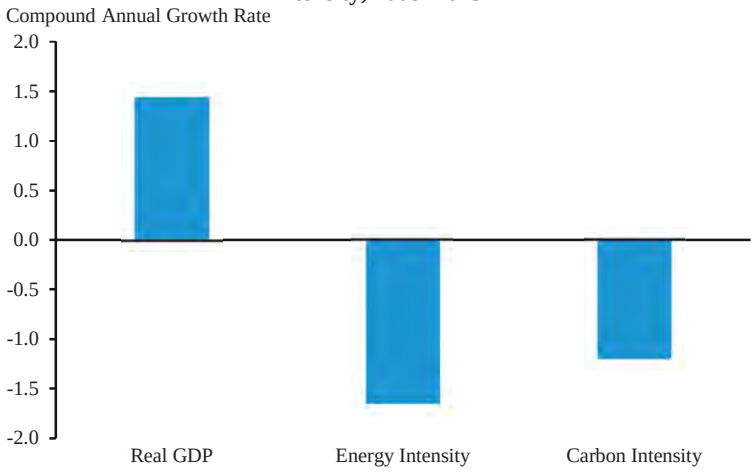
electricity generation would then represent the total avoided emissions from changes in the carbon intensity of the entire electricity portfolio. By subtracting total avoided emissions attributed to reduced carbon intensity from fossil fuel resources calculated as described above, the remaining difference between actual and counterfactual emissions can be attributed to an increase in resources with zero-carbon footprints; that is, an increase in the share of renewable energy resources.[32] For 2015, 284 million metric tons (MMT) (66 percent) of 428 MMT total avoided emissions was due to reduced carbon intensity from lower-carbon fossil resources, leaving 144 MMT (34 percent) attributable to increased generation from renewables. Figure 7-23 shows this decomposition from 2008 to 2015.

Decomposition of the Unexpected and Total Declines in Emissions

This section summarizes overall contributions to the observed emissions decline by decomposing reductions into those attributable to lower energy intensity, lower carbon intensity, and the difference from projections

[32] While this could include increased generation from nuclear power, the EIA shows that net generation from nuclear power remained fairly constant over the period, with an overall reduction in 2015 compared to 2008. Year-to-year fluctuations in nuclear or hydro power can affect annual changes in the contribution of non-carbon energy, but the overall result of significant contribution from non-hydro renewables over time is not altered by these sources, as both hydro and nuclear power saw small declines over the 2008-15 window.

Figure 7-24
Growth Rates of GDP, Energy Intensity and Carbon Intensity, 2008–2015



Source: Bureau of Economic Analysis, National Income and Product Accounts; Energy Information Administration.

on the size of the economy in 2015. The decomposition analysis follows the methodology in CEA (2013), but with the added component of considering emissions from both "expected" and "unexpected" trends. The emissions considered in the analysis are energy-related carbon dioxide emissions, which comprised 97 percent of U.S. carbon dioxide emissions and 83.6 percent of U.S. greenhouse gas emissions in 2014 (EPA 2016a).

As an initial step, one could simply look at GDP growth, energy intensity, and the carbon intensity of energy production to see what has influenced changes in emissions (Figure 7-24). Rising GDP, all else equal, causes an increase in emissions, but the declining energy intensity of output (energy usage per dollar of GDP) and the declining carbon intensity of energy (carbon emissions per energy usage) both pushed down on this tendency of emissions to rise as the economy grows.

Alternatively, one can use expectations for the paths of these three variables to understand what drove emissions relative to a reasonable expectation in 2008. The general approach of this decomposition is to ask the following: starting in a given base year, what were actual or plausible projections of the values of GDP, energy intensity, and the carbon intensity of energy out to the current year. These three values imply a projected value for the current level of carbon emissions. Then, relative to this forecast, what were the actual emissions, and what were the actual values of these

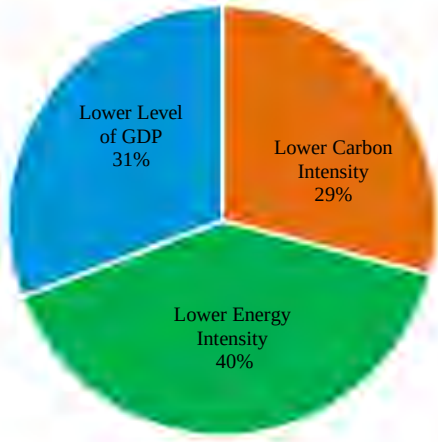
three determinants of emissions? If, hypothetically, the forecasts of energy and carbon intensity were on track, but the GDP forecast differed from projections because of the (unexpected) recession, this would suggest that the unexpected decline in carbon emissions was a consequence of the recession. In general, the forecasts of all the components will not match the realized outcomes, and the extent to which they vary—that is, the contribution of the forecast error of each component to the forecast error in carbon emissions—allows analysts to attribute shares of the unexpected decline in carbon emissions to unexpected movements in GDP, unexpected shifts in energy intensity, and unexpected shifts in carbon intensity.[33]

In the 2013 *Economic Report of the President*, this approach was performed to decompose emissions reductions from 2005 to 2012 (CEA 2013). The analysis found that actual 2012 carbon emissions were approximately 17 percent below the "business as usual" baseline projections made in 2005, with 52 percent due to the lower-than-expected level of GDP, 40 percent from cleaner energy resources, and 8 percent from increased energy efficiency improvements above the predicted trend.

CEA has completed this new decomposition approach in a similar fashion as in the 2013 *Economic Report of the President*, but over a different time frame: from 2008 to 2015 instead of from 2005 to 2012. In this decomposition, emissions in 2015 are compared to projections of emissions in 2015 made in 2008, based on the EIA's *Annual Energy Outlook* from 2008. Then, emissions reductions here can be seen as reductions above and beyond projections, or "unexpected" emissions reductions. As discussed above, energy intensity was projected to decline significantly over this time frame, and emissions reductions from energy intensity occurred largely as predicted. Thus, in this decomposition, energy intensity does not account for any of the "unexpected" emissions reductions, though it fell notably over the relevant time frame and contributed to realized declines in emissions. CEA's analysis suggests that 46 percent of unexpected emissions reductions in 2015 are attributable to a lower-than-predicted carbon intensity of energy, with the remaining 54 percent due to a lower level of GDP than projected in 2008. The role GDP plays in the decomposition largely reflects the fact that the major financial crisis and recession were not anticipated in early 2008, when EIA's projections were made. However, a larger-than-expected decline in carbon intensity also contributes substantially and reflects other

[33] Specifically, CO2 emissions are the product of (CO2/Btu)×(Btu/GDP)×GDP, where CO2 represents U.S. CO2 emissions in a given year, Btu represents energy consumption in that year, and GDP is that year's GDP. Taking logarithms of this expression, and then subtracting the baseline from the actual values, gives a decomposition of the CO2 reduction into contributions from each factor.

Figure 7-25
Decomposition of Total CO_2 Emission Reductions, 2008–2015



Source: Bureau of Economic Analysis, National Income and Product Accounts; Energy Information Administration, August 2016 Monthly Energy Review and 2008 Annual Energy Outlook; CEA Calculations.

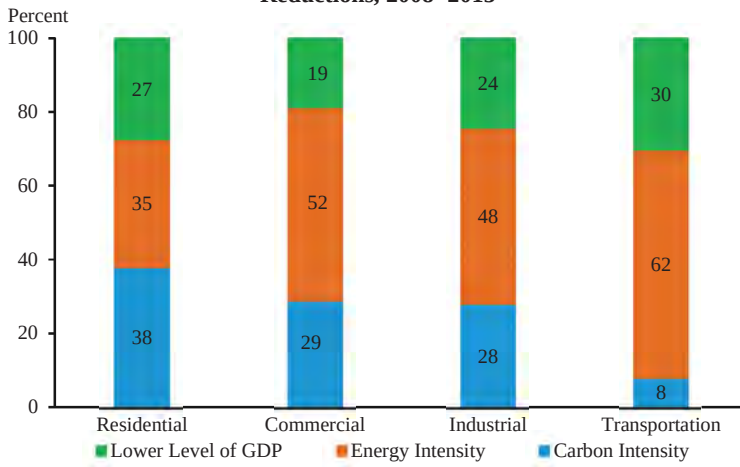
developments in recent years (for example, the shifts toward natural gas and renewables discussed earlier).

Figure 7-25 takes the same decomposition approach using the forecast of 2015 GDP to determine a "GDP surprise" but considers emissions reductions in 2015 compared with observed emissions in 2008, rather than projections for 2015. That is, the projections hold energy intensity and carbon intensity in 2008 constant over the period from 2009 to 2015. In this manner, Figure 7-25 decomposes *total* emissions reductions since 2008 in a way that includes expected, as well as unexpected, movements in either energy intensity or carbon intensity.

Considering total emissions reductions compared with 2008, Figure 7-25 shows that 40 percent of total emissions reductions can be attributed to lower energy intensity, 29 percent to lower carbon intensity, and 31 percent to a lower level of GDP. The impact of lower energy intensity, while expected, was substantial.

To further understand the decline in emissions since 2008, CEA considers emission declines separately by sector—residential, commercial, industrial, and transportation—and decomposes total emission impacts from reduced energy intensity, reduced carbon intensity, and a lower level of GDP (due to unanticipated shocks, most notably the Great Recession) separately by sector. To perform the sector-by-sector analysis, CEA estimates

Figure 7-26
Sectoral Decompostion of Total CO_2 Emission Reductions, 2008–2015



Source: Bureau of Economic Analysis, National Income and Product Accounts; Energy Information Administration, August 2016 Monthly Energy Review; CEA Calculations.

the GDP contributions from each sector using data from the U.S. Bureau of Economic Analysis.[34] Then, CEA performs the same decomposition of total emissions reductions that was done for the economy as a whole in Figure 7-25.

Results of the sectoral decomposition analysis are reported in Figure 7-26. In the residential sector, a lower level of GDP, lower energy intensity, and lower carbon intensity each played a similar role in reducing emissions from 2008 to 2015. For the transportation sector, a majority of emissions reductions (more than 60 percent) were due to a decrease in energy intensity. This finding could reflect the impact of increased fuel efficiency from light-duty vehicle fuel efficiency standards implemented by the Administration over this time, though the analysis cannot establish a causal link.[35] Reductions in energy intensity also played important roles (48 to 52 percent) in emissions reductions from the commercial and industrial sectors, possibly reflecting shifts toward less energy-intensive industries. Any influence of Administration energy efficiency policies (such as, appliance standards) could also be captured here, though no causal link is established in this analysis.

[34] See the Appendix for more detail.
[35] Phase 1 of the first-ever medium- and heavy-duty vehicle standards, finalized in 2011, affected model years 2014-2018, so fuel economy standards for these larger vehicles could only have contributed to the energy intensity share at the very end of the period.

Lower carbon intensity also played a role in emissions reductions in the residential, commercial, and industrial sectors, responsible for 38, 29, and 28 percent of emissions reductions, respectively. In the residential sector, lower carbon intensity in regional electricity supply portfolios from shifts toward natural gas and zero-carbon energy resources would translate to reduced emissions from end-use electricity consumption. This impact would occur similarly for electricity-intensive commercial and industrial activities. Lower carbon intensity in the industrial sector could also result from substitution of lower-carbon natural gas for coal or oil in industrial processes.

How Administration Policies Meet Future Emissions Reductions Targets

In 2009, the President set a goal to cut emissions in the range of 17 percent below 2005 levels by 2020, a goal that was re-affirmed by the U.S. pledge at the 2009 United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties in Copenhagen. Subsequently, in 2015 the United States submitted its target to the UNFCCC to reduce emissions 26 to 28 percent below 2005 levels by 2025. In the *2016 Second Biennial Report of the United States of America*, the U.S. presented results from an interagency effort to project the trajectory of GHG emissions through 2030, including the impact of U.S. policies and measures that have either been implemented or planned consistent with the Climate Action Plan. The report found that the implementation of all finalized, and planned, additional policies, including measures that at the time had been proposed but not yet finalized, would lay the foundation to meet those targets.

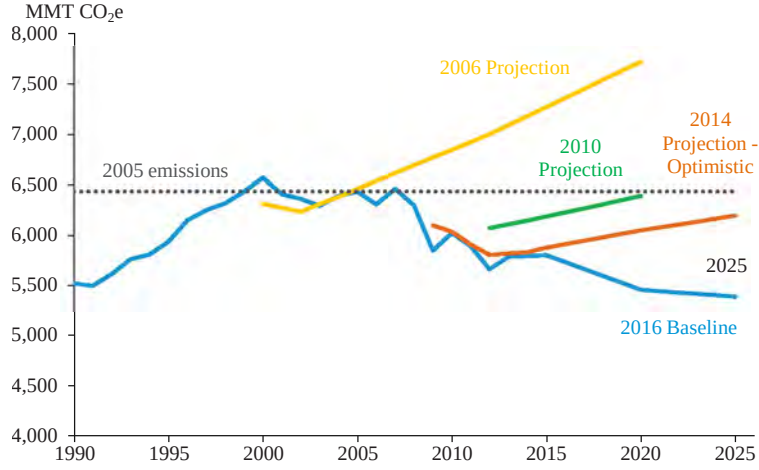
The estimates of U.S. GHG emissions take into account factors such as population growth, long-term economic growth, historic rates of technological change, and usual weather patterns. Projections for future emissions are modeled based on anticipated trends in technology adoption, demand-side efficiency gains, fuel switching, and implemented policies and measures. The report's estimates synthesize projected CO_2 emissions, non-CO_2 emissions, and CO_2 sequestration based on data from the Department of Energy, the Energy Information Administration, the Environmental Protection Agency, and the Department of Agriculture. The main source of uncertainty in emission projections is the range of land use, land-use change, and forestry projections, which approximate the ability of the land sector to remove CO_2 emissions from the atmosphere. The report therefore produces a range of projections using a set of modeling techniques from various agencies, which reflect differing perspectives on macroeconomic outlook, forest

characteristics, and management trends. However, in part due to actions undertaken by the United States to bolster the forest carbon sink, the authors of the 2016 report believe that the United States is trending toward a more high-sequestration ("optimistic") pathway.

The report estimates two emissions projection scenarios. The first, the *Current Measures* scenario, reflects the impact of those policies and measures that have been established up to mid-2015. This includes, most notably, the Clean Power Plan, more stringent light-duty vehicle economy standards, recent appliance and equipment efficiency standards, and actions to reduce agricultural emissions and bolster our forest carbon sink. However, the *Current Measures* scenario does not include measures that were not final at the time of the publication, such as then-draft standards for oil and gas methane, phase two heavy-duty vehicle standards, and the five-year extension of tax credits for wind and solar. Therefore, the *Current Measures* scenario underestimates the full impact of policies undertaken under the President's Climate Action Plan. Under the *Current Measures* scenario, GHG emissions are projected to decline 15 percent below the 2005 level in 2020 with an optimistic land sector sink (Figure 7-27). The effects of policies implemented under the Obama Administration are clear when comparing the 2015 projections to the 2006 projections, in which emissions were expected to increase by about 20 percent above 2005 levels by 2020. Clear progress in driving down projected GHG emissions can be seen since 2010 and even since 2014. The 2016 projections mark the first time a U.S. Climate Action Report has projected GHG emissions to fall based on existing policies. This reflects the large number of policies implemented in the prior two years.

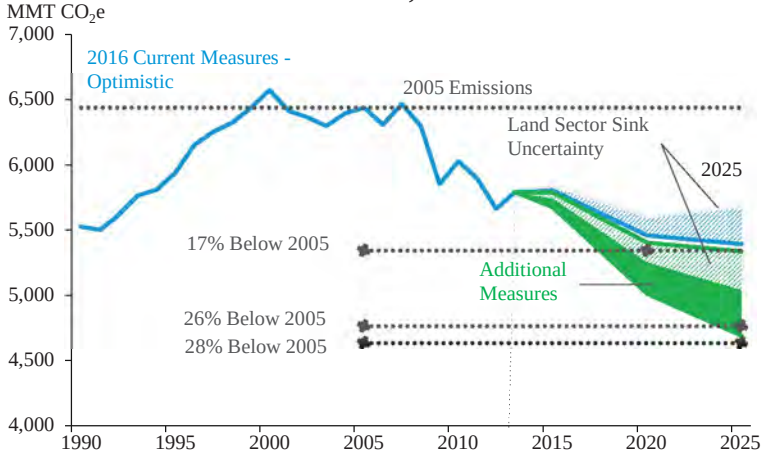
Also in the *2016 Second Biennial Report* is an *Additional Measures* scenario that includes measures consistent with the Climate Action Plan that were planned, but not implemented, when the Report was completed, such as policies to cut methane and volatile organic compound emissions from oil and gas systems, and a proposed amendment to the Montreal Protocol to phase down production and consumption of hydrofluorocarbons. The report estimates the impact of planned policies separately on emissions of carbon dioxide, hydrofluorocarbons, methane, and nitrous oxide. These estimates are synthesized and presented as a range due to uncertainty in policy implementation. The report projects that the *Additional Measures* scenario with an optimistic land sector sink will lead to emission reductions of at least 17 percent from 2005 levels in 2020, and 22 to 27 percent below 2005 levels in 2025 (Figure 7-28). Note that some of the policies included in the report as "additional measures" (for example, new GHG emissions standards for heavy-duty vehicles, and methane standards for new sources in the

Figure 7-27
U.S. Net Emissions based on Current Measures, 1990–2025



Note: The 2016 Baseline only includes policies finalized by mid-2015, so it underestimates the full impact of U.S. climate policies finalized under the Adminstration's Climate Action Plan through 2016.
Source: Department of State (2016).

Figure 7-28
U.S. Net Emissions, 1990—2025



Note: Major policies included in this figure as "additional measures" such as heavy-duty vehicle standards and methane rules for oil, gas and landfills have been finalized in 2016, and would further decrease the 2016 "current measures" projection if included.
Source: U.S. Department of State (2016).

oil and gas sector) were subsequently finalized in 2016, as was an agreement by the Parties to the Montreal Protocol to phase down global hydrofluorocarbon use (UNEP 2016). If included, these would move the 2016 projection below its current position in Figure 7-28.

These projections show that recent Administration actions on emission-reduction policies are already moving the United States toward its targets. The additional implementation of policies planned as of 2016 will put the economy on track to meet the 2020 target and will build a foundation for meeting the 2025 target. Under this scenario, this level of emission reduction will occur even while the economy is projected to grow by 50 percent.

American Leadership in International Cooperation

As climate change mitigation is a global public good, international cooperation is essential for an effective and economically efficient solution. The President's ambition and dedication to addressing climate change have helped accentuate the United States' position as a global leader on this issue. On December 12, 2015, more than 190 countries agreed to the most ambitious climate change mitigation goals in history. The Paris Agreement entered into force in November 2016, 30 days after the date on which the required threshold (at least 55 Parties, accounting for at least 55 percent of global greenhouse gas emissions) was officially met. The Agreement establishes a long-term, durable global framework to reduce global greenhouse gas emissions where, for the first time ever, all participating countries commit to putting forward nationally determined contributions. The Agreement lays the foundation for countries to work together to put the world on a path to keeping climate warming well below 2 degrees Celsius, while pursuing efforts to limit the increase even more. The nationally determined contributions agreed to in Paris, though historic, will not halt climate change on their own, but the Paris Agreement provides a framework for progress toward that goal.[36]

In the lead up to the Paris Agreement in 2015, the United States worked bilaterally with many countries to build support for an ambitious agreement. Most notably, starting in 2013, the United States and China intensified their climate cooperation and, in November 2014, President

[36] Building on the historic Paris Agreement, in October 2016, 191 members of the International Civil Aviation Organization (ICAO) meeting in Montreal, Canada adopted a market-based measure to reduce carbon dioxide emissions from international aviation – aviation comprises two percent of global carbon emissions, but was not covered by the Paris Agreement. Like other aspects of climate change mitigation, reducing aviation emissions requires international cooperation.

Obama and President Xi made a surprise announcement of their countries' respective post-2020 climate targets. President Obama announced the ambitious U.S. goal to reduce emissions by 26 to 28 percent below 2005 levels by 2025, and China committed for the first time to implement policies leading to a peak in its carbon dioxide emissions around 2030 and an increase in the share of non-fossil fuels in primary energy consumption. Further, in September 2015, President Obama and President Xi reaffirmed their commitment to a successful outcome in Paris, a shared determination to move ahead decisively in implementing domestic climate policies, strengthening bilateral coordination and cooperation on climate change and promoting sustainable development. In addition to working closely with China, the United States worked hand-in-hand with a broad range of countries to increase support for international climate action and an ambitious agreement in Paris, including with Brazil, Canada, India, Indonesia, Mexico, small islands, and many others.

The United States has remained a leader in the global effort to mobilize public and private finance for mitigation and adaptation. Since the 15th Conference of the Parties (COP-15) to the United Nations Framework Convention on Climate Change in December 2009, the United States has increased its climate financing by fourfold for developing countries (Department of State 2016a). In November 2014, President Obama pledged that the United States would contribute $3 billion to the Green Climate Fund to reduce carbon pollution and strengthen resilience in developing countries, the largest pledge of any country. This strong U.S. pledge helped increase the number and ambition of other countries' contributions, and U.S. leadership helped propel initial capitalization of the fund to over $10 billion, a threshold seen by stakeholders as demonstrating serious donor commitment.

At the Paris Conference, Secretary of State John Kerry announced that the United States would double its grant-based public climate finance for adaptation by 2020. As of 2014, the United States had invested more than $400 million a year of grant-based resources for climate adaptation in developing countries, providing support to vulnerable countries to reduce climate risks in key areas including infrastructure, agriculture, health, and water services. The commitment that the United States and other countries have shown to mobilizing climate finance will help to support developing countries' transitions to low-carbon growth paths.

One of the most important components of the landmark Paris Agreement is that, by sending a strong signal to the private sector that the global economy is transitioning toward clean energy, the Agreement will foster innovation to allow the United States to achieve its climate objectives

while creating new jobs and raising standards of living. The submission of ambitious national contributions in five-year cycles gives investors and technology innovators a clear indicator that the world will demand clean power plants, energy efficient factories and buildings, and low carbon transportation both in the short term and in the decades to come.

Another example of U.S. diplomatic leadership to drive global action on climate change mitigation is the Administration's work over several years toward an amendment to the 1987 Montreal Protocol to phase down the global production and consumption of hydrofluorocarbons, potent greenhouse gases. This work included the development of leader-level joint statements with China in 2013 and with India in 2015. In October 2016, the 197 Parties to the Montreal Protocol agreed to amend the Protocol to phase down HFC use in developed countries beginning in 2019, and to freeze and subsequently phase down HFC use in the vast majority of developing countries in 2024 (UNEP 2016). The agreement could avoid up to 0.5 degrees Celsius of warming by the end of the century, and it also provides financing to developing countries to help them transition to new air conditioning and refrigeration technologies that do not use HFCs.

The United States helped found the Clean Energy Ministerial, an ambitious effort among 25 governments representing around 75 percent of global greenhouse gas emissions and 90 percent of global clean energy investments. Through annual ministerial meetings (the United States hosted in 2010 and 2016), collaborative initiatives, and high-profile campaigns, the CEM is bringing together the world's largest countries, the private sector, and other stakeholders for real-world collaboration to accelerate the global clean energy transition. Twenty-one countries, the European Union, nearly 60 companies and organizations, and 10 subnational governments, made more than $1.5 billion in commitments to accelerate the deployment of clean energy and increase energy access at the June 2016 Clean Energy Ministerial.

On the first day of the Paris Conference, President Obama joined 19 other world leaders to launch Mission Innovation—a commitment to accelerate public and private global clean energy innovation. Twenty-two governments, representing well over 80 percent of the global clean energy research and development (R&D) funding base, have now agreed under Mission Innovation to seek to double their R&D investments over five years (Mission Innovation 2016). In addition, a coalition of 28 global investors committed to supporting early-stage breakthrough energy technologies in countries that have joined Mission Innovation (Bodnar and Turk 2015). The combination of ambitious commitments and broad support for innovation and technology will help ratchet up energy investments over the coming

years, accelerate cost reductions for low-carbon solutions, and spur increasing greenhouse gas emissions reductions.

Plans for the Future

Building on the progress discussed in this chapter in decreasing emissions and shifting toward a clean energy economy will require concerted effort over the coming years. Many of the policies and commitments begun by the President will have growing impacts over time, including several recently enacted policies mentioned above, as well as ongoing initiatives discussed below that form some of the next steps to continuing progress on climate issues. Also discussed below are some of the President's proposals for furthering clean energy goals that Congress has not yet acted upon, as well as potentially promising directions for longer-term climate policy.

On June 29, 2016 at the North American Leaders Summit in Ottawa, Canada, the President was joined by Canadian Prime Minister Justin Trudeau and Mexican President Enrique Peña Nieto in announcing the North American Climate, Energy, and Environment Partnership. The Partnership outlines several goals the three countries aim to achieve. Notably, a primary tenant of the Partnership is for North America to attain 50 percent clean power generation by 2025, including renewable, nuclear, and carbon capture, utilization and storage technologies, as well as demand reduction through energy efficiency. Each country will pursue these actions individually by establishing specific legal frameworks and clean energy national goals, tailored to each country's unique conditions. Additionally, the three countries aim to drive down short-lived climate pollutants, such as reducing methane emissions from the oil and gas sector by 40 to 45 percent by 2025. Other elements of the national methane emissions-reducing strategies could target key sectors such as waste management. To improve energy efficiency, the Partnership intends to better align and further improve appliance and equipment efficiency standards: North American neighbors plan to align six energy efficiency standards or test procedures for equipment by the end of 2017, and to align 10 standards or test procedures by the end of 2019. In order to advance integration of all clean energy sources, including renewables, the Partnership also strives to support the development of cross-border transmission projects that can play a key role in cleaning and increasing the reliability and flexibility of North America's electricity grid. At least six transmission lines currently proposed, or in permitting review, would add approximately 5,000 MW of new cross-border transmission capacity. The three economies will align approaches for evaluating the impact of direct and indirect greenhouse gas emissions of major projects,

such as using similar methodologies to estimate the social cost of carbon and other greenhouse gases. In summary, the North American Climate, Clean Energy, and Environment Partnership Action Plan aims to advance clean and secure energy, drive down short-lived climate pollutants, promote clean and efficient transportation, protect nature and advance science, and show global leadership in addressing climate change.

In 2015, about 41 percent of U.S. coal was produced on Federally managed land, and this coal was responsible for about 10 percent of U.S. greenhouse gas emissions (BLM 2016a). The President's 2016 State of the Union address called to "change the way we manage our oil and coal resources, so that they better reflect the costs they impose on taxpayers and our planet." Three days later, Department of the Interior Secretary Sally Jewell announced the first comprehensive review of the Federal coal leasing program in over 30 years (DOI 2016). This announcement followed a series of listening sessions across the country in 2015, initiated by Secretary Jewell, to consider if taxpayers and local communities were getting fair returns on public resources, how the coal leasing structure could improve in transparency and competitiveness, and how the federal coal program could be managed consistently with national climate change mitigation objectives (BLM 2016b). The Department of the Interior has yet to complete its analysis of these issues. However, the current structure of the coal leasing program does not price externalities from coal combustion, and independent analysis by CEA concludes that it does not provide a fair return to taxpayers, making this review a crucial policy step from an economic perspective (CEA 2016a).

Through a Programmatic Environmental Impact Statement (PEIS) expected to be prepared over three years, the review will examine the Interior Department's current process to determine when, where, and how to provide leases and respond to feedback and concerns raised during the listening sessions as well as by the Government Accountability Office (GAO 2013). The review will inform how the Federal coal program can be reformed to ensure a fair return to American taxpayers for public resources while considering the environmental and public health impact of Federal coal production.

While the review is underway, mining will continue under existing leases, but the Department of the Interior will pause new leases, with some limited exceptions. This is consistent with practices under the previous two programmatic reviews in the 1970s and 1980s. The Department of the Interior also announced a series of reforms to improve the transparency of the Federal coal program, including the establishment of a publicly available database to monitor carbon emissions from fossil fuels on public lands and

to increase transparency from Bureau of Land Management (BLM) offices regarding requests to lease coal or reduce royalties (BLM 2016b).

A transition to a clean energy economy means removing subsidies that encourage fossil fuel consumption and production, including the $4 billion in annual subsidies oil companies receive from taxpayers. The President called on Congress to end these subsidies (Slack 2012), and proposed eliminating inefficient fossil fuel subsidies in every budget he has submitted, with the Fiscal Year 2017 Federal Budget proposing to repeal $4 billion in subsidies to oil, gas, and other fossil fuel producers, as well as to expand the tax that supports the Oil Spill Liability Trust Fund to apply to oil sand crude oil. Following through on these proposals is a step toward avoiding a policy bias toward fossil fuel energy consumption and giving clean energy production a more level playing field. Given the climate externalities associated with fossil fuel use, subsidizing fossil fuel consumption or production means that not only are the externalities unpriced, but more fossil fuels are consumed than a pure market outcome even without considering the externalities. Removing the subsidies moves the incentives toward the efficient outcome.

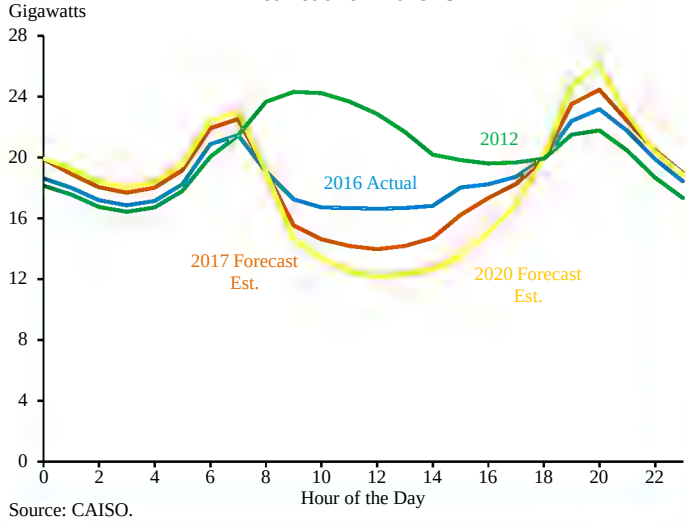
Announced in 2016, the President's 21st Century Clean Transportation Plan seeks to improve America's transportation accessibility and convenience, while reducing the emissions intensity of travel. The President's plan includes $20 billion in additional annual investments to reduce traffic and improve accessibility for work and school trips by expanding transit systems, adding high-speed rail in major corridors, modernizing freight systems, and supporting the TIGER program, which provides grants for innovative transportation projects. The Plan also directs an additional $10 billion a year to support planning efforts by State and local governments to maximize the benefits of public investments. The funds will encourage land use planning and investments in infrastructure to support low-carbon transit options as well as the development of livable cities with resilient transit options. In addition, the Plan directs just over $2 billion a year toward the deployment of smart and clean vehicles and aircraft, supporting pilot deployments of autonomous vehicles, expanding the Diesel Emissions Reduction Act Grant Program, and investing in the safe integration of new technologies.

To fund these investments, the President proposed a $10 a barrel fee on oil, phased in gradually over five years. Revenues from the fee would provide long-term solvency for the Highway Trust Fund to maintain infrastructure, in addition to supporting new investments under the Plan. By placing a fee on oil, this policy would take a step toward ameliorating the current market failure that allows parties involved in emissions-generating activities to bear less than the full costs of that activity. Further, by directing revenues from the fee toward investments in a resilient and low-carbon transportation

Box 7-4: Supporting Increased Penetration of Variable Energy with Smart Markets and Storage

The two most rapidly growing renewable energy technologies, wind and solar, come with unique operating characteristics. The variable nature of their production profile creates new challenges for management of the electric grid, as compared to traditional generating resources with a more dispatchable output profile. For example, when considering the timing of output from wind and solar, the net electricity load, which is the demand for electricity less wind and solar generation, can exhibit a "duck curve"—where the low net load in the middle of the day ramps up quickly as the sun sets before trailing off as demand ebbs later at night—looking much like the neck, head, and bill of a duck. The figure below plots this curve for an illustrative spring day in California. We see that current levels of variable energy resource (VER) penetration begin to create this duck shape, increasingly so for future years, when VERs are projected to increase.

Figure 7-i
Net Load for March 31



Source: CAISO.

In addition to the unique net load profile created by variable renewable resources, wind and solar output exhibits more idiosyncratic variation as compared to traditional resources, a feature that also creates additional grid management needs.

As penetration of variable energy resources has increased across the country and the world, so too has the development of technologies and operational changes to increase the flexibility of the electricity grid. In addition to increasing transmission, larger balancing areas, and system operational changes, smarter markets and energy storage and management systems can also support the flexibility requirements created by increased use of VERs. Smart markets, which refers to communications technologies and approaches that facilitate end-user responses in the demand for electricity, can be leveraged to allow demand to adjust to the true current cost of electricity. Dynamic electricity pricing structures, as well as technology that facilitates end-user adjustment of demand such as smart appliances, support integration of VERs by increasing the incentives and ability of consumers to modify their own electricity demand. Further, the recent proliferation of smart markets infrastructure with the deployment of 16 million smart meters since 2010 (DOE 2016e), lays the necessary foundation for these resources to support grid integration.

Opportunities for energy storage to support integration are also rapidly expanding as the storage industry has seen dramatic cost reductions in the last decade from over $1,000 per KWh in 2007 to under $410 per kWh today (Nykvist and Nilsoon 2015). Storage technologies support grid integration by temporarily storing electricity for later use during times of grid stress, as well as storing variable energy produced for use later that might otherwise be discarded due to low demand.

Although analysts had previously claimed that variable energy penetration beyond 15 to 20 percent was not technically feasible (Farmer, Newman, and Ashmole 1980; Cavallo, Hock, and Smith 1993), instantaneous VER penetrations have already achieved high levels, with Texas hitting a record 45 percent of total penetration in March 2016 and Portugal running for four days straight on 100 percent renewables (wind, solar, and hydropower) (Electricity Reliability Council of Texas 2016, ZERO 2016). As more VERs increase the need and the value of grid flexibility, supporting the ability of smart markets and energy storage to provide grid integration services by ensuring that regulatory and electricity markets allow for the monetization of these resources will be critical to transition to an increasingly low-carbon grid (CEA 2016b).

Sources: CEA (2016b), DOE (2016e), Nykvist and Nilsoon (2015), Electricity Reliability Council of Texas (2016), ZERO (2016), Farmer et al. (1980), Cavallo (1993).

sector, the fee would incentivize private-sector innovation and investment in clean transportation technologies. A portion of the fee would also be directed to provide relief to vulnerable households.

In 2009, the President urged Congress to pass an energy bill that would have used market-based mechanisms to incentivize a clean energy transformation (Obama 2009). A bill with a proposed national cap-and-trade system passed in the House but was not voted on in the Senate (Walsh 2010). While over the President's terms the Administration has pursued a number of policies that indirectly price carbon-emitting activities, going forward, a widely held view across a broad spectrum of economists is that policies that put a direct, uniform price on carbon are the most efficient and comprehensive way to both meet the goals set forth in the Paris Agreement and to efficiently transition to a clean energy economy. Even with a comprehensive national carbon price, some additional Federal climate policies (such as investments in clean energy research and development) would likely still be efficient.

Conclusion

As discussed in this report, the costs of climate change are large, the impacts are being felt now, and they will intensify in the future. Further, delaying policy action designed to halt climate change will likely increase its costs. There is strong economic rationale for policies to address climate change based on both correcting a market failure from the negative externality produced by greenhouse gas emissions, and as a form of insurance against catastrophes caused by global warming. Since the President took office in 2009, the United States has taken numerous steps to both mitigate climate change and respond to its effects. The Administration leveraged a diverse set of policy mechanisms, from tax credits for renewable energy technologies to the first-ever greenhouse gas emission standards for vehicles and power plants, to pivot the nation toward a greener and stronger economy while recovering from the Great Recession. With the implementation of these policies, renewable energy technology costs have declined, and deployment of clean energy technologies has increased. With the implementation of Administration policies, and with a concurrent increase in supply and decrease in the cost of natural gas, the carbon intensity of our electric portfolio has decreased, and the overall energy and carbon intensity of the economy has declined. All of these changes in the U.S. energy system, favorable to climate change mitigation, have occurred while the economy has grown.

Although the progress made to date in transitioning toward a clean-energy economy since 2009 presents only a portion of the Administration's

accomplishments in the clean energy and climate change space, the forward-looking policies established by this Administration, as well as proposals for further action, provide a pathway for the Nation to continue this transformation to a low-carbon economy that achieves future emissions reductions goals. Some of the progress made during the Administration's eight years is due to policy and some from technological breakthroughs and changes in natural gas production. To meet U.S. climate goals, it will be essential to build on this progress by achieving the emissions reductions projected from a number of policies that are just beginning to be implemented, and by taking further actions. The Administration's significant investments in clean energy research and development also help to ensure that the decreases in carbon intensity and energy intensity analyzed here will continue over the long run.

Finally, as climate change is global in nature, the 2015 Paris Agreement provides a critical missing link between domestic and international climate actions. Adopted by over 190 countries in December 2015, and officially entering into force in November 2016, the Agreement is the most ambitious climate change agreement in history, laying the foundation for a path to keep the global temperature rise well below 2 degrees while pursuing efforts to limit the increase even more. The United States set a goal of a 2025 emissions level in the range of 26 to 28 percent below 2005 emissions levels, and the goals set forth in the President's Climate Action Plan provide a path for the United States to uphold this commitment. However, the work is not finished. Continued efforts in upcoming years are critical to achieving these goals and transitioning to an energy system that incorporates externalities into energy production and consumption decisions, moving toward economically efficient outcomes that support the goal of global climate change mitigation.

Appendix: Detail on Sectoral Emissions Decomposition Analysis

In order to do the decomposition on a sector-by-sector basis, consider that each of the four sectors contributes to a portion of GDP. To approximate a sector's GDP contribution, each sector is matched to category in the National Income Product Accounts (NIPA), with matchings below. Then, the percent of GDP is calculated for each sector. To calculate 2008 baseline projections, this observed contribution percent is multiplied by forecasts of GDP made in 2008. This way, the difference between the actual versus the baseline of sector GDP mirrors the difference between actual and projected GDP. Performing this mapping for each sector allows for the same identity

to be used to decompose emissions in the total economy as for the sector by sector decomposition.

The energy consumption and emissions included for each sector can be found in EIA glossary and documentation materials for the Monthly Energy Review (MER) Tables 2.1 and Tables 12.2 – 12.5.

Residential Sector

The account category used to approximate GDP contribution is the category for "Housing and Utilities", within Personal Consumption Expenditure - Services - Household Consumption Expenditures.

Transportation Sector

The account category used to approximate GDP contribution is the category "Transportation", within Personal Consumption Expenditures - Services - Household Consumption Expenditures.

Industrial Sector

The account category used to approximate GDP contribution is the category "Goods", within Personal Consumption Expenditures.

Commercial Sector

The account category used to approximate GDP contribution is the category "Services" within Personal Consumption Expenditures.

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APPENDIX A

REPORT TO THE PRESIDENT ON THE ACTIVITIES OF THE COUNCIL OF ECONOMIC ADVISERS DURING 2016

LETTER OF TRANSMITTAL

COUNCIL OF ECONOMIC ADVISERS
Washington, D.C., December 15, 2016

MR. PRESIDENT:

The Council of Economic Advisers submits this report on its activities during calendar year 2016 in accordance with the requirements of the Congress, as set forth in section 10(d) of the Employment Act of 1946 as amended by the Full Employment and Balanced Growth Act of 1978.

Sincerely yours,

Jason Furman, *Chairman*
Sandra E. Black, *Member*
Jay C. Shambaugh, *Member*

Council Members and Their Dates of Service

Name	Position	Oath of office date	Separation date
Edwin G. Nourse	Chairman	August 9, 1946	November 1, 1949
Leon H. Keyserling	Vice Chairman	August 9, 1946	
	Acting Chairman	November 2, 1949	
	Chairman	May 10, 1950	January 20, 1953
John D. Clark	Member	August 9, 1946	
	Vice Chairman	May 10, 1950	February 11, 1953
Roy Blough	Member	June 29, 1950	August 20, 1952
Robert C. Turner	Member	September 8, 1952	January 20, 1953
Arthur F. Burns	Chairman	March 19, 1953	December 1, 1956
Neil H. Jacoby	Member	September 15, 1953	February 9, 1955
Walter W. Stewart	Member	December 2, 1953	April 29, 1955
Raymond J. Saulnier	Member	April 4, 1955	
	Chairman	December 3, 1956	January 20, 1961
Joseph S. Davis	Member	May 2, 1955	October 31, 1958
Paul W. McCracken	Member	December 3, 1956	January 31, 1959
Karl Brandt	Member	November 1, 1958	January 20, 1961
Henry C. Wallich	Member	May 7, 1959	January 20, 1961
Walter W. Heller	Chairman	January 29, 1961	November 15, 1964
James Tobin	Member	January 29, 1961	July 31, 1962
Kermit Gordon	Member	January 29, 1961	December 27, 1962
Gardner Ackley	Member	August 3, 1962	
	Chairman	November 16, 1964	February 15, 1968
John P. Lewis	Member	May 17, 1963	August 31, 1964
Otto Eckstein	Member	September 2, 1964	February 1, 1966
Arthur M. Okun	Member	November 16, 1964	
	Chairman	February 15, 1968	January 20, 1969
James S. Duesenberry	Member	February 2, 1966	June 30, 1968
Merton J. Peck	Member	February 15, 1968	January 20, 1969
Warren L. Smith	Member	July 1, 1968	January 20, 1969
Paul W. McCracken	Chairman	February 4, 1969	December 31, 1971
Hendrik S. Houthakker	Member	February 4, 1969	July 15, 1971
Herbert Stein	Member	February 4, 1969	
	Chairman	January 1, 1972	August 31, 1974
Ezra Solomon	Member	September 9, 1971	March 26, 1973
Marina v.N. Whitman	Member	March 13, 1972	August 15, 1973
Gary L. Seevers	Member	July 23, 1973	April 15, 1975
William J. Fellner	Member	October 31, 1973	February 25, 1975
Alan Greenspan	Chairman	September 4, 1974	January 20, 1977
Paul W. MacAvoy	Member	June 13, 1975	November 15, 1976
Burton G. Malkiel	Member	July 22, 1975	January 20, 1977
Charles L. Schultze	Chairman	January 22, 1977	January 20, 1981
William D. Nordhaus	Member	March 18, 1977	February 4, 1979
Lyle E. Gramley	Member	March 18, 1977	May 27, 1980
George C. Eads	Member	June 6, 1979	January 20, 1981
Stephen M. Goldfeld	Member	August 20, 1980	January 20, 1981
Murray L. Weidenbaum	Chairman	February 27, 1981	August 25, 1982
William A. Niskanen	Member	June 12, 1981	March 30, 1985
Jerry L. Jordan	Member	July 14, 1981	July 31, 1982

Council Members and Their Dates of Service

Name	Position	Oath of office date	Separation date
Martin Feldstein	Chairman	October 14, 1982	July 10, 1984
William Poole	Member	December 10, 1982	January 20, 1985
Beryl W. Sprinkel	Chairman	April 18, 1985	January 20, 1989
Thomas Gale Moore	Member	July 1, 1985	May 1, 1989
Michael L. Mussa	Member	August 18, 1986	September 19, 1988
Michael J. Boskin	Chairman	February 2, 1989	January 12, 1993
John B. Taylor	Member	June 9, 1989	August 2, 1991
Richard L. Schmalensee	Member	October 3, 1989	June 21, 1991
David F. Bradford	Member	November 13, 1991	January 20, 1993
Paul Wonnacott	Member	November 13, 1991	January 20, 1993
Laura D'Andrea Tyson	Chair	February 5, 1993	April 22, 1995
Alan S. Blinder	Member	July 27, 1993	June 26, 1994
Joseph E. Stiglitz	Member	July 27, 1993	
	Chairman	June 28, 1995	February 10, 1997
Martin N. Baily	Member	June 30, 1995	August 30, 1996
Alicia H. Munnell	Member	January 29, 1996	August 1, 1997
Janet L. Yellen	Chair	February 18, 1997	August 3, 1999
Jeffrey A. Frankel	Member	April 23, 1997	March 2, 1999
Rebecca M. Blank	Member	October 22, 1998	July 9, 1999
Martin N. Baily	Chairman	August 12, 1999	January 19, 2001
Robert Z. Lawrence	Member	August 12, 1999	January 12, 2001
Kathryn L. Shaw	Member	May 31, 2000	January 19, 2001
R. Glenn Hubbard	Chairman	May 11, 2001	February 28, 2003
Mark B. McClellan	Member	July 25, 2001	November 13, 2002
Randall S. Kroszner	Member	November 30, 2001	July 1, 2003
N. Gregory Mankiw	Chairman	May 29, 2003	February 18, 2005
Kristin J. Forbes	Member	November 21, 2003	June 3, 2005
Harvey S. Rosen	Member	November 21, 2003	
	Chairman	February 23, 2005	June 10, 2005
Ben S. Bernanke	Chairman	June 21, 2005	January 31, 2006
Katherine Baicker	Member	November 18, 2005	July 11, 2007
Matthew J. Slaughter	Member	November 18, 2005	March 1, 2007
Edward P. Lazear	Chairman	February 27, 2006	January 20, 2009
Donald B. Marron	Member	July 17, 2008	January 20, 2009
Christina D. Romer	Chair	January 29, 2009	September 3, 2010
Austan D. Goolsbee	Member	March 11, 2009	
	Chairman	September 10, 2010	August 5, 2011
Cecilia Elena Rouse	Member	March 11, 2009	February 28, 2011
Katharine G. Abraham	Member	April 19, 2011	April 19, 2013
Carl Shapiro	Member	April 19, 2011	May 4, 2012
Alan B. Krueger	Chairman	November 7, 2011	August 2, 2013
James H. Stock	Member	February 7, 2013	May 19, 2014
Jason Furman	Chairman	August 4, 2013	January 20, 2017
Betsey Stevenson	Member	August 6, 2013	August 7, 2015
Maurice Obstfeld	Member	July 21, 2014	August 28, 2015
Sandra E. Black	Member	August 10, 2015	January 20, 2017
Jay C. Shambaugh	Member	August 31, 2015	January 20, 2017

Report to the President on the Activities of the Council of Economic Advisers During 2016

The Council of Economic Advisers was established by the Employment Act of 1946 to provide the President with objective economic analysis and advice on the development and implementation of a wide range of domestic and international economic policy issues. The Council is governed by a Chairman and two Members. The Chairman is appointed by the President and confirmed by the United States Senate. The Members are appointed by the President.

The Chairman of the Council

Jason Furman was confirmed by the U.S. Senate on August 1, 2013. Prior to this role, Furman served as Assistant to the President for Economic Policy and the Principal Deputy Director of the National Economic Council.

From 2007 to 2008, Furman was a Senior Fellow in Economic Studies and Director of the Hamilton Project at the Brookings Institution. Previously, he served as a Staff Economist at the Council of Economic Advisers, a Special Assistant to the President for Economic Policy at the National Economic Council under President Clinton, and Senior Adviser to the Chief Economist and Senior Vice President of the World Bank. Furman was the Economic Policy Director for Obama for America. Furman has also served as Visiting Scholar at New York University's Wagner Graduate School of Public Service, a visiting lecturer at Yale and Columbia Universities, and a Senior Fellow at the Center on Budget and Policy Priorities.

The Members of the Council

Sandra E. Black was appointed by the President on August 10, 2015. She is on leave from the University of Texas, Austin where she holds the Audre and Bernard Rapoport Centennial Chair in Economics and Public Affairs and is a Professor of Economics. Dr. Black received her B.A. from the

University of California, Berkeley and her Ph.D. in economics from Harvard University.

Jay C. Shambaugh was appointed by the President on August 31, 2015. He is on leave from George Washington University, where he is a Professor of Economics and International Affairs. Dr. Shambaugh received a B.A. from Yale, an M.A.L.D. from The Fletcher School at Tufts University, and a Ph.D. in Economics from the University of California, Berkeley.

Areas of Activities

A central function of the Council is to advise the President on all economic issues and developments. In the past year, as in previous years, advising the President on policies to spur economic growth and job creation, and evaluating the effects of these policies on the economy, have been priorities.

The Council works closely with various government agencies, including the National Economic Council, the Domestic Policy Council, the Office of Management and Budget, White House senior staff, and other officials to engage in discussions on numerous policy matters. In the area of international economic policy, the Council coordinates with other units of the White House, the Treasury Department, the State Department, the Commerce Department, and the Federal Reserve.

Among the many economic policy areas that received attention in 2016, the Council focused in particular on: income inequality and inclusive growth; the Affordable Care Act and health care costs; labor force participation; criminal justice policies and incarceration; innovation and competition, including in the labor market; the minimum wage and unemployment insurance; trade policies and the Trans Pacific Partnership; international economics; financial system reform; energy and environment policies; and higher education and college affordability.

The Council prepares for the President, the Vice President, and the White House senior staff a daily economic briefing memo analyzing current economic developments, almost-daily memos on key economic data releases, and periodic memos on broader topics. The Council and its staff also presents a monthly briefing on the state of the economy to senior White House officials.

The Council, the Department of Treasury, and the Office of Management and Budget—the Administration's economic "troika"— are responsible for producing the economic forecasts that underlie the Administration's budget proposals. The Council initiates the forecasting process twice each year,

consulting with a wide variety of outside sources, including leading private-sector forecasters and other government agencies.

The Council was an active participant in the trade policy process, providing analysis and opinions on a range of trade-related issues involving the enforcement of existing trade agreements, reviews of current U.S. trade policies, and consideration of future policies. The Council also participated on the Trade Promotion Coordinating Committee, helping to examine the ways in which exports may support economic growth in the years to come. In the area of investment and security, the Council participated on the Committee on Foreign Investment in the United States (CFIUS), reviewing individual cases before the committee.

The Council is a leading participant in the Organisation for Economic Co-operation and Development (OECD), an important forum for economic cooperation among high-income industrial economies. The Council coordinated with other agencies to provide information for the OECD's review of the U.S. economy. Chairman Furman is chairman of the OECD's Economic Policy Committee, and Council Members and staff participate actively in working-party meetings on macroeconomic policy and coordination and contribute to the OECD's research agenda.

The Council issued a wide range of reports and issue briefs in 2016. In January, the Council commemorated the seven-year anniversary of the Lilly Ledbetter Fair Pay Act by releasing an issue brief on the gender pay gap and progress made to ensure that women receive equal pay for equal work. In February, the Council released a retrospective assessment of the impact of the clean energy investments made in the American Recovery and Reinvestment Act.

In March, the Council released an issue brief on the digital divide and the economic benefits of broadband access. The brief highlighted the impacts that the Administration's initiatives have had in dramatically expanding access to the Internet for families and students, and reviewed academic research that shows that Internet access leads to better labor market outcomes. The Council also released a March issue brief on patent litigation and its impact on innovation. The brief reviewed recent trends in increasing levels of patent litigation, and the possible negative effect of these suits on entrepreneurship and productivity growth. That same month, the Council released new analysis on the impact of the Affordable Care Act six years after passage. The analysis reviewed the substantial progress made on health care coverage, costs, and quality.

In April, the Council released a report on the economic impacts of incarceration and criminal justice policies. The report applied an economic framework to policy questions related to criminal justice reform and found

that some criminal justice policies, such as increased incarceration, fail cost-benefit tests. The report also highlighted that minority communities are disproportionately impacted by interactions with the criminal justice system, and these interactions can have long-run effects on individuals, families, and communities. In addition, the Council released an issue brief on the benefits of competition and indicators of market power. The issue brief highlighted the economic benefits of competition for workers and firms and reviewed several indicators that competition may be decreasing in the U.S. economy.

The Council released a June report on financial inclusion in the United States, which highlighted the lack of access to safe and affordable financial services for many low-income individuals. The report showed that expanding access to traditional banking services for underbanked communities has positive economic impacts. That same month, the Council released an extensive report on the long-term decline in the prime-age male labor force participation rate. The report reviewed trends over the last 50 years of declining labor force participation among working age men, and emphasized the economic impact of this decline for both the macroeconomy as well as individual families. The report reviewed various explanations for these changes, as well as policy responses.

In June, the Council also focused on energy and environment policies, issuing a report on prospects for integrating renewable energy sources into the electric grid. The report emphasized the important transition toward renewable generation in the United States, and the economics of integrating these energy sources into electric grid operation. The Council also released a report on the economics of coal leasing on Federal lands and reforms needed to ensure that taxpayers receive a fair return.

In July, the Council released a report on investments in higher education and the state of student debt. This report highlighted the financial benefits to individuals and the economy from higher education investments, and evaluated recent trends in the level of education-related debt. The report also highlighted the importance of the Administration's policies to make college affordable for American families and to protect students from low-quality academic institutions.

The Council published a report in August on the performance of community banks over time, finding that, across many measures, community banks have remained strong since financial reform legislation was passed in 2010. In October, the Council released an issue brief on the economic progress of the Hispanic community over the past eight years, focusing in particular on rising wages, declining poverty, and increased health insurance coverage.

In October, the Council released a report on labor market monopsony, or wage-setting power, including recent trends and policy responses. The report highlighted the role that firm wage-setting power may have played in the slow wage growth over recent decades and increasing inequality. In November, the Council released an issue brief on trade policy and the industries and jobs at risk if the Trans Pacific Partnership does not pass.

Some of the analysis and findings of these reports can be found throughout this *Economic Report of the President*. Additionally, over the course of 2016, the Council published a series of reports examining the Administration's economic record and quantifying the impact of President Obama's economic policies. These reports included analysis of progress reducing income inequality, economic benefits of health care reform, investments in higher education, the role of financial reform in strengthening the financial system, and actions to address climate change. They are collected and expanded upon in this *Economic Report of the President*.

All of the aforementioned reports can be found on the Council's website, archived at http://www.obamawhitehouse.gov/administration/eop/cea/factsheets-reports.

The Council continued its efforts to improve the public's understanding of economic developments and of the Administration's economic policies through briefings with the economic and financial press, speeches, discussions with outside economists, and regular updates on major data releases and postings of CEA's reports on the White House and CEA blogs. The Chairman and Members also regularly met to exchange views on the economy with the Chairman and Members of the Board of Governors of the Federal Reserve System.

Public Information

The Council's annual *Economic Report of the President* is an important vehicle for presenting the Administration's domestic and international economic policies. It is available for purchase through the Government Printing Office, and is viewable on the Internet at www.gpo.gov/erp.

The Council frequently prepared reports and blog posts in 2016, and the Chairman and Members gave numerous public speeches. The reports, posts and texts of speeches are available at the Council's website, archived at www.obamawhitehouse.gov/cea. Finally, the Council published the monthly *Economic Indicators*, which is available online at www.gpo.gov/economicindicators.

The Staff of the Council of Economic Advisers

The staff of the Council consists of the senior staff, senior economists, staff economists, research economists, and the administrative and support staff. The staff at the end of 2016 was:

Senior Staff

Andrea Taverna . . . . . Chief of Staff
Matthew Fiedler . . . . . Chief Economist
Steven N. Braun . . . . . Director of Macroeconomic Forecasting
Tomeka R. Jordan. . . . . Director of Finance and Administration
Adrienne Pilot. . . . . Director of Statistical Office

Senior Economists

Victor Bennett. . . . . Innovation, Industrial Organization, Technology
William J. Congdon . . . . . Behavioral Economics, Labor, Welfare
Laura Giuliano . . . . . Education, Labor, Welfare
Gregory Leiserson . . . . . Budget, Retirement, Tax
Sheila Olmstead . . . . . Energy, Environment
Christopher Otrok . . . . . Housing, Macroeconomics
Burt Porter. . . . . Finance
Katheryn Russ. . . . . International Economics
Aaron Sojourner. . . . . Criminal Justice, Education, Labor

Economists

Emily R. Gee . . . . . Health

Staff Economists

James Elwell . . . . . Criminal Justice, Labor
Amy Filipek. . . . . Housing, Macroeconomics
Conor Foley. . . . . International Trade, Macroeconomics
Stephen Harrell. . . . . Labor
Rahul Rekhi. . . . . Budget, Health, Tax

Research Economists

David Boddy . . . . . Labor
Marie Cases . . . . . International Trade, Macroeconomics
Neha Dalal . . . . . Education, Labor
Amelia Keyes . . . . . Competition, Energy, Environment
Nataliya Langburd . . . . . Energy, International Trade, Macroeconomics
Robert Liu . . . . . Finance, Macroeconomics
Ayushi Narayan . . . . . Education, Labor
Jana Parsons . . . . . Industrial Organization
Wilson Powell III . . . . . Health, Labor

Statistical Office

The Statistical Office gathers, administers, and produces statistical information for the Council. Duties include preparing the statistical appendix to the *Economic Report of the President* and the monthly publication *Economic Indicators*. The staff also creates background materials for economic analysis and verifies statistical content in Presidential memoranda. The Office serves as the Council's liaison to the statistical community.

Brian A. Amorosi . . . . . Statistical Analyst
Jennifer Vogl . . . . . Economic Statistician

Office of the Chairman and Members

Jeff Goldstein . . . . . Deputy Chief of Staff and Special Assistant to the Chairman
Harris R. Eppsteiner . . . . . Special Assistant to the Chairman and Research Economist
Jamie Keene . . . . . Special Assistant to the Members

Administrative Office

The Administrative Office provides general support for the Council's activities. This includes financial management, human resource management, travel, operations of facilities, security, information technology, and telecommunications management support.

Doris T. Searles . . . . . Operations Manager

Interns

Student interns provide invaluable help with research projects, day-to-day operations, and fact-checking. Interns during the year were: Andres Arguello, Edward Brown, John Patrick Bruno, Arianna Davis, Atticus Francken, Amy Frieder, Samarth Gupta, Kevin Gawora, Joe Jacobson, Joanna Jin, Gloria Li, Stephanie Lu, Karna Malaviya, Victoria Marlin, Brianna E. McClain, Femi Olaleye, Katherine Reinmuth, Andrés Rodríguez Brauer, Kunal Sangani, John Scianimanico, Riley Webster, Stacey Young, Laura Zhang, and Robin Zhang.

Departures in 2016

The senior economists who resigned in 2016 (with the institutions to which they returned after leaving the Council in parentheses) were: Kenneth Gillingham (Yale University), Timothy Park (Department of Agriculture), Nirupama Rao (New York University), Claudia Sahm (Federal Reserve), and Robert Seamans (New York University).

The staff economists who departed in 2016 were Martha Gimbel, E. Mallick Hossain, Bryson Rintala, Gabriel Scheffler, Paige Weber, and Emily Weisburst.

The research economists who departed in 2016 were Lydia Cox, Samuel Himel, Emma Rackstraw, and Jason Sockin.

The research assistants who departed in 2016 were William Weber and Samuel Young.

Anna Y. Lee resigned from her position as Director of Finance and Administration. Eric Van Nostrand resigned from his position as Special Assistant to the Chairman and Staff Economist. Jonathan Sheppard resigned from his position as Economic Statistician.

APPENDIX B

STATISTICAL TABLES RELATING TO INCOME, EMPLOYMENT, AND PRODUCTION

CONTENTS

GOVERNMENT FINANCE, INTEREST RATES, AND MONEY STOCK —*Continued*

General Notes

Detail in these tables may not add to totals due to rounding.

Because of the formula used for calculating real gross domestic product (GDP), the chained (2009) dollar estimates for the detailed components do not add to the chained-dollar value of GDP or to any intermediate aggregate. The Department of Commerce (Bureau of Economic Analysis) no longer publishes chained-dollar estimates prior to 1999, except for selected series.

Because of the method used for seasonal adjustment, the sum or average of seasonally adjusted monthly values generally will not equal annual totals based on unadjusted values.

Unless otherwise noted, all dollar figures are in current dollars.

Symbols used:

^{p} Preliminary.

... Not available (also, not applicable).

Data in these tables reflect revisions made by source agencies through December 2, 2016, unless otherwise noted.

Excel versions of these tables are available at *www.gpo.gov/erp*.

Table B–1. Percent changes in real gross domestic product, 1965–2016

[Percent change from preceding period; quarterly data at seasonally adjusted annual rates]

Year or quarter	Gross domestic product	Personal consumption expenditures			Gross private domestic investment							Change in private inventories
						Fixed investment						
							Nonresidential				Residential	
		Total	Goods	Services	Total	Total	Total	Structures	Equipment	Intellectual property products		
1965	6.5	6.3	7.1	5.5	13.8	10.4	16.7	15.9	18.2	12.7	–2.6	
1966	6.6	5.7	6.3	4.9	9.0	6.2	12.3	6.8	15.5	13.2	–8.4	
1967	2.7	3.0	2.0	4.1	–3.5	–.9	–.3	–2.5	–1.0	7.8	–2.6	
1968	4.9	5.7	6.2	5.3	6.0	7.0	4.8	1.4	6.1	7.5	13.5	
1969	3.1	3.7	3.1	4.4	5.6	5.9	7.0	5.4	8.3	5.4	3.1	
1970	.2	2.4	.8	3.9	–6.1	–2.1	–.9	.3	–1.8	–.1	–5.2	
1971	3.3	3.8	4.2	3.5	10.3	6.9	.0	–1.6	.8	.4	26.6	
1972	5.2	6.1	6.5	5.8	11.3	11.4	8.7	3.1	12.7	7.0	17.4	
1973	5.6	5.0	5.2	4.7	10.9	8.6	13.2	8.2	18.5	5.0	–.6	
1974	–.5	–.8	–3.6	1.9	–6.6	–5.6	.8	–2.2	2.1	2.9	–19.6	
1975	–.2	2.3	.7	3.8	–16.2	–9.8	–9.0	–10.5	–10.5	.9	–12.1	
1976	5.4	5.6	7.0	4.3	19.1	9.8	5.7	2.4	6.1	10.9	22.1	
1977	4.6	4.2	4.3	4.1	14.3	13.6	10.8	4.1	15.5	6.6	20.5	
1978	5.6	4.4	4.1	4.6	11.6	11.6	13.8	14.4	15.1	7.1	6.7	
1979	3.2	2.4	1.6	3.1	3.5	5.8	10.0	12.7	8.2	11.7	–3.7	
1980	–.2	–.3	–2.5	1.6	–10.1	–5.9	.0	5.9	–4.4	5.0	–20.9	
1981	2.6	1.5	1.2	1.7	8.8	2.7	6.1	8.0	3.7	10.9	–8.2	
1982	–1.9	1.4	.7	2.0	–13.0	–6.7	–3.6	–1.6	–7.6	6.2	–18.1	
1983	4.6	5.7	6.4	5.2	9.3	7.5	–.4	–10.8	4.6	7.9	42.0	
1984	7.3	5.3	7.2	3.9	27.3	16.2	16.7	13.9	19.4	13.7	14.8	
1985	4.2	5.3	5.3	5.3	–.1	5.5	6.6	7.1	5.5	9.0	2.3	
1986	3.5	4.2	5.6	3.2	.2	1.8	–1.7	–11.0	1.1	7.0	12.4	
1987	3.5	3.4	1.8	4.5	2.8	.6	.1	–2.9	.4	3.9	2.0	
1988	4.2	4.2	3.7	4.5	2.5	3.3	5.0	.7	6.6	7.1	–.9	
1989	3.7	2.9	2.5	3.2	4.0	3.2	5.7	2.0	5.3	11.7	–3.2	
1990	1.9	2.1	.6	3.0	–2.6	–1.4	1.1	1.5	–2.1	8.4	–8.5	
1991	–.1	.2	–2.0	1.6	–6.6	–5.1	–3.9	–11.1	–4.6	6.4	–8.9	
1992	3.6	3.7	3.2	4.0	7.3	5.5	2.9	–6.0	5.9	6.0	13.8	
1993	2.7	3.5	4.2	3.1	8.0	7.7	7.5	–.3	12.7	4.2	8.2	
1994	4.0	3.9	5.3	3.1	11.9	8.2	7.9	1.8	12.3	4.0	9.0	
1995	2.7	3.0	3.0	3.0	3.2	6.1	9.7	6.4	12.1	7.3	–3.4	
1996	3.8	3.5	4.5	2.9	8.8	8.9	9.1	5.7	9.5	11.3	8.2	
1997	4.5	3.8	4.8	3.2	11.4	8.6	10.8	7.3	11.1	13.0	2.4	
1998	4.5	5.3	6.7	4.6	9.5	10.2	10.8	5.1	13.1	10.8	8.6	
1999	4.7	5.3	7.9	3.9	8.4	8.8	9.7	.1	12.5	12.4	6.3	
2000	4.1	5.1	5.2	5.0	6.5	6.9	9.1	7.8	9.7	8.9	.7	
2001	1.0	2.6	3.0	2.4	–6.1	–1.6	–2.4	–1.5	–4.3	.5	.9	
2002	1.8	2.6	3.9	1.9	–.6	–3.5	–6.9	–17.7	–5.4	–.5	6.1	
2003	2.8	3.1	4.8	2.2	4.1	4.0	1.9	–3.9	3.2	3.8	9.1	
2004	3.8	3.8	5.1	3.2	8.8	6.7	5.2	–.4	7.7	5.1	10.0	
2005	3.3	3.5	4.1	3.2	6.4	6.8	7.0	1.7	9.6	6.5	6.6	
2006	2.7	3.0	3.6	2.7	2.1	2.0	7.1	7.2	8.6	4.5	–7.6	
2007	1.8	2.2	2.7	2.0	–3.1	–2.0	5.9	12.7	3.2	4.8	–18.8	
2008	–.3	–.3	–2.5	.8	–9.4	–6.8	–.7	6.1	–6.9	3.0	–24.0	
2009	–2.8	–1.6	–3.0	–.9	–21.6	–16.7	–15.6	–18.9	–22.9	–1.4	–21.2	
2010	2.5	1.9	3.4	1.2	12.9	1.5	2.5	–16.4	15.9	1.9	–2.5	
2011	1.6	2.3	3.1	1.8	5.2	6.3	7.7	2.3	13.6	3.6	.5	
2012	2.2	1.5	2.7	.8	10.6	9.8	9.0	12.9	10.8	3.9	13.5	
2013	1.7	1.5	3.1	.6	6.1	5.0	3.5	1.4	4.6	3.4	11.9	
2014	2.4	2.9	3.9	2.3	4.5	5.5	6.0	10.3	5.4	3.9	3.5	
2015	2.6	3.2	4.0	2.8	5.0	4.0	2.1	–4.4	3.5	4.8	11.7	
2013: I	2.8	1.9	5.7	.0	13.8	7.0	5.2	–5.1	8.7	7.6	14.7	
II	.8	.8	1.3	.6	5.0	4.3	2.5	10.4	2.8	–3.2	12.0	
III	3.1	1.9	2.9	1.3	13.4	2.9	2.1	17.1	–5.2	3.6	6.0	
IV	4.0	3.4	4.0	3.1	5.4	6.6	9.5	2.1	19.5	1.1	–4.5	
2014: I	–1.2	1.9	2.4	1.7	–6.6	5.3	7.0	25.1	.3	4.9	–1.4	
II	4.0	3.8	6.7	2.3	11.2	7.2	6.1	7.4	6.5	4.5	11.7	
III	5.0	3.7	4.3	3.4	8.9	7.4	8.3	–2.7	15.2	7.1	3.6	
IV	2.3	4.6	5.1	4.3	2.6	1.3	–1.1	4.1	–8.9	7.8	11.4	
2015: I	2.0	2.4	2.7	2.3	9.9	3.7	1.3	–12.3	9.3	.8	13.3	
II	2.6	2.9	4.3	2.2	1.0	4.3	1.6	–2.7	–.3	8.0	14.9	
III	2.0	2.7	4.2	2.0	2.0	5.7	3.9	–4.3	9.1	2.1	12.6	
IV	.9	2.3	2.1	2.3	–2.3	–.2	–3.3	–15.2	–2.6	4.6	11.5	
2016: I	.8	1.6	1.2	1.9	–3.3	–.9	–3.4	.1	–9.5	3.7	7.8	
II	1.4	4.3	7.1	3.0	–7.9	–1.1	1.0	–2.1	–2.9	9.0	–7.7	
III *p*	3.2	2.8	3.4	2.5	2.1	–.9	.1	10.1	–4.8	1.0	–4.4	

See next page for continuation of table.

TABLE B–1. Percent changes in real gross domestic product, 1965–2016—*Continued*

[Percent change from preceding period; quarterly data at seasonally adjusted annual rates]

Year or quarter	Net exports of goods and services			Government consumption expenditures and gross investment					Final sales of domestic product	Gross domestic purchases [1]	Final sales to private domestic purchasers [2]	Gross domestic income (GDI) [3]	Average of GDP and GDI
	Net exports	Exports	Imports	Total	Federal			State and local					
					Total	National defense	Non-defense						
1965	.....	2.8	10.6	3.2	0.8	–1.3	7.9	6.6	5.9	6.9	7.2	6.4	6.4
1966	.....	6.9	14.9	8.7	10.7	12.9	3.6	6.2	6.1	6.9	5.8	6.0	6.3
1967	.....	2.3	7.3	7.9	10.1	12.5	1.9	5.0	3.3	3.0	2.1	3.0	2.9
1968	.....	7.9	14.9	3.4	1.5	1.6	1.3	6.0	5.1	5.2	6.0	5.0	4.9
1969	.....	4.9	5.7	.2	–2.4	–4.1	3.9	3.5	3.2	3.2	4.2	3.3	3.2
1970	.....	10.7	4.3	–2.0	–6.1	–8.2	1.0	2.9	.9	–.1	1.4	–.1	.0
1971	.....	1.7	5.3	–1.8	–6.4	–10.2	5.6	3.1	2.7	3.5	4.4	3.0	3.1
1972	.....	7.8	11.3	–.5	–3.1	–6.9	7.2	2.2	5.2	5.4	7.3	5.5	5.4
1973	.....	18.8	4.6	–.3	–3.6	–5.1	.2	2.8	5.2	4.8	5.8	5.8	5.7
1974	.....	7.9	–2.3	2.3	.7	–1.0	4.6	3.7	–.3	–1.2	–1.9	–.6	–.5
1975	.....	–.6	–11.1	2.2	.5	–1.0	3.9	3.6	1.0	–1.1	–.4	–.5	–.4
1976	.....	4.4	19.5	.5	.2	–.5	1.6	.8	4.0	6.5	6.4	5.1	5.2
1977	.....	2.4	10.9	1.2	2.2	1.0	4.7	.4	4.4	5.3	6.2	4.8	4.7
1978	.....	10.5	8.7	2.9	2.5	.8	6.0	3.3	5.5	5.5	6.0	5.5	5.5
1979	.....	9.9	1.7	1.9	2.3	2.7	1.7	1.5	3.6	2.5	3.2	2.4	2.8
1980	.....	10.8	–6.6	1.9	4.4	3.9	5.4	–.2	.6	–1.9	–1.7	–.1	–.2
1981	.....	1.2	2.6	1.0	4.5	6.2	1.0	–2.0	1.5	2.7	1.8	3.0	2.8
1982	.....	–7.6	–1.3	1.8	3.7	7.2	–3.6	.1	–.6	–1.3	–.5	–1.0	–1.4
1983	.....	–2.6	12.6	3.8	6.5	7.3	4.7	1.3	4.3	5.9	6.1	3.3	4.0
1984	.....	8.2	24.3	3.6	3.3	5.2	–1.4	3.8	5.4	8.7	7.6	7.8	7.5
1985	.....	3.3	6.5	6.8	7.9	8.8	5.7	5.7	5.4	4.5	5.3	4.0	4.1
1986	.....	7.7	8.5	5.4	5.9	6.9	3.1	5.0	3.8	3.7	3.7	3.0	3.3
1987	.....	10.9	5.9	3.0	3.8	5.1	.2	2.2	3.1	3.2	2.8	4.3	3.9
1988	.....	16.2	3.9	1.3	–1.3	–.2	–4.3	3.9	4.4	3.3	4.0	5.1	4.6
1989	.....	11.6	4.4	2.9	1.7	–.2	7.2	4.0	3.5	3.1	3.0	2.5	3.1
1990	.....	8.8	3.6	3.2	2.1	.3	7.3	4.1	2.1	1.5	1.3	1.5	1.7
1991	.....	6.6	–.1	1.2	.0	–1.0	2.4	2.2	.2	–.7	–.9	.0	.0
1992	.....	6.9	7.0	.5	–1.5	–4.5	5.9	2.1	3.3	3.6	4.0	3.3	3.4
1993	.....	3.3	8.6	–.8	–3.5	–5.1	.0	1.2	2.7	3.3	4.3	2.2	2.5
1994	.....	8.8	11.9	.1	–3.5	–4.9	–.8	2.8	3.4	4.4	4.7	4.4	4.2
1995	.....	10.3	8.0	.5	–2.6	–4.0	.0	2.7	3.2	2.6	3.6	3.4	3.1
1996	.....	8.2	8.7	1.0	–1.2	–1.6	–.5	2.4	3.8	3.9	4.6	4.3	4.0
1997	.....	11.9	13.5	1.9	–.8	–2.7	2.8	3.6	4.0	4.7	4.8	5.1	4.8
1998	.....	2.3	11.7	2.1	–.9	–2.1	1.3	3.8	4.5	5.5	6.4	5.3	4.9
1999	.....	2.6	10.1	3.4	2.0	1.5	2.7	4.2	4.7	5.5	6.1	4.4	4.5
2000	.....	8.6	13.0	1.9	.3	–.9	2.3	2.8	4.2	4.8	5.5	4.7	4.4
2001	.....	–5.8	–2.8	3.8	3.9	3.5	4.7	3.7	1.9	1.2	1.7	1.1	1.0
2002	.....	–1.7	3.7	4.4	7.2	7.0	7.4	2.9	1.3	2.3	1.3	1.4	1.6
2003	.....	1.8	4.5	2.2	6.8	8.5	4.1	–.4	2.8	3.1	3.3	2.3	2.5
2004	.....	9.8	11.4	1.6	4.5	6.0	2.0	–.1	3.4	4.3	4.4	3.7	3.8
2005	.....	6.3	6.3	.6	1.7	2.0	1.3	.0	3.4	3.5	4.2	3.6	3.4
2006	.....	9.0	6.3	1.5	2.5	2.0	3.5	.9	2.6	2.6	2.8	4.0	3.3
2007	.....	9.3	2.5	1.6	1.7	2.5	.3	1.5	2.0	1.1	1.3	.1	.9
2008	.....	5.7	–2.6	2.8	6.8	7.5	5.5	.3	.2	–1.3	–1.7	–.8	–.6
2009	.....	–8.8	–13.7	3.2	5.7	5.4	6.2	1.6	–2.0	–3.8	–4.6	–2.6	–2.7
2010	.....	11.9	12.7	.1	4.4	3.2	6.4	–2.7	1.1	2.9	1.9	2.7	2.6
2011	.....	6.9	5.5	–3.0	–2.7	–2.3	–3.4	–3.3	1.7	1.6	2.9	2.2	1.9
2012	.....	3.4	2.2	–1.9	–1.9	–3.4	.9	–1.9	2.1	2.1	2.9	3.3	2.7
2013	.....	3.5	1.1	–2.9	–5.8	–6.8	–4.1	–.8	1.5	1.3	2.1	1.2	1.5
2014	.....	4.3	4.4	–.9	–2.5	–4.1	.1	.2	2.5	2.4	3.4	3.0	2.7
2015	.....	.1	4.6	1.8	.0	–2.1	3.3	2.9	2.4	3.2	3.3	2.5	2.6
2013: I	.....	4.0	1.3	–4.3	–10.5	–12.0	–8.1	.2	1.8	2.4	2.8	–.2	1.3
II	.....	5.0	5.3	–2.0	–5.3	–5.3	–5.2	.3	.6	.9	1.5	2.0	1.4
III	.....	3.1	1.7	–2.0	–5.1	–6.6	–2.6	.1	1.5	2.9	2.1	.8	2.0
IV	.....	11.8	1.6	–2.8	–5.7	–4.2	–8.1	–1.0	4.1	2.6	4.0	2.5	3.2
2014: I	.....	–2.7	4.9	–1.0	–.2	–5.0	8.3	–1.5	.8	.0	2.5	2.1	.4
II	.....	8.7	9.9	.1	–2.8	–3.2	–2.0	2.0	3.3	4.3	4.4	5.4	4.7
III	.....	2.1	–1.2	2.5	3.9	4.0	3.9	1.6	4.7	4.3	4.4	4.5	4.7
IV	.....	4.5	11.2	–.4	–6.0	–11.6	3.5	3.3	2.1	3.4	4.0	4.0	3.1
2015: I	.....	–5.8	5.6	2.6	1.9	–.4	5.4	3.0	1.0	3.6	2.7	1.6	1.8
II	.....	2.9	2.9	3.2	.2	–.5	1.1	5.1	3.2	2.6	3.2	.6	1.6
III	.....	–2.8	1.1	1.9	1.0	–1.2	4.2	2.5	2.6	2.4	3.3	2.5	2.2
IV	.....	–2.7	.7	1.0	3.8	4.4	2.8	–.6	1.2	1.3	1.8	1.5	1.2
2016: I	.....	–.7	–.6	1.6	–1.5	–3.2	.9	3.5	1.2	.8	1.1	.8	.8
II	.....	1.8	.2	–1.7	–.4	–3.2	3.8	–2.5	2.6	1.2	3.2	.7	1.1
III *p*	.....	10.1	2.1	.2	2.5	2.1	3.0	–1.1	2.7	2.2	2.1	5.2	4.2

[1] Gross domestic product (GDP) less exports of goods and services plus imports of goods and services.
[2] Personal consumption expenditures plus gross private fixed investment.
[3] Gross domestic income is deflated by the implicit price deflator for GDP.

Note: Percent changes based on unrounded GDP quantity indexes.

Source: Department of Commerce (Bureau of Economic Analysis).

Table B–2. Gross domestic product, 2000–2016

[Quarterly data at seasonally adjusted annual rates]

Year or quarter	Gross domestic product	Personal consumption expenditures			Gross private domestic investment							Change in private inventories
						Fixed investment						
							Nonresidential				Residential	
		Total	Goods	Services	Total	Total	Total	Structures	Equipment	Intellectual property products		
	Billions of dollars											
2000	10,284.8	6,792.4	2,452.9	4,339.5	2,033.8	1,979.2	1,493.8	318.1	766.1	409.5	485.4	54.5
2001	10,621.8	7,103.1	2,525.2	4,577.9	1,928.6	1,966.9	1,453.9	329.7	711.5	412.6	513.0	–38.3
2002	10,977.5	7,384.1	2,598.6	4,785.5	1,925.0	1,906.5	1,348.9	282.9	659.6	406.4	557.6	18.5
2003	11,510.7	7,765.5	2,721.6	5,044.0	2,027.9	2,008.7	1,371.7	281.8	669.0	420.9	636.9	19.3
2004	12,274.9	8,260.0	2,900.3	5,359.8	2,276.7	2,212.8	1,463.1	301.8	719.2	442.1	749.7	63.9
2005	13,093.7	8,794.1	3,080.3	5,713.8	2,527.1	2,467.5	1,611.5	345.6	790.7	475.1	856.1	59.6
2006	13,855.9	9,304.0	3,235.8	6,068.2	2,680.6	2,613.7	1,776.3	415.6	856.1	504.6	837.4	67.0
2007	14,477.6	9,750.5	3,361.6	6,388.9	2,643.7	2,609.3	1,920.6	496.9	885.8	537.9	688.7	34.5
2008	14,718.6	10,013.6	3,375.7	6,637.9	2,424.8	2,456.8	1,941.0	552.4	825.1	563.4	515.9	–32.0
2009	14,418.7	9,847.0	3,198.4	6,648.5	1,878.1	2,025.7	1,633.4	438.2	644.3	550.9	392.2	–147.6
2010	14,964.4	10,202.2	3,362.8	6,839.4	2,100.8	2,039.3	1,658.2	362.0	731.8	564.3	381.1	61.5
2011	15,517.9	10,689.3	3,596.5	7,092.8	2,239.9	2,198.1	1,812.1	381.6	838.2	592.2	386.0	41.8
2012	16,155.3	11,050.6	3,739.1	7,311.5	2,511.7	2,449.9	2,007.7	448.0	937.9	621.7	442.2	61.8
2013	16,691.5	11,361.2	3,834.5	7,526.7	2,706.3	2,613.9	2,094.4	463.6	982.8	647.9	519.5	92.4
2014	17,393.1	11,863.4	3,970.5	7,892.9	2,886.5	2,821.0	2,251.0	530.7	1,040.7	679.6	570.1	65.4
2015	18,036.6	12,283.7	4,012.1	8,271.6	3,056.6	2,963.2	2,311.3	507.3	1,086.1	717.9	651.9	93.4
2013: I	16,475.4	11,256.7	3,827.6	7,429.0	2,617.6	2,554.0	2,058.3	439.3	974.3	644.7	495.7	63.6
II	16,541.4	11,284.5	3,803.6	7,480.9	2,658.1	2,593.6	2,077.1	454.7	980.4	642.0	516.5	64.5
III	16,749.3	11,379.1	3,834.7	7,544.5	2,750.8	2,625.3	2,094.2	476.1	968.6	649.5	531.1	125.5
IV	16,999.9	11,524.4	3,872.2	7,652.2	2,798.6	2,682.7	2,147.9	484.3	1,008.0	655.6	534.8	115.9
2014: I	17,025.2	11,636.1	3,900.8	7,735.3	2,774.0	2,738.6	2,194.5	518.1	1,011.6	664.7	544.1	35.4
II	17,285.6	11,800.6	3,967.4	7,833.2	2,861.6	2,796.7	2,235.5	531.8	1,031.5	672.2	561.2	64.9
III	17,569.4	11,941.0	3,999.7	7,941.3	2,939.8	2,863.6	2,287.5	532.4	1,070.8	684.4	576.0	76.2
IV	17,692.2	12,075.8	4,014.1	8,061.7	2,970.4	2,885.2	2,286.3	540.4	1,049.0	696.9	598.8	85.3
2015: I	17,783.6	12,098.9	3,956.7	8,142.2	3,044.6	2,915.7	2,297.6	519.8	1,076.6	701.2	618.1	129.0
II	17,998.3	12,240.2	4,010.7	8,229.5	3,049.9	2,944.7	2,304.9	512.9	1,075.7	716.3	639.8	105.2
III	18,141.9	12,356.9	4,043.0	8,313.9	3,072.1	2,995.3	2,331.5	508.5	1,099.7	723.3	663.8	76.8
IV	18,222.8	12,438.8	4,038.1	8,400.6	3,059.9	2,997.2	2,311.3	487.8	1,092.6	730.9	685.9	62.7
2016: I	18,281.6	12,498.0	4,008.7	8,489.3	3,036.8	2,994.8	2,292.4	486.0	1,066.3	740.1	702.4	41.9
II	18,450.1	12,692.7	4,085.4	8,607.3	2,987.5	3,002.5	2,304.7	487.3	1,058.7	758.7	697.8	–15.0
III *p*	18,657.9	12,825.3	4,110.6	8,714.8	3,010.0	3,005.8	2,306.9	498.5	1,048.6	759.8	698.9	4.2
	Billions of chained (2009) dollars											
2000	12,559.7	8,170.7	2,588.3	5,599.3	2,375.5	2,316.2	1,647.7	533.5	726.9	426.1	637.9	66.2
2001	12,682.2	8,382.6	2,666.6	5,731.0	2,231.4	2,280.0	1,608.4	525.4	695.7	428.0	643.7	–46.2
2002	12,908.8	8,598.8	2,770.2	5,838.2	2,218.2	2,201.1	1,498.0	432.5	658.0	425.9	682.7	22.5
2003	13,271.1	8,867.6	2,904.5	5,966.9	2,308.7	2,289.5	1,526.1	415.8	679.0	442.2	744.5	22.6
2004	13,773.5	9,208.2	3,051.9	6,156.6	2,511.3	2,443.9	1,605.4	414.1	731.2	464.9	818.9	71.4
2005	14,234.2	9,531.8	3,177.2	6,353.4	2,672.6	2,611.0	1,717.4	421.2	801.6	495.0	872.6	64.3
2006	14,613.8	9,821.7	3,292.5	6,526.6	2,730.0	2,662.5	1,839.6	451.5	870.8	517.5	806.6	71.6
2007	14,873.7	10,041.6	3,381.8	6,656.4	2,644.1	2,609.6	1,948.4	509.0	898.3	542.4	654.8	35.5
2008	14,830.4	10,007.2	3,297.8	6,708.6	2,396.0	2,432.6	1,934.4	540.2	836.1	558.8	497.7	–33.7
2009	14,418.7	9,847.0	3,198.4	6,648.5	1,878.1	2,025.7	1,633.4	438.2	644.3	550.9	392.2	–147.6
2010	14,783.8	10,036.3	3,308.7	6,727.6	2,120.4	2,056.2	1,673.8	366.3	746.7	561.3	382.4	58.2
2011	15,020.6	10,263.5	3,411.8	6,851.4	2,230.4	2,186.7	1,802.3	374.7	847.9	581.3	384.5	37.6
2012	15,354.6	10,413.2	3,504.3	6,908.1	2,465.7	2,400.4	1,964.1	423.1	939.2	603.8	436.5	54.7
2013	15,612.2	10,565.4	3,613.5	6,951.3	2,616.5	2,521.4	2,032.9	428.8	982.3	624.5	488.3	78.7
2014	15,982.3	10,868.9	3,755.4	7,114.2	2,733.6	2,660.6	2,155.6	472.9	1,035.7	648.6	505.4	57.7
2015	16,397.2	11,214.7	3,907.4	7,310.3	2,869.0	2,767.8	2,200.2	452.1	1,072.5	680.0	564.5	84.0
2013: I	15,491.9	10,502.3	3,582.9	6,918.6	2,543.0	2,482.7	2,006.7	412.0	972.7	625.2	475.9	49.6
II	15,521.6	10,523.9	3,594.3	6,929.0	2,574.3	2,508.8	2,019.0	422.3	979.6	620.1	489.5	52.6
III	15,641.3	10,573.1	3,620.5	6,952.2	2,656.8	2,526.7	2,029.6	439.3	966.6	625.5	496.8	109.0
IV	15,793.9	10,662.2	3,656.3	7,005.6	2,692.0	2,567.2	2,076.3	441.6	1,010.5	627.2	491.1	103.6
2014: I	15,747.0	10,712.8	3,678.2	7,034.4	2,646.4	2,600.5	2,111.8	467.0	1,011.3	634.7	489.4	31.7
II	15,900.8	10,813.3	3,738.7	7,075.4	2,717.5	2,646.1	2,143.4	475.4	1,027.4	641.7	503.1	55.2
III	16,094.5	10,912.9	3,778.6	7,135.3	2,776.3	2,693.4	2,186.7	472.2	1,064.4	652.8	507.6	66.8
IV	16,186.7	11,036.4	3,826.2	7,211.4	2,794.1	2,702.3	2,180.6	477.0	1,039.9	665.1	521.4	76.9
2015: I	16,269.0	11,102.4	3,851.5	7,252.4	2,860.8	2,727.2	2,187.9	461.5	1,063.2	666.5	538.0	114.4
II	16,374.2	11,181.3	3,892.1	7,291.8	2,867.7	2,756.0	2,196.6	458.4	1,062.3	679.5	556.9	93.8
III	16,454.9	11,255.9	3,932.6	7,327.2	2,882.2	2,794.5	2,217.5	453.4	1,085.7	683.1	573.7	70.9
IV	16,490.7	11,319.3	3,953.4	7,369.8	2,865.4	2,793.3	2,198.8	435.1	1,078.6	690.7	589.5	56.9
2016: I	16,525.0	11,365.2	3,964.7	7,403.9	2,841.5	2,786.7	2,179.7	435.2	1,052.0	697.1	600.7	40.7
II	16,583.1	11,484.9	4,032.9	7,458.5	2,783.8	2,778.8	2,185.0	432.9	1,044.1	712.2	588.7	–9.5
III *p*	16,712.5	11,563.5	4,066.7	7,504.2	2,798.1	2,772.4	2,185.8	443.4	1,031.5	714.0	582.1	7.6

See next page for continuation of table.

TABLE B–2. Gross domestic product, 2000–2016—*Continued*

[Quarterly data at seasonally adjusted annual rates]

Year or quarter	Net exports of goods and services			Government consumption expenditures and gross investment					Final sales of domestic product	Gross domestic purchases [1]	Final sales to private domestic purchasers [2]	Gross domestic income (GDI) [3]	Average of GDP and GDI
	Net exports	Exports	Imports	Total	Federal			State and local					
					Total	National defense	Non-defense						
	Billions of dollars												
2000	–375.8	1,096.8	1,472.6	1,834.4	632.4	391.7	240.7	1,202.0	10,230.2	10,660.6	8,771.6	10,384.3	10,334.5
2001	–368.7	1,026.7	1,395.4	1,958.8	669.2	412.7	256.5	1,289.5	10,660.1	10,990.5	9,070.0	10,736.8	10,679.3
2002	–426.5	1,002.5	1,429.0	2,094.9	740.6	456.8	283.8	1,354.3	10,959.0	11,404.0	9,290.5	11,050.3	11,013.9
2003	–503.7	1,040.3	1,543.9	2,220.8	824.8	519.9	304.9	1,396.0	11,491.4	12,014.3	9,774.2	11,524.3	11,517.5
2004	–619.2	1,181.5	1,800.7	2,357.4	892.4	570.2	322.1	1,465.0	12,211.1	12,894.1	10,472.8	12,283.5	12,279.2
2005	–721.2	1,308.9	2,030.1	2,493.7	946.3	608.3	338.1	1,547.4	13,034.1	13,814.9	11,261.6	13,129.2	13,111.5
2006	–770.9	1,476.3	2,247.3	2,642.2	1,002.0	642.4	359.6	1,640.2	13,788.9	14,626.8	11,917.7	14,073.2	13,964.5
2007	–718.5	1,664.6	2,383.2	2,801.9	1,049.8	678.7	371.0	1,752.2	14,443.2	15,196.2	12,359.8	14,460.1	14,468.9
2008	–723.1	1,841.9	2,565.0	3,003.2	1,155.6	754.1	401.5	1,847.6	14,750.6	15,441.6	12,470.5	14,619.2	14,668.9
2009	–395.4	1,587.7	1,983.2	3,089.1	1,217.7	788.3	429.4	1,871.4	14,566.3	14,814.2	11,872.7	14,343.4	14,381.1
2010	–512.7	1,852.3	2,365.0	3,174.0	1,303.9	832.8	471.1	1,870.2	14,902.8	15,477.0	12,241.5	14,915.2	14,939.8
2011	–580.0	2,106.4	2,686.4	3,168.7	1,303.5	836.9	466.5	1,865.3	15,476.2	16,097.9	12,887.4	15,556.3	15,537.1
2012	–565.7	2,198.2	2,763.8	3,158.6	1,292.5	817.8	474.7	1,866.1	16,093.5	16,720.9	13,500.5	16,358.5	16,256.9
2013	–492.0	2,276.6	2,768.6	3,116.1	1,229.5	767.0	462.5	1,886.6	16,599.1	17,183.5	13,975.1	16,829.5	16,760.5
2014	–508.8	2,375.3	2,884.1	3,152.1	1,218.9	746.0	472.9	1,933.2	17,327.7	17,901.9	14,684.4	17,651.1	17,522.1
2015	–522.0	2,264.3	2,786.3	3,218.3	1,225.0	732.0	493.0	1,993.3	17,943.3	18,558.6	15,246.9	18,290.3	18,163.5
2013: I	–519.5	2,242.2	2,761.7	3,120.7	1,245.3	779.6	465.7	1,875.4	16,411.8	16,995.0	13,810.6	16,635.8	16,555.6
II	–514.7	2,253.1	2,767.8	3,113.4	1,231.4	770.0	461.5	1,882.0	16,476.8	17,056.1	13,878.1	16,752.6	16,647.0
III	–492.9	2,274.1	2,767.0	3,112.3	1,220.2	759.3	460.9	1,892.1	16,623.8	17,242.3	14,004.4	16,867.8	16,808.6
IV	–440.9	2,337.1	2,777.9	3,117.7	1,220.9	759.0	461.9	1,896.8	16,883.9	17,440.8	14,207.1	17,061.6	17,030.7
2014: I	–508.4	2,339.1	2,847.4	3,123.6	1,218.1	750.0	468.0	1,905.5	16,989.9	17,533.6	14,374.7	17,225.5	17,125.4
II	–515.6	2,388.4	2,904.0	3,139.0	1,214.3	746.0	468.3	1,924.7	17,220.7	17,801.2	14,597.2	17,548.3	17,416.9
III	–485.6	2,394.7	2,880.3	3,174.2	1,230.6	755.5	475.1	1,943.6	17,493.2	18,055.0	14,804.6	17,817.0	17,693.2
IV	–525.5	2,379.0	2,904.6	3,171.4	1,212.5	732.5	480.0	1,958.9	17,606.9	18,217.7	14,961.0	18,013.5	17,852.8
2015: I	–534.7	2,287.8	2,822.4	3,174.7	1,218.8	731.2	487.6	1,955.9	17,654.7	18,318.3	15,014.6	18,084.5	17,934.1
II	–508.9	2,298.6	2,807.5	3,217.2	1,222.1	731.8	490.3	1,995.1	17,893.1	18,507.2	15,184.9	18,211.1	18,104.7
III	–523.4	2,259.1	2,782.5	3,236.3	1,225.0	729.3	495.7	2,011.3	18,065.1	18,665.3	15,352.2	18,378.0	18,260.0
IV	–520.9	2,211.7	2,732.6	3,245.0	1,234.0	735.6	498.4	2,011.0	18,160.1	18,743.7	15,436.0	18,487.6	18,355.2
2016: I	–507.4	2,179.0	2,686.3	3,254.3	1,233.8	731.4	502.4	2,020.5	18,239.7	18,789.0	15,492.8	18,546.0	18,413.8
II	–492.4	2,209.7	2,702.2	3,262.3	1,239.2	729.3	509.9	2,023.1	18,465.0	18,942.5	15,695.2	18,684.0	18,567.0
III *p*	–459.0	2,277.0	2,736.0	3,281.5	1,251.8	736.0	515.8	2,029.7	18,653.7	19,116.9	15,831.2	18,985.7	18,821.8
	Billions of chained (2009) dollars												
2000	–477.8	1,258.4	1,736.2	2,498.2	817.7	512.3	305.4	1,689.1	12,494.9	13,057.9	10,494.9	12,681.2	12,620.4
2001	–502.1	1,184.9	1,687.0	2,592.4	849.8	530.0	319.7	1,751.5	12,729.6	13,208.5	10,669.0	12,819.5	12,750.9
2002	–584.3	1,164.5	1,748.8	2,705.8	910.8	567.3	343.3	1,802.4	12,888.9	13,518.4	10,805.0	12,994.4	12,951.5
2003	–641.9	1,185.0	1,826.9	2,764.3	973.0	615.4	357.5	1,795.3	13,249.0	13,938.5	11,162.3	13,286.8	13,278.9
2004	–734.8	1,300.6	2,035.3	2,808.2	1,017.1	652.7	364.5	1,792.8	13,702.2	14,531.7	11,657.9	13,783.1	13,778.3
2005	–782.3	1,381.9	2,164.2	2,826.2	1,034.8	665.5	369.4	1,792.3	14,168.8	15,040.3	12,149.9	14,272.7	14,253.5
2006	–794.3	1,506.8	2,301.0	2,869.3	1,060.9	678.8	382.1	1,808.8	14,542.3	15,431.6	12,490.8	14,842.9	14,728.4
2007	–712.6	1,646.4	2,359.0	2,914.4	1,078.7	695.6	383.1	1,836.1	14,836.2	15,606.8	12,655.0	14,855.8	14,864.8
2008	–557.8	1,740.8	2,298.6	2,994.8	1,152.3	748.1	404.2	1,842.4	14,865.7	15,399.9	12,441.1	14,730.2	14,780.3
2009	–395.4	1,587.7	1,983.2	3,089.1	1,217.7	788.3	429.4	1,871.4	14,566.3	14,814.2	11,872.7	14,343.4	14,381.1
2010	–458.8	1,776.6	2,235.4	3,091.4	1,270.7	813.5	457.1	1,820.8	14,722.2	15,244.9	12,092.5	14,735.2	14,759.5
2011	–459.4	1,898.3	2,357.7	2,997.4	1,236.4	795.0	441.4	1,761.0	14,979.0	15,483.9	12,448.1	15,057.7	15,039.1
2012	–447.1	1,963.2	2,410.2	2,941.6	1,213.5	768.2	445.3	1,728.1	15,292.3	15,804.3	12,806.0	15,547.8	15,451.2
2013	–404.9	2,031.5	2,436.4	2,857.6	1,142.8	715.7	427.0	1,714.1	15,521.1	16,016.9	13,076.3	15,741.2	15,676.7
2014	–425.7	2,118.3	2,544.0	2,833.0	1,113.8	686.3	427.3	1,718.1	15,912.9	16,408.9	13,516.9	16,219.3	16,100.8
2015	–540.0	2,120.6	2,660.5	2,883.7	1,113.8	672.0	441.3	1,768.2	16,300.6	16,937.8	13,969.1	16,627.8	16,512.5
2013: I	–414.4	1,991.1	2,405.5	2,880.6	1,166.1	731.1	435.0	1,714.1	15,434.3	15,906.2	12,975.3	15,642.7	15,567.3
II	–421.1	2,015.5	2,436.6	2,866.2	1,150.5	721.2	429.2	1,715.2	15,459.1	15,943.5	13,022.4	15,719.8	15,620.7
III	–416.1	2,031.0	2,447.1	2,852.0	1,135.5	709.0	426.4	1,715.7	15,516.6	16,057.8	13,089.4	15,752.0	15,696.7
IV	–368.1	2,088.6	2,456.6	2,831.5	1,119.1	701.5	417.6	1,711.5	15,674.3	16,160.2	13,218.3	15,851.3	15,822.6
2014: I	–412.0	2,074.1	2,486.1	2,824.3	1,118.6	692.5	425.9	1,704.8	15,703.8	16,159.6	13,301.5	15,932.3	15,839.7
II	–427.5	2,118.0	2,545.5	2,825.1	1,110.8	686.8	423.8	1,713.2	15,833.0	16,329.7	13,447.0	16,142.4	16,021.6
III	–409.4	2,128.7	2,538.1	2,842.6	1,121.5	693.5	427.8	1,720.1	16,015.6	16,504.1	13,593.2	16,321.2	16,207.8
IV	–454.0	2,152.3	2,606.2	2,840.0	1,104.4	672.5	431.6	1,734.1	16,099.3	16,642.1	13,725.8	16,480.7	16,333.7
2015: I	–521.2	2,120.6	2,641.8	2,858.0	1,109.6	671.8	437.3	1,746.9	16,140.9	16,791.3	13,816.5	16,544.3	16,406.6
II	–524.9	2,135.5	2,660.5	2,880.7	1,110.1	671.0	438.6	1,768.9	16,267.5	16,900.1	13,924.1	16,567.8	16,471.0
III	–547.1	2,120.4	2,667.6	2,894.4	1,112.7	669.0	443.1	1,779.9	16,371.7	17,002.6	14,036.7	16,669.0	16,561.9
IV	–566.6	2,105.8	2,672.4	2,901.7	1,123.0	676.3	446.2	1,777.1	16,422.4	17,057.2	14,099.1	16,730.3	16,610.5
2016: I	–566.3	2,102.0	2,668.2	2,913.2	1,118.7	670.9	447.2	1,792.6	16,473.5	17,091.5	14,138.7	16,763.9	16,644.5
II	–558.5	2,111.3	2,669.7	2,900.9	1,117.7	665.5	451.4	1,781.4	16,579.5	17,142.6	14,251.0	16,793.4	16,688.3
III *p*	–521.0	2,162.9	2,683.9	2,902.7	1,124.5	668.9	454.8	1,776.6	16,688.9	17,236.9	14,323.7	17,006.1	16,859.3

[1] Gross domestic product (GDP) less exports of goods and services plus imports of goods and services.
[2] Personal consumption expenditures plus gross private fixed investment.
[3] For chained dollar measures, gross domestic income is deflated by the implicit price deflator for GDP.

Source: Department of Commerce (Bureau of Economic Analysis).

TABLE B–3. Quantity and price indexes for gross domestic product, and percent changes, 1965–2016

[Quarterly data are seasonally adjusted]

Year or quarter	Index numbers, 2009=100						Percent change from preceding period [1]					
	Gross domestic product (GDP)			Personal consumption expenditures (PCE)		Gross domestic purchases price index	Gross domestic product (GDP)			Personal consumption expenditures (PCE)		Gross domestic purchases price index
	Real GDP (chain-type quantity index)	GDP chain-type price index	GDP implicit price deflator	PCE chain-type price index	PCE less food and energy price index		Real GDP (chain-type quantity index)	GDP chain-type price index	GDP implicit price deflator	PCE chain-type price index	PCE less food and energy price index	
1965	27.580	18.744	18.702	18.681	19.325	18.321	6.5	1.8	1.8	1.4	1.3	1.7
1966	29.399	19.271	19.227	19.155	19.762	18.830	6.6	2.8	2.8	2.5	2.3	2.8
1967	30.205	19.831	19.786	19.637	20.367	19.346	2.7	2.9	2.9	2.5	3.1	2.7
1968	31.688	20.674	20.627	20.402	21.240	20.164	4.9	4.3	4.3	3.9	4.3	4.2
1969	32.683	21.691	21.642	21.326	22.238	21.149	3.1	4.9	4.9	4.5	4.7	4.9
1970	32.749	22.836	22.784	22.325	23.281	22.287	.2	5.3	5.3	4.7	4.7	5.4
1971	33.833	23.996	23.941	23.274	24.377	23.450	3.3	5.1	5.1	4.3	4.7	5.2
1972	35.609	25.035	24.978	24.070	25.165	24.498	5.2	4.3	4.3	3.4	3.2	4.5
1973	37.618	26.396	26.337	25.368	26.126	25.888	5.6	5.4	5.4	5.4	3.8	5.7
1974	37.424	28.760	28.703	28.009	28.196	28.511	–.5	9.0	9.0	10.4	7.9	10.1
1975	37.350	31.431	31.361	30.348	30.558	31.116	–.2	9.3	9.3	8.4	8.4	9.1
1976	39.361	33.157	33.083	32.013	32.415	32.821	5.4	5.5	5.5	5.5	6.1	5.5
1977	41.175	35.209	35.135	34.091	34.495	34.977	4.6	6.2	6.2	6.5	6.4	6.6
1978	43.466	37.680	37.602	36.479	36.802	37.459	5.6	7.0	7.0	7.0	6.7	7.1
1979	44.846	40.790	40.706	39.714	39.479	40.730	3.2	8.3	8.3	8.9	7.3	8.7
1980	44.736	44.480	44.377	43.978	43.093	44.963	–.2	9.0	9.0	10.7	9.2	10.4
1981	45.897	48.658	48.520	47.908	46.857	49.088	2.6	9.4	9.3	8.9	8.7	9.2
1982	45.020	51.624	51.530	50.553	49.881	51.876	–1.9	6.1	6.2	5.5	6.5	5.7
1983	47.105	53.658	53.565	52.729	52.466	53.697	4.6	3.9	3.9	4.3	5.2	3.5
1984	50.525	55.564	55.466	54.724	54.645	55.483	7.3	3.6	3.5	3.8	4.2	3.3
1985	52.666	57.341	57.240	56.661	56.898	57.151	4.2	3.2	3.2	3.5	4.1	3.0
1986	54.516	58.504	58.395	57.887	58.850	58.345	3.5	2.0	2.0	2.2	3.4	2.1
1987	56.403	59.935	59.885	59.650	60.719	59.985	3.5	2.4	2.6	3.0	3.2	2.8
1988	58.774	62.036	61.982	61.974	63.290	62.092	4.2	3.5	3.5	3.9	4.2	3.5
1989	60.937	64.448	64.392	64.641	65.869	64.516	3.7	3.9	3.9	4.3	4.1	3.9
1990	62.107	66.841	66.773	67.440	68.492	67.040	1.9	3.7	3.7	4.3	4.0	3.9
1991	62.061	69.057	68.996	69.652	70.886	69.112	–.1	3.3	3.3	3.3	3.5	3.1
1992	64.267	70.632	70.569	71.494	73.021	70.720	3.6	2.3	2.3	2.6	3.0	2.3
1993	66.032	72.315	72.248	73.279	75.008	72.324	2.7	2.4	2.4	2.5	2.7	2.3
1994	68.698	73.851	73.785	74.803	76.680	73.835	4.0	2.1	2.1	2.1	2.2	2.1
1995	70.566	75.393	75.324	76.356	78.324	75.421	2.7	2.1	2.1	2.1	2.1	2.1
1996	73.245	76.767	76.699	77.981	79.801	76.729	3.8	1.8	1.8	2.1	1.9	1.7
1997	76.531	78.088	78.012	79.327	81.196	77.852	4.5	1.7	1.7	1.7	1.7	1.5
1998	79.937	78.935	78.859	79.936	82.200	78.359	4.5	1.1	1.1	.8	1.2	.7
1999	83.682	80.065	80.065	81.110	83.291	79.579	4.7	1.4	1.5	1.5	1.3	1.6
2000	87.107	81.890	81.887	83.131	84.747	81.644	4.1	2.3	2.3	2.5	1.7	2.6
2001	87.957	83.755	83.754	84.736	86.281	83.209	1.0	2.3	2.3	1.9	1.8	1.9
2002	89.528	85.040	85.039	85.873	87.750	84.360	1.8	1.5	1.5	1.3	1.7	1.4
2003	92.041	86.735	86.735	87.572	89.047	86.196	2.8	2.0	2.0	2.0	1.5	2.2
2004	95.525	89.118	89.120	89.703	90.751	88.729	3.8	2.7	2.7	2.4	1.9	2.9
2005	98.720	91.985	91.988	92.261	92.711	91.851	3.3	3.2	3.2	2.9	2.2	3.5
2006	101.353	94.812	94.814	94.729	94.786	94.783	2.7	3.1	3.1	2.7	2.2	3.2
2007	103.156	97.340	97.337	97.102	96.832	97.372	1.8	2.7	2.7	2.5	2.2	2.7
2008	102.855	99.218	99.246	100.065	98.827	100.244	–.3	1.9	2.0	3.1	2.1	2.9
2009	100.000	100.000	100.000	100.000	100.000	100.000	–2.8	.8	.8	–.1	1.2	–.2
2010	102.532	101.226	101.221	101.653	101.286	101.527	2.5	1.2	1.2	1.7	1.3	1.5
2011	104.174	103.315	103.311	104.149	102.800	103.970	1.6	2.1	2.1	2.5	1.5	2.4
2012	106.491	105.220	105.214	106.121	104.741	105.805	2.2	1.8	1.8	1.9	1.9	1.8
2013	108.277	106.917	106.913	107.532	106.323	107.287	1.7	1.6	1.6	1.3	1.5	1.4
2014	110.844	108.838	108.828	109.150	108.048	109.109	2.4	1.8	1.8	1.5	1.6	1.7
2015	113.721	109.999	109.998	109.532	109.540	109.569	2.6	1.1	1.1	.3	1.4	.4
2013: I	107.443	106.318	106.349	107.184	105.796	106.813	2.8	1.4	1.6	1.4	1.7	1.4
II	107.649	106.565	106.570	107.229	106.097	106.972	.8	.9	.8	.2	1.1	.6
III	108.479	107.112	107.084	107.625	106.465	107.403	3.1	2.1	1.9	1.5	1.4	1.6
IV	109.538	107.674	107.636	108.089	106.934	107.961	4.0	2.1	2.1	1.7	1.8	2.1
2014: I	109.212	108.140	108.117	108.621	107.365	108.525	–1.2	1.7	1.8	2.0	1.6	2.1
II	110.279	108.714	108.709	109.133	107.910	109.015	4.0	2.1	2.2	1.9	2.0	1.8
III	111.622	109.178	109.165	109.425	108.308	109.411	5.0	1.7	1.7	1.1	1.5	1.5
IV	112.262	109.321	109.300	109.422	108.608	109.487	2.3	.5	.5	.0	1.1	.3
2015: I	112.832	109.307	109.310	108.979	108.908	109.090	2.0	–.1	.0	–1.6	1.1	–1.4
II	113.562	109.922	109.919	109.472	109.385	109.512	2.6	2.3	2.2	1.8	1.8	1.6
III	114.121	110.268	110.253	109.784	109.770	109.793	2.0	1.3	1.2	1.1	1.4	1.0
IV	114.370	110.498	110.504	109.892	110.095	109.881	.9	.8	.9	.4	1.2	.3
2016: I	114.608	110.635	110.630	109.969	110.657	109.936	.8	.5	.5	.3	2.1	.2
II	115.011	111.268	111.258	110.519	111.150	110.509	1.4	2.3	2.3	2.0	1.8	2.1
III [p]	115.908	111.656	111.640	110.914	111.619	110.922	3.2	1.4	1.4	1.4	1.7	1.5

[1] Quarterly percent changes are at annual rates.

Source: Department of Commerce (Bureau of Economic Analysis).

Table B–4. Growth rates in real gross domestic product by area and country, 1998–2017

[Percent change]

Area and country	1998–2007 annual average	2008	2009	2010	2011	2012	2013	2014	2015	2016 [1]	2017 [1]
World	4.2	3.0	–.1	5.4	4.2	3.5	3.3	3.4	3.2	3.1	3.4
Advanced economies	2.8	.1	–3.4	3.1	1.7	1.2	1.2	1.9	2.1	1.6	1.8
Of which:											
United States	3.0	–.3	–2.8	2.5	1.6	2.2	1.7	2.4	2.6	1.6	2.2
Euro area [2]	2.4	.4	–4.5	2.1	1.5	–.9	–.3	1.1	2.0	1.7	1.5
Germany	1.7	.8	–5.6	4.0	3.7	.7	.6	1.6	1.5	1.7	1.4
France	2.4	.2	–2.9	2.0	2.1	.2	.6	.6	1.3	1.3	1.3
Italy	1.5	–1.1	–5.5	1.7	.6	–2.8	–1.7	–.3	.8	.8	.9
Spain	3.9	1.1	–3.6	.0	–1.0	–2.6	–1.7	1.4	3.2	3.1	2.2
Japan	1.0	–1.0	–5.5	4.7	–.5	1.7	1.4	.0	.5	.5	.6
United Kingdom	2.9	–.6	–4.3	1.9	1.5	1.3	1.9	3.1	2.2	1.8	1.1
Canada	3.2	1.0	–2.9	3.1	3.1	1.7	2.2	2.5	1.1	1.2	1.9
Other advanced economies	4.0	1.7	–.9	5.9	3.4	2.1	2.3	2.8	2.0	2.0	2.3
Emerging market and developing economies	5.8	5.8	2.9	7.5	6.3	5.3	5.0	4.6	4.0	4.2	4.6
Regional groups:											
Commonwealth of Independent States [3]	6.2	5.3	–6.3	4.7	4.7	3.5	2.1	1.1	–2.8	–.3	1.4
Russia	5.8	5.2	–7.8	4.5	4.0	3.5	1.3	.7	–3.7	–.8	1.1
Excluding Russia	7.5	5.6	–2.4	5.1	6.2	3.6	4.3	2.0	–.5	.9	2.3
Emerging and Developing Asia	7.6	7.2	7.5	9.6	7.9	7.0	7.0	6.8	6.6	6.5	6.3
China	9.9	9.6	9.2	10.6	9.5	7.9	7.8	7.3	6.9	6.6	6.2
India [4]	7.1	3.9	8.5	10.3	6.6	5.6	6.6	7.2	7.6	7.6	7.6
ASEAN-5 [5]	3.7	5.4	2.4	6.9	4.7	6.2	5.1	4.6	4.8	4.8	5.1
Emerging and Developing Europe	4.2	3.1	–3.0	4.7	5.4	1.2	2.8	2.8	3.6	3.3	3.1
Latin America and the Caribbean	3.1	4.0	–1.8	6.1	4.6	3.0	2.9	1.0	.0	–.6	1.6
Brazil	3.0	5.1	–.1	7.5	3.9	1.9	3.0	.1	–3.8	–3.3	.5
Mexico	2.9	1.4	–4.7	5.1	4.0	4.0	1.4	2.2	2.5	2.1	2.3
Middle East, North Africa, Afghanistan, and Pakistan	5.3	4.8	1.5	4.9	4.5	5.0	2.4	2.7	2.3	3.4	3.4
Saudi Arabia	2.9	6.2	–2.1	4.8	10.0	5.4	2.7	3.6	3.5	1.2	2.0
Sub-Saharan Africa	5.2	5.9	3.9	7.0	5.0	4.3	5.2	5.1	3.4	1.4	2.9
Nigeria	7.0	7.2	8.4	11.3	4.9	4.3	5.4	6.3	2.7	–1.7	.6
South Africa	3.7	3.2	–1.5	3.0	3.3	2.2	2.3	1.6	1.3	.1	.8

[1] All figures are forecasts as published by the International Monetary Fund.
[2] For 2017, includes data for: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovak Republic, Slovenia, and Spain.
[3] Includes Georgia,Turkmenistan, and Ukraine, which are not members of the Commonwealth of Independent States but are included for reasons of geography and similarity in economic structure.
[4] Data and forecasts are presented on a fiscal year basis and output growth is based on GDP at market prices.
[5] Consists of Indonesia, Malaysia, Philippines, Thailand, and Vietnam.

Note: For details on data shown in this table, see *World Economic Outlook*, October 2016, published by the International Monetary Fund.

Source: International Monetary Fund.

TABLE B–5. Real exports and imports of goods and services, 1999–2016

[Billions of chained (2009) dollars; quarterly data at seasonally adjusted annual rates]

Year or quarter	Exports of goods and services					Imports of goods and services				
	Total	Goods [1]			Services [1]	Total	Goods [1]			Services [1]
		Total	Durable goods	Nondurable goods			Total	Durable goods	Nondurable goods	
1999	1,159.1	819.4	533.8	288.0	338.6	1,536.2	1,286.9	724.4	572.8	245.4
2000	1,258.4	902.2	599.3	301.9	354.3	1,736.2	1,455.4	834.4	624.4	276.4
2001	1,184.9	846.7	549.5	300.1	336.6	1,687.0	1,408.4	782.2	641.1	274.6
2002	1,164.5	817.8	518.7	305.7	345.7	1,748.8	1,461.1	815.3	659.3	283.6
2003	1,185.0	833.1	528.0	312.0	350.8	1,826.9	1,533.0	850.4	698.9	289.6
2004	1,300.6	904.5	586.0	323.4	395.4	2,035.3	1,704.1	969.3	745.7	326.4
2005	1,381.9	970.6	641.0	333.2	410.3	2,164.2	1,817.9	1,051.6	774.8	341.1
2006	1,506.8	1,062.0	710.1	355.2	443.5	2,301.0	1,925.4	1,145.2	787.7	370.5
2007	1,646.4	1,141.5	770.8	373.9	504.1	2,359.0	1,960.9	1,174.5	794.2	393.5
2008	1,740.8	1,211.5	810.2	404.2	528.3	2,298.6	1,887.9	1,129.0	766.1	408.2
2009	1,587.7	1,065.1	671.6	393.5	522.6	1,983.2	1,590.3	893.8	696.5	392.9
2010	1,776.6	1,218.3	784.8	434.0	558.0	2,235.4	1,826.7	1,095.2	735.8	407.8
2011	1,898.3	1,297.6	852.0	448.2	600.6	2,357.7	1,932.1	1,197.9	745.9	424.2
2012	1,963.2	1,344.2	890.8	457.5	618.7	2,410.2	1,972.2	1,283.3	715.1	437.1
2013	2,031.5	1,385.7	911.3	477.4	645.7	2,436.4	1,995.4	1,332.1	698.1	439.9
2014	2,118.3	1,447.3	948.2	501.7	670.9	2,544.0	2,090.8	1,433.8	702.7	451.4
2015	2,120.6	1,438.1	922.5	516.4	681.9	2,660.5	2,194.1	1,509.6	733.4	464.4
2013: I	1,991.1	1,350.5	894.2	460.4	640.7	2,405.5	1,968.0	1,301.8	697.5	436.5
II	2,015.5	1,372.3	916.6	461.2	643.1	2,436.6	1,996.1	1,326.4	703.0	439.3
III	2,031.0	1,384.2	908.2	478.7	646.6	2,447.1	2,004.7	1,340.7	699.5	441.2
IV	2,088.6	1,435.7	926.3	509.5	652.6	2,456.6	2,012.8	1,359.3	692.3	442.6
2014: I	2,074.1	1,408.8	926.8	485.3	665.0	2,486.1	2,040.7	1,376.3	703.3	443.9
II	2,118.0	1,445.0	945.8	501.7	672.8	2,545.5	2,093.0	1,435.5	703.5	450.7
III	2,128.7	1,460.7	959.1	504.5	667.9	2,538.1	2,085.6	1,437.2	695.8	450.7
IV	2,152.3	1,474.5	961.1	515.4	677.7	2,606.2	2,144.0	1,486.0	708.3	460.4
2015: I	2,120.6	1,435.8	928.1	508.9	684.0	2,641.8	2,179.6	1,501.5	727.3	460.2
II	2,135.5	1,452.0	929.8	523.0	683.2	2,660.5	2,198.1	1,507.2	739.4	460.4
III	2,120.4	1,440.7	921.5	520.0	679.3	2,667.6	2,197.4	1,512.7	733.5	468.2
IV	2,105.8	1,423.8	910.7	513.8	681.1	2,672.4	2,201.4	1,517.0	733.3	469.0
2016: I	2,102.0	1,424.1	899.3	526.2	677.3	2,668.2	2,194.1	1,497.0	745.4	471.9
II	2,111.3	1,430.1	900.4	531.3	680.5	2,669.7	2,194.3	1,493.1	749.4	473.2
III *p*	2,162.9	1,478.3	911.1	569.7	685.4	2,683.9	2,198.1	1,508.5	738.5	483.1

[1] Certain goods, primarily military equipment purchased and sold by the Federal Government, are included in services. Repairs and alterations of equipment are also included in services.

Source: Department of Commerce (Bureau of Economic Analysis).

Table B–6. Corporate profits by industry, 1965–2016

[Billions of dollars; quarterly data at seasonally adjusted annual rates]

Year or quarter	Corporate profits with inventory valuation adjustment and without capital consumption adjustment													
	Total	Domestic industries												Rest of the world
		Total	Financial			Nonfinancial								
			Total	Federal Reserve banks	Other	Total	Manufacturing	Transportation [1]	Utilities	Wholesale trade	Retail trade	Information	Other	
SIC: [2]														
1965	81.9	77.2	9.3	1.3	8.0	67.9	42.1	11.4	.....	3.8	4.9	.....	5.7	4.7
1966	88.3	83.7	10.7	1.7	9.1	73.0	45.3	12.6	.....	4.0	4.9	.....	6.3	4.5
1967	86.1	81.3	11.2	2.0	9.2	70.1	42.4	11.4	.....	4.1	5.7	.....	6.6	4.8
1968	94.3	88.6	12.9	2.5	10.4	75.7	45.8	11.4	.....	4.7	6.4	.....	7.4	5.6
1969	90.8	84.2	13.6	3.1	10.6	70.6	41.6	11.1	.....	4.9	6.4	.....	6.5	6.6
1970	79.7	72.6	15.5	3.5	12.0	57.1	32.0	8.8	.....	4.6	6.1	.....	5.8	7.1
1971	94.7	86.8	17.9	3.3	14.6	69.0	40.0	9.6	.....	5.4	7.3	.....	6.7	7.9
1972	109.3	99.7	19.5	3.3	16.1	80.3	47.6	10.4	.....	7.2	7.5	.....	7.6	9.5
1973	126.6	111.7	21.1	4.5	16.6	90.6	55.0	10.2	.....	8.8	7.0	.....	9.6	14.9
1974	123.3	105.8	20.8	5.7	15.1	85.1	51.0	9.1	.....	12.2	2.8	.....	10.0	17.5
1975	144.2	129.6	20.4	5.6	14.8	109.2	63.0	11.7	.....	14.3	8.4	.....	11.8	14.6
1976	182.1	165.6	25.6	5.9	19.7	140.0	82.5	17.5	.....	13.7	10.9	.....	15.3	16.5
1977	212.8	193.7	32.6	6.1	26.5	161.1	91.5	21.2	.....	16.4	12.8	.....	19.2	19.1
1978	246.7	223.8	40.8	7.6	33.1	183.1	105.8	25.5	.....	16.7	13.1	.....	22.0	22.9
1979	261.0	226.4	41.8	9.4	32.3	184.6	107.1	21.6	.....	20.0	10.7	.....	25.2	34.6
1980	240.6	205.2	35.2	11.8	23.5	169.9	97.6	22.2	.....	18.5	7.0	.....	24.6	35.5
1981	252.0	222.3	30.3	14.4	15.9	192.0	112.5	25.1	.....	23.7	10.7	.....	20.1	29.7
1982	224.8	192.2	27.2	15.2	12.0	165.0	89.6	28.1	.....	20.7	14.3	.....	12.3	32.6
1983	256.4	221.4	36.2	14.6	21.6	185.2	97.3	34.3	.....	21.9	19.3	.....	12.3	35.1
1984	294.3	257.7	34.7	16.4	18.3	223.0	114.2	44.7	.....	30.4	21.5	.....	12.1	36.6
1985	289.7	251.6	46.5	16.3	30.2	205.1	107.1	39.1	.....	24.6	22.8	.....	11.4	38.1
1986	273.3	233.8	56.4	15.5	40.8	177.4	75.6	39.3	.....	24.4	23.4	.....	14.7	39.5
1987	314.6	266.5	60.3	16.2	44.1	206.2	101.8	42.0	.....	18.9	23.3	.....	20.3	48.0
1988	366.2	309.2	66.9	18.1	48.8	242.3	132.8	46.8	.....	20.4	19.8	.....	22.5	57.0
1989	373.1	305.9	78.3	20.6	57.6	227.6	122.3	41.9	.....	22.0	20.9	.....	20.5	67.1
1990	391.2	315.1	89.6	21.8	67.8	225.5	120.9	43.5	.....	19.4	20.3	.....	21.3	76.1
1991	434.2	357.8	120.4	20.7	99.7	237.3	109.3	54.5	.....	22.3	26.9	.....	24.3	76.5
1992	459.7	386.6	132.4	18.3	114.1	254.2	109.8	57.7	.....	25.3	28.1	.....	33.4	73.1
1993	501.9	425.0	119.9	16.7	103.2	305.1	122.9	70.1	.....	26.5	39.7	.....	45.8	76.9
1994	589.3	511.3	125.9	18.5	107.4	385.4	162.6	83.9	.....	31.4	46.3	.....	61.2	78.0
1995	667.0	574.0	140.3	22.9	117.3	433.7	199.8	89.0	.....	28.0	43.9	.....	73.1	92.9
1996	741.8	639.8	147.9	22.5	125.3	492.0	220.4	91.2	.....	39.9	52.0	.....	88.5	102.0
1997	811.0	703.4	162.2	24.3	137.9	541.2	248.5	81.0	.....	48.1	63.4	.....	100.3	107.6
1998	743.8	641.1	138.9	25.6	113.3	502.1	220.4	72.6	.....	50.6	72.3	.....	86.3	102.8
1999	762.2	640.2	154.6	26.7	127.9	485.6	219.4	49.3	.....	46.8	72.5	.....	97.6	122.0
2000	730.3	584.1	149.7	31.2	118.5	434.4	205.9	33.8	.....	50.4	68.9	.....	75.4	146.2
NAICS: [2]														
1998	743.8	641.1	138.9	25.6	113.3	502.1	193.5	12.8	33.3	57.3	62.5	33.1	109.7	102.8
1999	762.2	640.2	154.6	26.7	127.9	485.6	184.5	7.2	34.4	55.6	59.5	20.8	123.5	122.0
2000	730.3	584.1	149.7	31.2	118.5	434.4	175.6	9.5	24.3	59.5	51.3	–11.9	126.1	146.2
2001	698.7	528.3	195.0	28.9	166.1	333.3	75.1	–.7	22.5	51.1	71.3	–26.4	140.2	170.4
2002	795.1	636.3	270.7	23.5	247.2	365.6	75.1	–6.0	11.1	55.8	83.7	–3.1	149.0	158.8
2003	959.9	793.3	306.5	20.1	286.5	486.7	125.3	4.8	13.5	59.3	90.5	16.3	177.1	166.6
2004	1,215.2	1,010.1	349.4	20.0	329.4	660.7	182.7	12.0	20.5	74.7	93.2	52.7	224.9	205.0
2005	1,621.2	1,382.1	409.7	26.6	383.1	972.4	277.7	27.7	30.8	96.2	121.7	91.3	327.2	239.1
2006	1,815.7	1,559.6	415.1	33.8	381.3	1,144.4	349.7	41.2	55.1	105.9	132.5	107.0	353.1	256.2
2007	1,708.9	1,355.5	301.5	36.0	265.5	1,054.0	321.9	23.9	49.5	103.2	119.0	108.4	328.2	353.4
2008	1,345.5	938.8	95.4	35.1	60.4	843.4	240.6	28.8	30.1	90.6	80.3	92.2	280.8	406.7
2009	1,479.2	1,122.0	362.9	47.3	315.5	759.2	171.4	22.4	23.8	89.3	108.7	81.2	262.3	357.2
2010	1,799.7	1,404.5	406.3	71.6	334.8	998.2	287.6	44.7	30.3	102.4	118.6	95.1	319.5	395.2
2011	1,738.5	1,316.6	375.9	75.9	300.0	940.7	298.1	30.4	9.8	94.4	114.3	83.8	309.9	421.9
2012	2,116.6	1,706.3	479.0	71.7	407.3	1,227.2	395.7	53.8	12.5	135.3	154.1	100.6	375.2	410.3
2013	2,159.4	1,747.6	429.4	79.6	349.8	1,318.2	429.6	50.6	26.9	142.7	154.5	125.4	388.5	411.8
2014	2,265.9	1,854.9	480.3	103.5	376.8	1,374.7	449.8	59.4	33.3	146.5	167.8	117.4	400.4	411.0
2015	2,192.4	1,806.6	493.2	100.7	392.5	1,313.4	412.7	68.1	6.7	150.0	178.7	120.1	377.0	385.8
2014: I	2,136.5	1,722.9	469.2	98.5	370.7	1,253.7	384.7	53.1	40.3	121.7	152.2	115.0	386.6	413.7
II	2,287.0	1,885.5	515.7	104.7	411.0	1,369.8	474.6	63.5	28.9	139.4	164.0	118.5	380.9	401.5
III	2,308.9	1,886.5	446.7	106.2	340.4	1,439.8	464.4	67.1	31.1	170.1	169.2	115.7	422.2	422.4
IV	2,331.2	1,924.9	489.4	104.3	385.1	1,435.4	475.4	54.0	33.0	155.1	185.7	120.2	412.1	406.3
2015: I	2,284.5	1,895.0	507.9	99.5	408.3	1,387.1	456.6	69.4	24.1	148.3	188.7	118.1	381.9	389.5
II	2,214.9	1,832.3	504.2	100.7	403.5	1,328.1	436.4	63.8	9.4	142.6	173.5	120.8	381.6	382.6
III	2,200.5	1,826.0	489.1	103.7	385.4	1,336.9	447.0	71.0	4.7	150.3	177.3	115.3	371.4	374.5
IV	2,069.8	1,673.3	471.8	99.0	372.8	1,201.5	310.8	68.1	–11.2	158.7	175.5	126.3	373.3	396.5
2016: I	2,139.2	1,769.6	479.1	115.2	364.0	1,290.5	394.4	68.5	4.1	153.9	185.3	126.9	357.4	369.6
II	2,127.1	1,719.5	484.6	110.0	374.6	1,234.9	384.0	63.8	2.5	116.1	181.5	129.8	357.3	407.6
III *p*	2,256.8	1,842.8	534.8	108.4	426.3	1,308.1	.....	.....	.....	.....	.....	.....	.....	414.0

[1] Data on Standard Industrial Classification (SIC) basis include transportation and public utilities. Those on North American Industry Classification System (NAICS) basis include transporation and warehousing. Utilities classified separately in NAICS (as shown beginning 1998).
[2] SIC-based industry data use the 1987 SIC for data beginning in 1987 and the 1972 SIC for prior data. NAICS-based data use 2002 NAICS.

Note: Industry data on SIC basis and NAICS basis are not necessarily the same and are not strictly comparable.

Source: Department of Commerce (Bureau of Economic Analysis).

Table B–7. Real farm income, 1952–2016

[Billions of chained (2009) dollars]

Year	Income of farm operators from farming [1]							
	Gross farm income						Production expenses	Net farm income
	Total	Value of agricultural sector production				Direct Federal Government payments		
		Total	Crops [2, 3]	Animals and animal products [3]	Farm-related income [4]			
1952	251.7	249.9	102.2	135.7	12.0	1.8	152.0	99.8
1953	226.8	225.4	93.1	120.1	12.2	1.4	141.3	85.4
1954	222.7	221.1	94.0	115.3	11.8	1.7	142.1	80.6
1955	215.1	213.6	91.6	110.0	12.0	1.5	142.4	72.6
1956	210.9	207.5	89.7	106.2	11.6	3.4	141.0	69.9
1957	208.8	202.7	81.9	109.0	11.7	6.1	142.2	66.5
1958	228.5	222.1	88.0	121.9	12.2	6.4	151.3	77.2
1959	219.3	215.4	85.5	116.8	13.1	3.9	157.3	62.0
1960	220.3	216.3	89.5	113.5	13.4	4.0	156.3	64.0
1961	229.0	220.5	89.3	117.4	13.8	8.4	161.4	67.5
1962	236.2	226.5	92.9	119.5	14.0	9.7	168.9	67.3
1963	239.2	229.9	98.9	116.4	14.6	9.4	174.3	64.9
1964	229.8	218.0	91.7	111.2	15.1	11.8	172.8	57.0
1965	248.3	235.2	101.5	118.4	15.3	13.1	179.5	68.8
1966	261.9	244.9	95.0	134.2	15.6	17.0	189.4	72.4
1967	254.8	239.2	96.9	126.0	16.3	15.5	192.5	62.2
1968	250.8	234.0	91.5	126.3	16.2	16.7	191.2	59.6
1969	260.1	242.6	90.7	135.2	16.6	17.5	194.2	65.9
1970	257.6	241.3	89.9	134.7	16.7	16.3	194.7	62.9
1971	258.9	245.8	97.6	131.1	17.0	13.1	196.3	62.6
1972	284.2	268.4	103.7	147.4	17.3	15.8	206.5	77.7
1973	374.7	364.8	163.1	183.2	18.5	9.9	244.6	130.2
1974	341.6	339.8	170.9	148.9	20.0	1.8	246.8	94.8
1975	319.9	317.4	160.4	136.8	20.2	2.6	238.8	81.2
1976	310.4	308.2	145.9	140.6	21.7	2.2	249.5	60.8
1977	308.9	303.7	145.3	134.4	24.1	5.2	252.4	56.5
1978	340.9	332.8	150.2	156.2	26.4	8.0	274.0	66.9
1979	369.5	366.1	163.4	174.5	28.2	3.4	302.3	67.2
1980	335.6	332.7	144.7	158.1	29.9	2.9	299.3	36.3
1981	341.8	337.8	162.2	144.7	31.0	4.0	286.6	55.2
1982	318.0	311.2	139.1	136.6	35.5	6.8	271.8	46.2
1983	286.7	269.4	106.0	130.5	32.9	17.3	260.2	26.6
1984	302.3	287.1	139.9	129.6	17.6	15.2	255.6	46.7
1985	280.9	267.5	128.5	120.3	18.7	13.4	231.2	49.7
1986	266.9	246.7	108.2	120.9	17.5	20.2	213.7	53.2
1987	281.0	253.0	107.6	126.4	19.1	27.9	217.6	63.4
1988	286.8	263.5	111.7	126.8	25.0	23.3	222.9	63.9
1989	297.3	280.4	126.4	129.5	24.5	16.9	225.2	72.1
1990	295.9	282.0	124.5	134.7	22.8	13.9	226.7	69.2
1991	278.1	266.2	117.6	126.3	22.3	11.9	219.8	58.3
1992	283.9	271.0	126.1	123.4	21.5	13.0	212.9	71.0
1993	283.5	265.0	114.3	127.2	23.5	18.5	218.9	64.6
1994	292.6	282.0	136.1	121.5	24.4	10.7	221.4	71.2
1995	279.6	270.0	127.2	116.4	26.4	9.7	226.9	52.8
1996	307.2	297.6	150.7	119.9	27.0	9.6	230.4	76.8
1997	304.8	295.2	144.1	123.3	27.8	9.6	239.1	65.7
1998	294.7	279.0	129.4	119.3	30.3	15.7	235.0	59.7
1999	293.4	266.6	115.9	118.9	31.8	26.9	233.9	59.6
2000	295.1	266.8	116.0	121.0	29.8	28.4	233.2	61.9
2001	298.4	271.6	113.5	127.0	31.1	26.8	232.8	65.5
2002	271.1	256.5	115.1	109.9	31.5	14.6	225.1	46.0
2003	298.3	279.2	125.2	121.1	33.0	19.1	228.0	70.3
2004	330.9	316.3	140.4	139.4	36.5	14.6	232.8	98.1
2005	324.5	298.0	124.3	137.5	36.1	26.5	238.9	85.6
2006	306.0	289.4	125.2	125.9	38.3	16.7	245.5	60.6
2007	348.8	336.6	155.2	142.2	39.2	12.2	276.9	71.9
2008	367.5	355.1	175.2	140.5	39.4	12.3	288.7	78.7
2009	336.5	324.4	164.7	119.5	40.2	12.2	274.4	62.2
2010	352.2	339.9	166.1	138.5	35.3	12.2	276.0	76.2
2011	406.9	396.8	192.9	158.4	45.4	10.1	297.0	109.9
2012	427.5	417.4	202.3	160.7	54.3	10.1	335.8	91.7
2013	452.4	442.1	218.5	169.2	54.4	10.3	336.7	115.7
2014	444.4	435.4	189.5	197.3	48.6	9.0	359.2	85.2
2015	400.2	390.4	166.4	177.1	46.9	9.8	326.6	73.6
2016 [p]	374.0	362.5	166.3	151.4	44.8	11.6	313.9	60.1

[1] The GDP chain-type price index is used to convert the current-dollar statistics to 2009=100 equivalents.
[2] Crop receipts include proceeds received from commodities placed under Commodity Credit Corporation loans.
[3] The value of production equates to the sum of cash receipts, home consumption, and the value of the change in inventories.
[4] Includes income from forest products sold, the gross imputed rental value of farm dwellings, machine hire and custom work, and other sources of farm income such as commodity insurance indemnities.

Note: Data for 2016 are forecasts.

Source: Department of Agriculture (Economic Research Service).

TABLE B–8. New private housing units started, authorized, and completed and houses sold, 1972–2016

[Thousands; monthly data at seasonally adjusted annual rates]

Year or month	New housing units started				New housing units authorized [1]				New housing units completed	New houses sold
	Type of structure				Type of structure					
	Total	1 unit	2 to 4 units [2]	5 units or more	Total	1 unit	2 to 4 units	5 units or more		
1972	2,356.6	1,309.2	141.2	906.2	2,218.9	1,033.1	148.6	1,037.2	2,003.9	718
1973	2,045.3	1,132.0	118.2	795.0	1,819.5	882.1	117.0	820.5	2,100.5	634
1974	1,337.7	888.1	68.0	381.6	1,074.4	643.8	64.4	366.2	1,728.5	519
1975	1,160.4	892.2	64.0	204.3	939.2	675.5	63.8	199.8	1,317.2	549
1976	1,537.5	1,162.4	85.8	289.2	1,296.2	893.6	93.1	309.5	1,377.2	646
1977	1,987.1	1,450.9	121.7	414.4	1,690.0	1,126.1	121.3	442.7	1,657.1	819
1978	2,020.3	1,433.3	125.1	462.0	1,800.5	1,182.6	130.6	487.3	1,867.5	817
1979	1,745.1	1,194.1	122.0	429.0	1,551.8	981.5	125.4	444.8	1,870.8	709
1980	1,292.2	852.2	109.5	330.5	1,190.6	710.4	114.5	365.7	1,501.6	545
1981	1,084.2	705.4	91.2	287.7	985.5	564.3	101.8	319.4	1,265.7	436
1982	1,062.2	662.6	80.1	319.6	1,000.5	546.4	88.3	365.8	1,005.5	412
1983	1,703.0	1,067.6	113.5	522.0	1,605.2	901.5	133.7	570.1	1,390.3	623
1984	1,749.5	1,084.2	121.4	543.9	1,681.8	922.4	142.6	616.8	1,652.2	639
1985	1,741.8	1,072.4	93.5	576.0	1,733.3	956.6	120.1	656.6	1,703.3	688
1986	1,805.4	1,179.4	84.0	542.0	1,769.4	1,077.6	108.4	583.5	1,756.4	750
1987	1,620.5	1,146.4	65.1	408.7	1,534.8	1,024.4	89.3	421.1	1,668.8	671
1988	1,488.1	1,081.3	58.7	348.0	1,455.6	993.8	75.7	386.1	1,529.8	676
1989	1,376.1	1,003.3	55.3	317.6	1,338.4	931.7	66.9	339.8	1,422.8	650
1990	1,192.7	894.8	37.6	260.4	1,110.8	793.9	54.3	262.6	1,308.0	534
1991	1,013.9	840.4	35.6	137.9	948.8	753.5	43.1	152.1	1,090.8	509
1992	1,199.7	1,029.9	30.9	139.0	1,094.9	910.7	45.8	138.4	1,157.5	610
1993	1,287.6	1,125.7	29.4	132.6	1,199.1	986.5	52.4	160.2	1,192.7	666
1994	1,457.0	1,198.4	35.2	223.5	1,371.6	1,068.5	62.2	241.0	1,346.9	670
1995	1,354.1	1,076.2	33.8	244.1	1,332.5	997.3	63.8	271.5	1,312.6	667
1996	1,476.8	1,160.9	45.3	270.8	1,425.6	1,069.5	65.8	290.3	1,412.9	757
1997	1,474.0	1,133.7	44.5	295.8	1,441.1	1,062.4	68.4	310.3	1,400.5	804
1998	1,616.9	1,271.4	42.6	302.9	1,612.3	1,187.6	69.2	355.5	1,474.2	886
1999	1,640.9	1,302.4	31.9	306.6	1,663.5	1,246.7	65.8	351.1	1,604.9	880
2000	1,568.7	1,230.9	38.7	299.1	1,592.3	1,198.1	64.9	329.3	1,573.7	877
2001	1,602.7	1,273.3	36.6	292.8	1,636.7	1,235.6	66.0	335.2	1,570.8	908
2002	1,704.9	1,358.6	38.5	307.9	1,747.7	1,332.6	73.7	341.4	1,648.4	973
2003	1,847.7	1,499.0	33.5	315.2	1,889.2	1,460.9	82.5	345.8	1,678.7	1,086
2004	1,955.8	1,610.5	42.3	303.0	2,070.1	1,613.4	90.4	366.2	1,841.9	1,203
2005	2,068.3	1,715.8	41.1	311.4	2,155.3	1,682.0	84.0	389.3	1,931.4	1,283
2006	1,800.9	1,465.4	42.7	292.8	1,838.9	1,378.2	76.6	384.1	1,979.4	1,051
2007	1,355.0	1,046.0	31.7	277.3	1,398.4	979.9	59.6	359.0	1,502.8	776
2008	905.5	622.0	17.5	266.0	905.4	575.6	34.4	295.4	1,119.7	485
2009	554.0	445.1	11.6	97.3	583.0	441.1	20.7	121.1	794.4	375
2010	586.9	471.2	11.4	104.3	604.6	447.3	22.0	135.3	651.7	323
2011	608.8	430.6	10.9	167.3	624.1	418.5	21.6	184.0	584.9	306
2012	780.6	535.3	11.4	233.9	829.7	518.7	25.9	285.1	649.2	368
2013	924.9	617.6	13.6	293.7	990.8	620.8	29.0	341.1	764.4	429
2014	1,003.3	647.9	13.7	341.7	1,052.1	640.3	29.9	382.0	883.8	437
2015	1,111.8	714.5	11.5	385.8	1,182.6	696.0	32.1	454.5	968.2	501
2015: Jan	1,101	712	.....	383	1,073	669	28	376	964	524
Feb	893	591	.....	294	1,114	636	30	448	876	549
Mar	964	626	.....	318	1,071	656	27	388	798	490
Apr	1,192	746	.....	428	1,178	679	33	466	1,008	500
May	1,063	694	.....	360	1,266	693	34	539	1,024	507
June	1,213	686	.....	513	1,334	702	34	598	966	472
July	1,147	760	.....	376	1,142	694	30	418	994	498
Aug	1,132	731	.....	394	1,166	710	30	426	963	505
Sept	1,189	743	.....	435	1,129	708	38	383	1,010	457
Oct	1,073	714	.....	347	1,175	725	35	415	984	478
Nov	1,171	786	.....	379	1,286	735	29	522	973	508
Dec	1,160	765	.....	378	1,201	738	35	428	1,033	538
2016: Jan	1,128	775	.....	335	1,188	727	35	426	1,056	526
Feb	1,213	845	.....	356	1,162	733	33	396	1,025	525
Mar	1,113	751	.....	353	1,077	725	34	318	1,063	537
Apr	1,155	764	.....	378	1,130	741	32	357	952	570
May	1,128	737	.....	386	1,136	731	28	377	1,015	566
June	1,195	763	.....	414	1,153	738	29	386	1,129	558
July	1,218	769	.....	442	1,144	711	29	404	1,070	622
Aug	1,164	724	.....	422	1,152	736	33	383	1,034	567
Sept [p]	1,054	785	.....	255	1,225	742	36	447	1,000	574
Oct [p]	1,323	869	.....	445	1,260	774	30	456	1,055	563

[1] Authorized by issuance of local building permits in permit-issuing places: 20,100 places beginning with 2014; 19,300 for 2004–2013; 19,000 for 1994–2003; 17,000 for 1984–93; 16,000 for 1978–83; and 14,000 for 1972–77.

[2] Monthly data do not meet publication standards because tests for identifiable and stable seasonality do not meet reliability standards.

Note: One-unit estimates prior to 1999, for new housing units started and completed and for new houses sold, include an upward adjustment of 3.3 percent to account for structures in permit-issuing areas that did not have permit authorization.

Source: Department of Commerce (Bureau of the Census).

TABLE B–9. Median money income (in 2015 dollars) and poverty status of families and people, by race, 2007-2015

Race, Hispanic origin, and year	Families [1]						People below poverty level [2]		Median money income (in 2015 dollars) of people 15 years old and over with income [3]			
	Number (millions)	Median money income (in 2015 dollars) [3]	Below poverty level [2]				Number (millions)	Percent	Males		Females	
			Total		Female householder, no husband present				All people	Year-round full-time workers	All people	Year-round full-time workers
			Number (millions)	Percent	Number (millions)	Percent						
TOTAL (all races) [4]												
2007	77.9	$70,137	7.6	9.8	4.1	28.3	37.3	12.5	$37,948	$52,840	$23,917	$41,344
2008	78.9	67,726	8.1	10.3	4.2	28.7	39.8	13.2	36,505	52,598	22,972	40,388
2009	78.9	66,379	8.8	11.1	4.4	29.9	43.6	14.3	35,554	54,311	23,151	41,132
2010 [5]	79.6	65,483	9.4	11.8	4.8	31.7	46.3	15.1	35,010	54,519	22,585	41,787
2011	80.5	64,259	9.5	11.8	4.9	31.2	46.2	15.0	34,763	53,027	22,239	40,769
2012	80.9	64,252	9.5	11.8	4.8	30.9	46.5	15.0	35,000	52,321	22,215	41,312
2013 [6]	81.2	64,934	9.1	11.2	4.6	30.6	45.3	14.5	35,846	51,836	22,450	41,309
2013 [7]	82.3	66,619	9.6	11.7	5.2	32.2	46.3	14.8	36,255	52,320	22,514	41,413
2014	81.7	66,709	9.5	11.6	4.8	30.6	46.7	14.8	36,344	51,515	22,266	40,844
2015	82.2	70,697	8.6	10.4	4.4	28.2	43.1	13.5	37,138	52,247	23,769	41,754
WHITE, non-Hispanic [8]												
2007	53.9	79,948	3.2	5.9	1.5	20.7	16.0	8.2	42,723	58,832	24,791	44,214
2008	54.5	77,137	3.4	6.2	1.5	20.7	17.0	8.6	41,182	57,625	23,942	43,451
2009	54.5	74,391	3.8	7.0	1.7	23.3	18.5	9.4	40,636	57,962	24,236	44,481
2010 [5]	53.8	74,905	3.9	7.2	1.7	24.1	19.3	9.9	40,390	59,414	23,607	44,932
2011	54.2	73,591	4.0	7.3	1.8	23.4	19.2	9.8	40,203	58,767	23,423	43,602
2012	54.0	73,788	3.8	7.1	1.7	23.4	18.9	9.7	40,003	58,065	23,642	43,534
2013 [6]	53.8	73,897	3.7	6.9	1.6	22.6	18.8	9.6	40,825	57,446	24,197	43,534
2013 [7]	54.7	75,941	4.0	7.3	1.9	25.8	19.6	10.0	41,572	59,907	24,149	43,832
2014	53.8	76,746	3.9	7.3	1.7	23.7	19.7	10.1	41,119	58,780	24,033	44,287
2015	53.8	80,527	3.5	6.4	1.6	21.7	17.8	9.1	42,207	60,750	25,629	45,694
BLACK [8]												
2007	9.3	45,889	2.0	22.1	1.5	37.3	9.2	24.5	29,518	41,994	22,579	36,113
2008	9.4	43,901	2.1	22.0	1.5	37.2	9.4	24.7	27,801	42,506	22,234	35,432
2009	9.4	42,430	2.1	22.7	1.5	36.7	9.9	25.8	26,223	43,483	21,508	35,869
2010 [5]	9.6	41,956	2.3	24.1	1.7	38.7	10.7	27.4	25,325	41,010	21,357	37,008
2011	9.7	42,677	2.3	24.2	1.7	39.0	10.9	27.6	24,740	42,443	20,819	37,039
2012	9.8	41,826	2.3	23.7	1.6	37.8	10.9	27.2	25,728	41,103	20,668	36,224
2013 [6]	9.9	42,317	2.3	22.8	1.6	38.5	11.0	27.2	25,291	42,360	20,395	36,001
2013 [7]	9.9	42,624	2.2	22.4	1.7	36.7	10.2	25.2	25,560	41,146	21,437	35,248
2014	9.9	43,201	2.3	22.9	1.6	37.2	10.8	26.2	26,600	41,339	20,990	35,370
2015	9.8	45,781	2.1	21.1	1.5	33.9	10.0	24.1	27,404	41,710	21,613	37,110
ASIAN [8]												
2007	3.3	88,174	.3	7.9	.1	16.1	1.3	10.2	42,517	58,544	27,841	47,229
2008	3.5	80,999	.3	9.8	.1	16.7	1.6	11.8	40,299	57,008	25,440	48,667
2009	3.6	82,882	.3	9.4	.1	16.9	1.7	12.5	41,238	59,022	26,892	49,299
2010 [5]	3.9	81,769	.4	9.3	.1	21.1	1.9	12.2	38,943	57,078	25,615	45,571
2011	4.2	76,929	.4	9.7	.1	19.1	2.0	12.3	38,291	59,315	23,226	43,642
2012	4.1	80,380	.4	9.4	.1	19.2	1.9	11.7	41,527	62,200	24,089	47,869
2013 [6]	4.4	77,742	.4	8.7	.1	14.9	1.8	10.5	40,857	61,209	25,276	45,866
2013 [7]	4.4	84,245	.4	10.2	.1	25.7	2.3	13.1	43,539	62,291	26,296	48,047
2014	4.5	82,827	.4	8.9	.1	18.9	2.1	12.0	40,948	60,368	25,420	48,602
2015	4.7	90,847	.4	8.0	.1	16.2	2.1	11.4	43,705	64,740	26,532	50,118
HISPANIC (any race) [8]												
2007	10.4	46,373	2.0	19.7	1.0	38.4	9.9	21.5	27,951	34,813	19,145	31,041
2008	10.5	44,547	2.2	21.3	1.0	39.2	11.0	23.2	26,424	34,368	18,073	30,209
2009	10.4	43,890	2.4	22.7	1.1	38.8	12.4	25.3	24,586	34,950	17,907	30,802
2010 [5]	11.3	42,723	2.7	24.3	1.3	42.6	13.5	26.5	24,373	34,617	17,711	31,630
2011	11.6	42,219	2.7	22.9	1.3	41.2	13.2	25.3	25,009	33,817	17,736	31,724
2012	12.0	42,081	2.8	23.5	1.3	40.7	13.6	25.6	25,387	33,567	17,265	30,462
2013 [6]	12.1	43,010	2.6	21.6	1.3	40.4	12.7	23.5	25,857	33,527	18,073	31,339
2013 [7]	12.4	41,657	2.9	23.1	1.4	40.5	13.4	24.7	24,625	32,933	17,249	31,717
2014	12.5	45,166	2.7	21.5	1.3	37.9	13.1	23.6	26,706	35,154	17,605	30,864
2015	12.8	47,328	2.5	19.6	1.2	35.5	12.1	21.4	28,110	35,973	18,905	31,657

[1] The term "family" refers to a group of two or more persons related by birth, marriage, or adoption and residing together. Every family must include a reference person.

[2] Poverty thresholds are updated each year to reflect changes in the consumer price index for all urban consumers (CPI-U).

[3] Adjusted by consumer price index research series (CPI-U-RS).

[4] Data for American Indians and Alaska natives, native Hawaiians and other Pacific Islanders, and those reporting two or more races are included in the total but not shown separately.

[5] Reflects implementation of Census 2010-based population controls comparable to succeeding years.

[6] The 2014 Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) included redesigned income questions, which were implemented to a subsample of the 98,000 addresses using a probability split panel design. These 2013 data are based on the 2014 ASEC sample of 68,000 addresses that received income questions similar to those used in the 2013 ASEC and are consistent with data in earlier years.

[7] These 2013 data are based on the 2014 ASEC sample of 30,000 addresses that received redesigned income questions and are consistent with data in later years.

[8] The CPS allows respondents to choose more than one race. Data shown are for "white alone, non-Hispanic," "black alone," and "Asian alone" race categories. ("Black" is also "black or African American.") Family race and Hispanic origin are based on the reference person.

Note: For details see *Income and Poverty in the United States* in publication Series P–60 on the CPS ASEC.

Source: Department of Commerce (Bureau of the Census).

Table B–10. Changes in consumer price indexes, 1947–2015

[For all urban consumers; percent change]

December to December	All items	All items less food and energy					Food			Energy [4]		C-CPI-U [5]
		Total [1]	Shelter [2]	Medical care [3]	Apparel	New vehicles	Total [1]	At home	Away from home	Total [1, 3]	Gasoline	
1947	8.8			6.9	8.2		11.3				16.4	
1948	3.0			5.8	5.1	11.5	–.8	–1.1			6.2	
1949	–2.1			1.4	–7.4	4.0	–3.9	–3.7			1.6	
1950	5.9			3.4	5.3	.2	9.8	9.5			1.6	
1951	6.0			5.8	5.7	9.7	7.1	7.6			2.1	
1952	.8			4.3	–2.9	4.4	–1.0	–1.3			.5	
1953	.7		3.2	3.5	.7	–1.7	–1.1	–1.6			10.1	
1954	–.7		1.8	2.3	–.7	1.3	–1.8	–2.3	0.9		–1.4	
1955	.4		.9	3.3	.5	–2.3	–.7	–1.0	1.4		4.2	
1956	3.0		2.6	3.2	2.5	7.8	2.9	2.7	2.7		3.1	
1957	2.9		3.4	4.7	.9	2.0	2.8	3.0	3.9		2.2	
1958	1.8	1.7	.8	4.5	.2	6.1	2.4	1.9	2.1	–0.9	–3.8	
1959	1.7	2.0	2.0	3.8	1.3	–.2	–1.0	–1.3	3.3	4.7	7.0	
1960	1.4	1.0	1.6	3.2	1.5	–3.0	3.1	3.2	2.4	1.3	1.2	
1961	.7	1.3	.8	3.1	.4	.2	–.7	–1.6	2.3	–1.3	–3.2	
1962	1.3	1.3	.8	2.2	.6	–1.0	1.3	1.3	3.0	2.2	3.8	
1963	1.6	1.6	1.9	2.5	1.7	–.4	2.0	1.6	1.8	–.9	–2.4	
1964	1.0	1.2	1.5	2.1	.4	–.6	1.3	1.5	1.4	.0	.0	
1965	1.9	1.5	2.2	2.8	1.3	–2.9	3.5	3.6	3.2	1.8	4.1	
1966	3.5	3.3	4.0	6.7	3.9	.0	4.0	3.2	5.5	1.7	3.2	
1967	3.0	3.8	2.8	6.3	4.2	2.8	1.2	.3	4.6	1.7	1.5	
1968	4.7	5.1	6.5	6.2	6.3	1.4	4.4	4.0	5.6	1.7	1.5	
1969	6.2	6.2	8.7	6.2	5.2	2.1	7.0	7.1	7.4	2.9	3.4	
1970	5.6	6.6	8.9	7.4	3.9	6.6	2.3	1.3	6.1	4.8	2.5	
1971	3.3	3.1	2.7	4.6	2.1	–3.2	4.3	4.3	4.4	3.1	–.4	
1972	3.4	3.0	4.0	3.3	2.6	.2	4.6	5.1	4.2	2.6	2.8	
1973	8.7	4.7	7.1	5.3	4.4	1.3	20.3	22.0	12.7	17.0	19.6	
1974	12.3	11.1	11.4	12.6	8.7	11.4	12.0	12.4	11.3	21.6	20.7	
1975	6.9	6.7	7.2	9.8	2.4	7.3	6.6	6.2	7.4	11.4	11.0	
1976	4.9	6.1	4.2	10.0	4.6	4.8	.5	–.8	6.0	7.1	2.8	
1977	6.7	6.5	8.8	8.9	4.3	7.2	8.1	7.9	7.9	7.2	4.8	
1978	9.0	8.5	11.4	8.8	3.1	6.2	11.8	12.5	10.4	7.9	8.6	
1979	13.3	11.3	17.5	10.1	5.5	7.4	10.2	9.7	11.4	37.5	52.1	
1980	12.5	12.2	15.0	9.9	6.8	7.4	10.2	10.5	9.6	18.0	18.9	
1981	8.9	9.5	9.9	12.5	3.5	6.8	4.3	2.9	7.1	11.9	9.4	
1982	3.8	4.5	2.4	11.0	1.6	1.4	3.1	2.3	5.1	1.3	–6.7	
1983	3.8	4.8	4.7	6.4	2.9	3.3	2.7	1.8	4.1	–.5	–1.6	
1984	3.9	4.7	5.2	6.1	2.0	2.5	3.8	3.6	4.2	.2	–2.5	
1985	3.8	4.3	6.0	6.8	2.8	3.6	2.6	2.0	3.8	1.8	3.0	
1986	1.1	3.8	4.6	7.7	.9	5.6	3.8	3.7	4.3	–19.7	–30.7	
1987	4.4	4.2	4.8	5.8	4.8	1.8	3.5	3.5	3.7	8.2	18.6	
1988	4.4	4.7	4.5	6.9	4.7	2.2	5.2	5.6	4.4	.5	–1.8	
1989	4.6	4.4	4.9	8.5	1.0	2.4	5.6	6.2	4.6	5.1	6.5	
1990	6.1	5.2	5.2	9.6	5.1	2.0	5.3	5.8	4.5	18.1	36.8	
1991	3.1	4.4	3.9	7.9	3.4	3.2	1.9	1.3	2.9	–7.4	–16.2	
1992	2.9	3.3	2.9	6.6	1.4	2.3	1.5	1.5	1.4	2.0	2.0	
1993	2.7	3.2	3.0	5.4	.9	3.3	2.9	3.5	1.9	–1.4	–5.9	
1994	2.7	2.6	3.0	4.9	–1.6	3.3	2.9	3.5	1.9	2.2	6.4	
1995	2.5	3.0	3.5	3.9	.1	1.9	2.1	2.0	2.2	–1.3	–4.2	
1996	3.3	2.6	2.9	3.0	–.2	1.8	4.3	4.9	3.1	8.6	12.4	
1997	1.7	2.2	3.4	2.8	1.0	–.9	1.5	1.0	2.6	–3.4	–6.1	
1998	1.6	2.4	3.3	3.4	–.7	.0	2.3	2.1	2.5	–8.8	–15.4	
1999	2.7	1.9	2.5	3.7	–.5	–.3	1.9	1.7	2.3	13.4	30.1	
2000	3.4	2.6	3.4	4.2	–1.8	.0	2.8	2.9	2.4	14.2	13.9	2.6
2001	1.6	2.7	4.2	4.7	–3.2	–.1	2.8	2.6	3.0	–13.0	–24.9	1.3
2002	2.4	1.9	3.1	5.0	–1.8	–2.0	1.5	.8	2.3	10.7	24.8	2.0
2003	1.9	1.1	2.2	3.7	–2.1	–1.8	3.6	4.5	2.3	6.9	6.8	1.7
2004	3.3	2.2	2.7	4.2	–.2	.6	2.7	2.4	3.0	16.6	26.1	3.2
2005	3.4	2.2	2.6	4.3	–1.1	–.4	2.3	1.7	3.2	17.1	16.1	2.9
2006	2.5	2.6	4.2	3.6	.9	–.9	2.1	1.4	3.2	2.9	6.4	2.3
2007	4.1	2.4	3.1	5.2	–.3	–.3	4.9	5.6	4.0	17.4	29.6	3.7
2008	.1	1.8	1.9	2.6	–1.0	–3.2	5.9	6.6	5.0	–21.3	–43.1	.2
2009	2.7	1.8	.3	3.4	1.9	4.9	–.5	–2.4	1.9	18.2	53.5	2.5
2010	1.5	.8	.4	3.3	–1.1	–.2	1.5	1.7	1.3	7.7	13.8	1.3
2011	3.0	2.2	1.9	3.5	4.6	3.2	4.7	6.0	2.9	6.6	9.9	2.9
2012	1.7	1.9	2.2	3.2	1.8	1.6	1.8	1.3	2.5	.5	1.7	1.5
2013	1.5	1.7	2.5	2.0	.6	.4	1.1	.4	2.1	.5	–1.0	1.3
2014	.8	1.6	2.9	3.0	–2.0	.5	3.4	3.7	3.0	–10.6	–21.0	.5
2015	.7	2.1	3.2	2.6	–.9	.2	.8	–.4	2.6	–12.6	–19.7	.4

[1] Includes other items not shown separately.
[2] Data beginning with 1983 incorporate a rental equivalence measure for homeowners' costs.
[3] Commodities and services.
[4] Household energy--electricity, utility (piped) gas service, fuel oil, etc.--and motor fuel.
[5] Chained consumer price index (C-CPI-U) introduced in 2002. Reflects the effect of substitution that consumers make across item categories in response to changes in relative prices.

Note: Changes from December to December are based on unadjusted indexes.

Source: Department of Labor (Bureau of Labor Statistics).

Table B–11. Civilian labor force, 1929–2016

[Monthly data seasonally adjusted, except as noted]

Year or month	Civilian noninstitutional population [1]	Civilian labor force					Not in labor force	Civilian labor force participation rate [2]	Civilian employment/population ratio [3]	Unemployment rate, civilian workers [4]
		Total	Employment			Unemployment				
			Total	Agricultural	Non-agricultural					
	Thousands of persons 14 years of age and over							Percent		
1929		49,180	47,630	10,450	37,180	1,550				3.2
1930		49,820	45,480	10,340	35,140	4,340				8.7
1931		50,420	42,400	10,290	32,110	8,020				15.9
1932		51,000	38,940	10,170	28,770	12,060				23.6
1933		51,590	38,760	10,090	28,670	12,830				24.9
1934		52,230	40,890	9,900	30,990	11,340				21.7
1935		52,870	42,260	10,110	32,150	10,610				20.1
1936		53,440	44,410	10,000	34,410	9,030				16.9
1937		54,000	46,300	9,820	36,480	7,700				14.3
1938		54,610	44,220	9,690	34,530	10,390				19.0
1939		55,230	45,750	9,610	36,140	9,480				17.2
1940	99,840	55,640	47,520	9,540	37,980	8,120	44,200	55.7	47.6	14.6
1941	99,900	55,910	50,350	9,100	41,250	5,560	43,990	56.0	50.4	9.9
1942	98,640	56,410	53,750	9,250	44,500	2,660	42,230	57.2	54.5	4.7
1943	94,640	55,540	54,470	9,080	45,390	1,070	39,100	58.7	57.6	1.9
1944	93,220	54,630	53,960	8,950	45,010	670	38,590	58.6	57.9	1.2
1945	94,090	53,860	52,820	8,580	44,240	1,040	40,230	57.2	56.1	1.9
1946	103,070	57,520	55,250	8,320	46,930	2,270	45,550	55.8	53.6	3.9
1947	106,018	60,168	57,812	8,256	49,557	2,356	45,850	56.8	54.5	3.9
	Thousands of persons 16 years of age and over									
1947	101,827	59,350	57,038	7,890	49,148	2,311	42,477	58.3	56.0	3.9
1948	103,068	60,621	58,343	7,629	50,714	2,276	42,447	58.8	56.6	3.8
1949	103,994	61,286	57,651	7,658	49,993	3,637	42,708	58.9	55.4	5.9
1950	104,995	62,208	58,918	7,160	51,758	3,288	42,787	59.2	56.1	5.3
1951	104,621	62,017	59,961	6,726	53,235	2,055	42,604	59.2	57.3	3.3
1952	105,231	62,138	60,250	6,500	53,749	1,883	43,093	59.0	57.3	3.0
1953	107,056	63,015	61,179	6,260	54,919	1,834	44,041	58.9	57.1	2.9
1954	108,321	63,643	60,109	6,205	53,904	3,532	44,678	58.8	55.5	5.5
1955	109,683	65,023	62,170	6,450	55,722	2,852	44,660	59.3	56.7	4.4
1956	110,954	66,552	63,799	6,283	57,514	2,750	44,402	60.0	57.5	4.1
1957	112,265	66,929	64,071	5,947	58,123	2,859	45,336	59.6	57.1	4.3
1958	113,727	67,639	63,036	5,586	57,450	4,602	46,088	59.5	55.4	6.8
1959	115,329	68,369	64,630	5,565	59,065	3,740	46,960	59.3	56.0	5.5
1960	117,245	69,628	65,778	5,458	60,318	3,852	47,617	59.4	56.1	5.5
1961	118,771	70,459	65,746	5,200	60,546	4,714	48,312	59.3	55.4	6.7
1962	120,153	70,614	66,702	4,944	61,759	3,911	49,539	58.8	55.5	5.5
1963	122,416	71,833	67,762	4,687	63,076	4,070	50,583	58.7	55.4	5.7
1964	124,485	73,091	69,305	4,523	64,782	3,786	51,394	58.7	55.7	5.2
1965	126,513	74,455	71,088	4,361	66,726	3,366	52,058	58.9	56.2	4.5
1966	128,058	75,770	72,895	3,979	68,915	2,875	52,288	59.2	56.9	3.8
1967	129,874	77,347	74,372	3,844	70,527	2,975	52,527	59.6	57.3	3.8
1968	132,028	78,737	75,920	3,817	72,103	2,817	53,291	59.6	57.5	3.6
1969	134,335	80,734	77,902	3,606	74,296	2,832	53,602	60.1	58.0	3.5
1970	137,085	82,771	78,678	3,463	75,215	4,093	54,315	60.4	57.4	4.9
1971	140,216	84,382	79,367	3,394	75,972	5,016	55,834	60.2	56.6	5.9
1972	144,126	87,034	82,153	3,484	78,669	4,882	57,091	60.4	57.0	5.6
1973	147,096	89,429	85,064	3,470	81,594	4,365	57,667	60.8	57.8	4.9
1974	150,120	91,949	86,794	3,515	83,279	5,156	58,171	61.3	57.8	5.6
1975	153,153	93,775	85,846	3,408	82,438	7,929	59,377	61.2	56.1	8.5
1976	156,150	96,158	88,752	3,331	85,421	7,406	59,991	61.6	56.8	7.7
1977	159,033	99,009	92,017	3,283	88,734	6,991	60,025	62.3	57.9	7.1
1978	161,910	102,251	96,048	3,387	92,661	6,202	59,659	63.2	59.3	6.1
1979	164,863	104,962	98,824	3,347	95,477	6,137	59,900	63.7	59.9	5.8
1980	167,745	106,940	99,303	3,364	95,938	7,637	60,806	63.8	59.2	7.1
1981	170,130	108,670	100,397	3,368	97,030	8,273	61,460	63.9	59.0	7.6
1982	172,271	110,204	99,526	3,401	96,125	10,678	62,067	64.0	57.8	9.7
1983	174,215	111,550	100,834	3,383	97,450	10,717	62,665	64.0	57.9	9.6
1984	176,383	113,544	105,005	3,321	101,685	8,539	62,839	64.4	59.5	7.5
1985	178,206	115,461	107,150	3,179	103,971	8,312	62,744	64.8	60.1	7.2
1986	180,587	117,834	109,597	3,163	106,434	8,237	62,752	65.3	60.7	7.0
1987	182,753	119,865	112,440	3,208	109,232	7,425	62,888	65.6	61.5	6.2
1988	184,613	121,669	114,968	3,169	111,800	6,701	62,944	65.9	62.3	5.5
1989	186,393	123,869	117,342	3,199	114,142	6,528	62,523	66.5	63.0	5.3

[1] Not seasonally adjusted.
[2] Civilian labor force as percent of civilian noninstitutional population.
[3] Civilian employment as percent of civilian noninstitutional population.
[4] Unemployed as percent of civilian labor force.

See next page for continuation of table.

TABLE B–11. Civilian labor force, 1929–2016—*Continued*

[Monthly data seasonally adjusted, except as noted]

Year or month	Civilian noninstitutional population [1]	Civilian labor force					Not in labor force	Civilian labor force participation rate [2]	Civilian employment/population ratio [3]	Unemployment rate, civilian workers [4]
		Total	Employment			Unemployment				
			Total	Agricultural	Nonagricultural					
	Thousands of persons 16 years of age and over							Percent		
1990	189,164	125,840	118,793	3,223	115,570	7,047	63,324	66.5	62.8	5.6
1991	190,925	126,346	117,718	3,269	114,449	8,628	64,578	66.2	61.7	6.8
1992	192,805	128,105	118,492	3,247	115,245	9,613	64,700	66.4	61.5	7.5
1993	194,838	129,200	120,259	3,115	117,144	8,940	65,638	66.3	61.7	6.9
1994	196,814	131,056	123,060	3,409	119,651	7,996	65,758	66.6	62.5	6.1
1995	198,584	132,304	124,900	3,440	121,460	7,404	66,280	66.6	62.9	5.6
1996	200,591	133,943	126,708	3,443	123,264	7,236	66,647	66.8	63.2	5.4
1997	203,133	136,297	129,558	3,399	126,159	6,739	66,837	67.1	63.8	4.9
1998	205,220	137,673	131,463	3,378	128,085	6,210	67,547	67.1	64.1	4.5
1999	207,753	139,368	133,488	3,281	130,207	5,880	68,385	67.1	64.3	4.2
2000 [5]	212,577	142,583	136,891	2,464	134,427	5,692	69,994	67.1	64.4	4.0
2001	215,092	143,734	136,933	2,299	134,635	6,801	71,359	66.8	63.7	4.7
2002	217,570	144,863	136,485	2,311	134,174	8,378	72,707	66.6	62.7	5.8
2003	221,168	146,510	137,736	2,275	135,461	8,774	74,658	66.2	62.3	6.0
2004	223,357	147,401	139,252	2,232	137,020	8,149	75,956	66.0	62.3	5.5
2005	226,082	149,320	141,730	2,197	139,532	7,591	76,762	66.0	62.7	5.1
2006	228,815	151,428	144,427	2,206	142,221	7,001	77,387	66.2	63.1	4.6
2007	231,867	153,124	146,047	2,095	143,952	7,078	78,743	66.0	63.0	4.6
2008	233,788	154,287	145,362	2,168	143,194	8,924	79,501	66.0	62.2	5.8
2009	235,801	154,142	139,877	2,103	137,775	14,265	81,659	65.4	59.3	9.3
2010	237,830	153,889	139,064	2,206	136,858	14,825	83,941	64.7	58.5	9.6
2011	239,618	153,617	139,869	2,254	137,615	13,747	86,001	64.1	58.4	8.9
2012	243,284	154,975	142,469	2,186	140,283	12,506	88,310	63.7	58.6	8.1
2013	245,679	155,389	143,929	2,130	141,799	11,460	90,290	63.2	58.6	7.4
2014	247,947	155,922	146,305	2,237	144,068	9,617	92,025	62.9	59.0	6.2
2015	250,801	157,130	148,834	2,422	146,411	8,296	93,671	62.7	59.3	5.3
2014: Jan	246,915	155,285	145,092	2,161	142,922	10,192	91,630	62.9	58.8	6.6
Feb	247,085	155,560	145,185	2,137	143,098	10,375	91,526	63.0	58.8	6.7
Mar	247,258	156,187	145,772	2,133	143,544	10,415	91,071	63.2	59.0	6.7
Apr	247,439	155,376	145,677	2,162	143,504	9,699	92,063	62.8	58.9	6.2
May	247,622	155,511	145,792	2,057	143,737	9,719	92,111	62.8	58.9	6.2
June	247,814	155,684	146,214	2,158	144,090	9,470	92,130	62.8	59.0	6.1
July	248,023	156,090	146,438	2,180	144,213	9,651	91,934	62.9	59.0	6.2
Aug	248,229	156,080	146,464	2,288	144,128	9,617	92,149	62.9	59.0	6.2
Sept	248,446	156,129	146,834	2,384	144,420	9,296	92,317	62.8	59.1	6.0
Oct	248,657	156,363	147,374	2,402	145,057	8,989	92,294	62.9	59.3	5.7
Nov	248,844	156,442	147,389	2,399	145,042	9,053	92,402	62.9	59.2	5.8
Dec	249,027	156,142	147,439	2,355	145,132	8,704	92,885	62.7	59.2	5.6
2015: Jan	249,723	157,025	148,104	2,417	145,683	8,920	92,699	62.9	59.3	5.7
Feb	249,899	156,878	148,231	2,424	145,801	8,646	93,022	62.8	59.3	5.5
Mar	250,080	156,890	148,333	2,556	145,681	8,557	93,190	62.7	59.3	5.5
Apr	250,266	157,032	148,509	2,419	146,065	8,523	93,234	62.7	59.3	5.4
May	250,455	157,367	148,748	2,395	146,336	8,619	93,089	62.8	59.4	5.5
June	250,663	156,984	148,722	2,548	146,198	8,262	93,679	62.6	59.3	5.3
July	250,876	157,115	148,866	2,369	146,444	8,249	93,761	62.6	59.3	5.3
Aug	251,096	157,061	149,043	2,350	146,666	8,018	94,035	62.6	59.4	5.1
Sept	251,325	156,867	148,942	2,368	146,535	7,925	94,458	62.4	59.3	5.1
Oct	251,541	157,096	149,197	2,394	146,864	7,899	94,446	62.5	59.3	5.0
Nov	251,747	157,367	149,444	2,424	147,110	7,924	94,380	62.5	59.4	5.0
Dec	251,936	157,833	149,929	2,411	147,587	7,904	94,103	62.6	59.5	5.0
2016: Jan	252,397	158,335	150,544	2,385	148,115	7,791	94,062	62.7	59.6	4.9
Feb	252,577	158,890	151,074	2,456	148,620	7,815	93,688	62.9	59.8	4.9
Mar	252,768	159,286	151,320	2,623	148,704	7,966	93,482	63.0	59.9	5.0
Apr	252,969	158,924	151,004	2,592	148,377	7,920	94,044	62.8	59.7	5.0
May	253,174	158,466	151,030	2,585	148,429	7,436	94,708	62.6	59.7	4.7
June	253,397	158,880	151,097	2,516	148,640	7,783	94,517	62.7	59.6	4.9
July	253,620	159,287	151,517	2,388	149,155	7,770	94,333	62.8	59.7	4.9
Aug	253,854	159,463	151,614	2,520	149,118	7,849	94,391	62.8	59.7	4.9
Sept	254,091	159,907	151,968	2,441	149,560	7,939	94,184	62.9	59.8	5.0
Oct	254,321	159,712	151,925	2,321	149,637	7,787	94,609	62.8	59.7	4.9
Nov	254,540	159,486	152,085	2,438	149,772	7,400	95,055	62.7	59.7	4.6

[5] Beginning in 2000, data for agricultural employment are for agricultural and related industries; data for this series and for nonagricultural employment are not strictly comparable with data for earlier years. Because of independent seasonal adjustment for these two series, monthly data will not add to total civilian employment.

Note: Labor force data in Tables B–11 through B–13 are based on household interviews and usually relate to the calendar week that includes the 12th of the month. Historical comparability is affected by revisions to population controls, changes in occupational and industry classification, and other changes to the survey. In recent years, updated population controls have been introduced annually with the release of January data, so data are not strictly comparable with earlier periods. Particularly notable changes were introduced for data in the years 1953, 1960, 1962, 1972, 1973, 1978, 1980, 1990, 1994, 1997, 1998, 2000, 2003, 2008 and 2012. For definitions of terms, area samples used, historical comparability of the data, comparability with other series, etc., see *Employment and Earnings* or concepts and methodology of the CPS at http://www.bls.gov/cps/documentation.htm#concepts.

Source: Department of Labor (Bureau of Labor Statistics).

Table B–12. Civilian unemployment rate, 1972–2016

[Percent [1]; monthly data seasonally adjusted, except as noted]

Year or month	All civilian workers	Males			Females			Both sexes 16–19 years	By race			Hispanic or Latino ethnicity [3]	Married men, spouse present	Women who maintain families [4]
		Total	16–19 years	20 years and over	Total	16–19 years	20 years and over		White [2]	Black or African American [2]	Asian [2]			
1972	5.6	5.0	15.9	4.0	6.6	16.7	5.4	16.2	5.1	10.4	.....	.....	2.8	7.2
1973	4.9	4.2	13.9	3.3	6.0	15.3	4.9	14.5	4.3	9.4	.....	7.5	2.3	7.1
1974	5.6	4.9	15.6	3.8	6.7	16.6	5.5	16.0	5.0	10.5	.....	8.1	2.7	7.0
1975	8.5	7.9	20.1	6.8	9.3	19.7	8.0	19.9	7.8	14.8	.....	12.2	5.1	10.0
1976	7.7	7.1	19.2	5.9	8.6	18.7	7.4	19.0	7.0	14.0	.....	11.5	4.2	10.1
1977	7.1	6.3	17.3	5.2	8.2	18.3	7.0	17.8	6.2	14.0	.....	10.1	3.6	9.4
1978	6.1	5.3	15.8	4.3	7.2	17.1	6.0	16.4	5.2	12.8	.....	9.1	2.8	8.5
1979	5.8	5.1	15.9	4.2	6.8	16.4	5.7	16.1	5.1	12.3	.....	8.3	2.8	8.3
1980	7.1	6.9	18.3	5.9	7.4	17.2	6.4	17.8	6.3	14.3	.....	10.1	4.2	9.2
1981	7.6	7.4	20.1	6.3	7.9	19.0	6.8	19.6	6.7	15.6	.....	10.4	4.3	10.4
1982	9.7	9.9	24.4	8.8	9.4	21.9	8.3	23.2	8.6	18.9	.....	13.8	6.5	11.7
1983	9.6	9.9	23.3	8.9	9.2	21.3	8.1	22.4	8.4	19.5	.....	13.7	6.5	12.2
1984	7.5	7.4	19.6	6.6	7.6	18.0	6.8	18.9	6.5	15.9	.....	10.7	4.6	10.3
1985	7.2	7.0	19.5	6.2	7.4	17.6	6.6	18.6	6.2	15.1	.....	10.5	4.3	10.4
1986	7.0	6.9	19.0	6.1	7.1	17.6	6.2	18.3	6.0	14.5	.....	10.6	4.4	9.8
1987	6.2	6.2	17.8	5.4	6.2	15.9	5.4	16.9	5.3	13.0	.....	8.8	3.9	9.2
1988	5.5	5.5	16.0	4.8	5.6	14.4	4.9	15.3	4.7	11.7	.....	8.2	3.3	8.1
1989	5.3	5.2	15.9	4.5	5.4	14.0	4.7	15.0	4.5	11.4	.....	8.0	3.0	8.1
1990	5.6	5.7	16.3	5.0	5.5	14.7	4.9	15.5	4.8	11.4	.....	8.2	3.4	8.3
1991	6.8	7.2	19.8	6.4	6.4	17.5	5.7	18.7	6.1	12.5	.....	10.0	4.4	9.3
1992	7.5	7.9	21.5	7.1	7.0	18.6	6.3	20.1	6.6	14.2	.....	11.6	5.1	10.0
1993	6.9	7.2	20.4	6.4	6.6	17.5	5.9	19.0	6.1	13.0	.....	10.8	4.4	9.7
1994	6.1	6.2	19.0	5.4	6.0	16.2	5.4	17.6	5.3	11.5	.....	9.9	3.7	8.9
1995	5.6	5.6	18.4	4.8	5.6	16.1	4.9	17.3	4.9	10.4	.....	9.3	3.3	8.0
1996	5.4	5.4	18.1	4.6	5.4	15.2	4.8	16.7	4.7	10.5	.....	8.9	3.0	8.2
1997	4.9	4.9	16.9	4.2	5.0	15.0	4.4	16.0	4.2	10.0	.....	7.7	2.7	8.1
1998	4.5	4.4	16.2	3.7	4.6	12.9	4.1	14.6	3.9	8.9	.....	7.2	2.4	7.2
1999	4.2	4.1	14.7	3.5	4.3	13.2	3.8	13.9	3.7	8.0	.....	6.4	2.2	6.4
2000	4.0	3.9	14.0	3.3	4.1	12.1	3.6	13.1	3.5	7.6	3.6	5.7	2.0	5.9
2001	4.7	4.8	16.0	4.2	4.7	13.4	4.1	14.7	4.2	8.6	4.5	6.6	2.7	6.6
2002	5.8	5.9	18.1	5.3	5.6	14.9	5.1	16.5	5.1	10.2	5.9	7.5	3.6	8.0
2003	6.0	6.3	19.3	5.6	5.7	15.6	5.1	17.5	5.2	10.8	6.0	7.7	3.8	8.5
2004	5.5	5.6	18.4	5.0	5.4	15.5	4.9	17.0	4.8	10.4	4.4	7.0	3.1	8.0
2005	5.1	5.1	18.6	4.4	5.1	14.5	4.6	16.6	4.4	10.0	4.0	6.0	2.8	7.8
2006	4.6	4.6	16.9	4.0	4.6	13.8	4.1	15.4	4.0	8.9	3.0	5.2	2.4	7.1
2007	4.6	4.7	17.6	4.1	4.5	13.8	4.0	15.7	4.1	8.3	3.2	5.6	2.5	6.5
2008	5.8	6.1	21.2	5.4	5.4	16.2	4.9	18.7	5.2	10.1	4.0	7.6	3.4	8.0
2009	9.3	10.3	27.8	9.6	8.1	20.7	7.5	24.3	8.5	14.8	7.3	12.1	6.6	11.5
2010	9.6	10.5	28.8	9.8	8.6	22.8	8.0	25.9	8.7	16.0	7.5	12.5	6.8	12.3
2011	8.9	9.4	27.2	8.7	8.5	21.7	7.9	24.4	7.9	15.8	7.0	11.5	5.8	12.4
2012	8.1	8.2	26.8	7.5	7.9	21.1	7.3	24.0	7.2	13.8	5.9	10.3	4.9	11.4
2013	7.4	7.6	25.5	7.0	7.1	20.3	6.5	22.9	6.5	13.1	5.2	9.1	4.3	10.2
2014	6.2	6.3	21.4	5.7	6.1	17.7	5.6	19.6	5.3	11.3	5.0	7.4	3.4	8.6
2015	5.3	5.4	18.4	4.9	5.2	15.5	4.8	16.9	4.6	9.6	3.8	6.6	2.8	7.4
2015: Jan	5.7	5.8	20.0	5.3	5.5	17.8	5.0	18.9	4.9	10.3	4.0	6.7	2.9	8.1
Feb	5.5	5.6	17.7	5.2	5.4	16.3	4.9	17.0	4.7	10.3	4.0	6.7	3.0	7.7
Mar	5.5	5.6	19.8	5.1	5.3	15.3	4.9	17.6	4.7	10.0	3.2	6.8	2.8	8.1
Apr	5.4	5.5	17.8	5.0	5.4	16.3	4.9	17.1	4.7	9.6	4.4	6.9	3.0	7.0
May	5.5	5.5	20.4	5.0	5.4	15.2	5.0	17.8	4.7	10.2	4.1	6.7	2.9	6.8
June	5.3	5.3	20.1	4.8	5.2	15.8	4.7	17.9	4.6	9.5	3.8	6.6	2.8	7.8
July	5.3	5.2	17.6	4.8	5.3	14.9	4.9	16.3	4.6	9.1	4.0	6.8	2.8	8.0
Aug	5.1	5.1	17.6	4.7	5.1	15.9	4.7	16.8	4.4	9.4	3.5	6.6	2.8	8.1
Sept	5.1	5.1	16.8	4.7	5.0	15.6	4.5	16.2	4.4	9.2	3.7	6.4	2.8	7.1
Oct	5.0	5.1	16.7	4.7	4.9	14.9	4.5	15.8	4.4	9.2	3.5	6.4	2.8	7.5
Nov	5.0	5.2	18.1	4.7	4.9	13.0	4.6	15.6	4.4	9.4	3.9	6.4	2.7	6.9
Dec	5.0	5.2	17.7	4.7	4.8	14.4	4.4	16.1	4.5	8.3	4.0	6.3	2.7	5.8
2016: Jan	4.9	4.9	17.4	4.5	4.9	14.5	4.5	16.0	4.3	8.8	3.7	5.9	2.6	7.1
Feb	4.9	4.9	16.8	4.5	4.9	14.3	4.5	15.6	4.3	8.8	3.8	5.4	2.6	7.0
Mar	5.0	5.0	17.0	4.5	5.0	14.6	4.6	15.9	4.3	9.0	4.0	5.6	2.9	6.8
Apr	5.0	5.0	16.4	4.6	5.0	15.7	4.5	16.0	4.3	8.8	3.8	6.1	2.7	6.7
May	4.7	4.7	16.2	4.3	4.7	15.9	4.2	16.0	4.1	8.2	4.1	5.6	2.6	6.6
June	4.9	4.9	17.1	4.5	4.9	14.8	4.5	16.0	4.4	8.6	3.5	5.8	2.6	7.3
July	4.9	5.0	16.5	4.6	4.7	14.8	4.3	15.6	4.3	8.4	3.8	5.4	2.6	7.2
Aug	4.9	5.0	17.5	4.5	4.9	13.7	4.5	15.7	4.4	8.1	4.2	5.6	2.7	7.9
Sept	5.0	5.1	16.5	4.7	4.8	15.0	4.4	15.8	4.4	8.3	3.9	6.4	2.9	6.4
Oct	4.9	5.1	17.9	4.6	4.7	13.3	4.3	15.6	4.3	8.6	3.4	5.7	2.8	6.1
Nov	4.6	4.7	18.0	4.3	4.5	12.1	4.2	15.2	4.2	8.1	3.0	5.7	2.7	6.2

[1] Unemployed as percent of civilian labor force in group specified.
[2] Beginning in 2003, persons who selected this race group only. Prior to 2003, persons who selected more than one race were included in the group they identified as the main race. Data for "black or African American" were for "black" prior to 2003. See *Employment and Earnings* or concepts and methodology of the CPS at http://www.bls.gov/cps/documentation.htm#concepts for details.
[3] Persons whose ethnicity is identified as Hispanic or Latino may be of any race.
[4] Not seasonally adjusted.

Note: Data relate to persons 16 years of age and over.
See Note, Table B–11.

Source: Department of Labor (Bureau of Labor Statistics).

Table B–13. Unemployment by duration and reason, 1972–2016

[Thousands of persons, except as noted; monthly data seasonally adjusted [1]]

Year or month	Unemployment	Duration of unemployment						Reason for unemployment					
		Less than 5 weeks	5–14 weeks	15–26 weeks	27 weeks and over	Average (mean) duration (weeks) [2]	Median duration (weeks)	Job losers [3]			Job leavers	Re-entrants	New entrants
								Total	On layoff	Other			
1972	4,882	2,242	1,472	601	566	12.0	6.2	2,108	582	1,526	641	1,456	677
1973	4,365	2,224	1,314	483	343	10.0	5.2	1,694	472	1,221	683	1,340	649
1974	5,156	2,604	1,597	574	381	9.8	5.2	2,242	746	1,495	768	1,463	681
1975	7,929	2,940	2,484	1,303	1,203	14.2	8.4	4,386	1,671	2,714	827	1,892	823
1976	7,406	2,844	2,196	1,018	1,348	15.8	8.2	3,679	1,050	2,628	903	1,928	895
1977	6,991	2,919	2,132	913	1,028	14.3	7.0	3,166	865	2,300	909	1,963	953
1978	6,202	2,865	1,923	766	648	11.9	5.9	2,585	712	1,873	874	1,857	885
1979	6,137	2,950	1,946	706	535	10.8	5.4	2,635	851	1,784	880	1,806	817
1980	7,637	3,295	2,470	1,052	820	11.9	6.5	3,947	1,488	2,459	891	1,927	872
1981	8,273	3,449	2,539	1,122	1,162	13.7	6.9	4,267	1,430	2,837	923	2,102	981
1982	10,678	3,883	3,311	1,708	1,776	15.6	8.7	6,268	2,127	4,141	840	2,384	1,185
1983	10,717	3,570	2,937	1,652	2,559	20.0	10.1	6,258	1,780	4,478	830	2,412	1,216
1984	8,539	3,350	2,451	1,104	1,634	18.2	7.9	4,421	1,171	3,250	823	2,184	1,110
1985	8,312	3,498	2,509	1,025	1,280	15.6	6.8	4,139	1,157	2,982	877	2,256	1,039
1986	8,237	3,448	2,557	1,045	1,187	15.0	6.9	4,033	1,090	2,943	1,015	2,160	1,029
1987	7,425	3,246	2,196	943	1,040	14.5	6.5	3,566	943	2,623	965	1,974	920
1988	6,701	3,084	2,007	801	809	13.5	5.9	3,092	851	2,241	983	1,809	816
1989	6,528	3,174	1,978	730	646	11.9	4.8	2,983	850	2,133	1,024	1,843	677
1990	7,047	3,265	2,257	822	703	12.0	5.3	3,387	1,028	2,359	1,041	1,930	688
1991	8,628	3,480	2,791	1,246	1,111	13.7	6.8	4,694	1,292	3,402	1,004	2,139	792
1992	9,613	3,376	2,830	1,453	1,954	17.7	8.7	5,389	1,260	4,129	1,002	2,285	937
1993	8,940	3,262	2,584	1,297	1,798	18.0	8.3	4,848	1,115	3,733	976	2,198	919
1994	7,996	2,728	2,408	1,237	1,623	18.8	9.2	3,815	977	2,838	791	2,786	604
1995	7,404	2,700	2,342	1,085	1,278	16.6	8.3	3,476	1,030	2,446	824	2,525	579
1996	7,236	2,633	2,287	1,053	1,262	16.7	8.3	3,370	1,021	2,349	774	2,512	580
1997	6,739	2,538	2,138	995	1,067	15.8	8.0	3,037	931	2,106	795	2,338	569
1998	6,210	2,622	1,950	763	875	14.5	6.7	2,822	866	1,957	734	2,132	520
1999	5,880	2,568	1,832	755	725	13.4	6.4	2,622	848	1,774	783	2,005	469
2000	5,692	2,558	1,815	669	649	12.6	5.9	2,517	852	1,664	780	1,961	434
2001	6,801	2,853	2,196	951	801	13.1	6.8	3,476	1,067	2,409	835	2,031	459
2002	8,378	2,893	2,580	1,369	1,535	16.6	9.1	4,607	1,124	3,483	866	2,368	536
2003	8,774	2,785	2,612	1,442	1,936	19.2	10.1	4,838	1,121	3,717	818	2,477	641
2004	8,149	2,696	2,382	1,293	1,779	19.6	9.8	4,197	998	3,199	858	2,408	686
2005	7,591	2,667	2,304	1,130	1,490	18.4	8.9	3,667	933	2,734	872	2,386	666
2006	7,001	2,614	2,121	1,031	1,235	16.8	8.3	3,321	921	2,400	827	2,237	616
2007	7,078	2,542	2,232	1,061	1,243	16.8	8.5	3,515	976	2,539	793	2,142	627
2008	8,924	2,932	2,804	1,427	1,761	17.9	9.4	4,789	1,176	3,614	896	2,472	766
2009	14,265	3,165	3,828	2,775	4,496	24.4	15.1	9,160	1,630	7,530	882	3,187	1,035
2010	14,825	2,771	3,267	2,371	6,415	33.0	21.4	9,250	1,431	7,819	889	3,466	1,220
2011	13,747	2,677	2,993	2,061	6,016	39.3	21.4	8,106	1,230	6,876	956	3,401	1,284
2012	12,506	2,644	2,866	1,859	5,136	39.4	19.3	6,877	1,183	5,694	967	3,345	1,316
2013	11,460	2,584	2,759	1,807	4,310	36.5	17.0	6,073	1,136	4,937	932	3,207	1,247
2014	9,617	2,471	2,432	1,497	3,218	33.7	14.0	4,878	1,007	3,871	824	2,829	1,086
2015	8,296	2,399	2,302	1,267	2,328	29.2	11.6	4,063	974	3,089	819	2,535	879
2015: Jan	8,920	2,390	2,332	1,371	2,776	32.0	13.4	4,246	919	3,327	851	2,836	1,026
Feb	8,646	2,432	2,251	1,317	2,677	31.4	13.0	4,177	1,027	3,150	880	2,632	949
Mar	8,557	2,488	2,330	1,255	2,547	30.4	12.1	4,194	1,004	3,190	870	2,666	812
Apr	8,523	2,707	2,339	1,162	2,503	30.5	11.6	4,130	959	3,171	824	2,649	867
May	8,619	2,397	2,507	1,286	2,491	30.5	11.6	4,263	1,041	3,222	823	2,584	963
June	8,262	2,347	2,350	1,385	2,128	28.1	11.4	4,060	1,040	3,019	767	2,488	931
July	8,249	2,471	2,249	1,182	2,190	28.3	11.4	4,116	989	3,127	844	2,441	827
Aug	8,018	2,106	2,354	1,254	2,189	28.3	12.1	4,014	968	3,046	787	2,344	846
Sept	7,925	2,373	2,211	1,228	2,109	26.3	11.3	3,883	901	2,982	778	2,443	832
Oct	7,899	2,339	2,295	1,227	2,132	28.0	11.1	3,944	936	3,007	790	2,435	812
Nov	7,924	2,412	2,253	1,270	2,054	27.9	10.7	3,873	939	2,934	800	2,449	847
Dec	7,904	2,405	2,192	1,235	2,085	27.6	10.5	3,796	937	2,859	821	2,476	858
2016: Jan	7,791	2,249	2,282	1,135	2,089	28.9	10.9	3,664	923	2,741	766	2,468	827
Feb	7,815	2,297	2,236	1,132	2,165	29.0	11.2	3,749	960	2,790	760	2,467	833
Mar	7,966	2,412	2,205	1,178	2,213	28.4	11.4	3,835	921	2,914	833	2,495	778
Apr	7,920	2,545	2,131	1,304	2,063	27.7	11.4	3,855	841	3,014	851	2,357	839
May	7,436	2,207	2,239	1,173	1,885	26.7	10.7	3,573	829	2,744	796	2,209	865
June	7,783	2,418	2,140	1,129	1,979	27.7	10.3	3,776	1,097	2,679	828	2,268	902
July	7,770	2,160	2,266	1,150	2,020	28.1	11.6	3,739	997	2,743	824	2,298	826
Aug	7,849	2,290	2,329	1,056	2,006	27.6	11.2	3,791	998	2,792	885	2,271	861
Sept	7,939	2,574	2,234	1,157	1,974	27.5	10.3	3,967	1,075	2,892	893	2,333	805
Oct	7,787	2,397	2,296	1,165	1,979	27.2	10.2	3,749	994	2,755	949	2,354	793
Nov	7,400	2,421	2,136	1,077	1,856	26.3	10.1	3,555	904	2,651	934	2,274	729

[1] Because of independent seasonal adjustment of the various series, detail will not sum to totals.
[2] Beginning with 2011, includes unemployment durations of up to 5 years; prior data are for up to 2 years.
[3] Beginning with 1994, job losers and persons who completed temporary jobs.

Note: Data relate to persons 16 years of age and over.
See Note, Table B–11.

Source: Department of Labor (Bureau of Labor Statistics).

Table B–14. Employees on nonagricultural payrolls, by major industry, 1972–2016

[Thousands of jobs; monthly data seasonally adjusted]

Year or month	Total nonagricultural employment	Private industries									
		Total private	Goods-producing industries						Private service-providing industries		
			Total	Mining and logging	Construction	Manufacturing			Total	Trade, transportation, and utilities [1]	
						Total	Durable goods	Nondurable goods		Total	Retail trade
1972	73,798	60,333	22,299	672	3,957	17,669	10,630	7,039	38,034	14,788	8,038
1973	76,912	63,050	23,450	693	4,167	18,589	11,414	7,176	39,600	15,349	8,371
1974	78,389	64,086	23,364	755	4,095	18,514	11,432	7,082	40,721	15,693	8,536
1975	77,069	62,250	21,318	802	3,608	16,909	10,266	6,643	40,932	15,606	8,600
1976	79,502	64,501	22,025	832	3,662	17,531	10,640	6,891	42,476	16,128	8,966
1977	82,593	67,334	22,972	865	3,940	18,167	11,132	7,035	44,362	16,765	9,359
1978	86,826	71,014	24,156	902	4,322	18,932	11,770	7,162	46,858	17,658	9,879
1979	89,933	73,865	24,997	1,008	4,562	19,426	12,220	7,206	48,869	18,303	10,180
1980	90,533	74,158	24,263	1,077	4,454	18,733	11,679	7,054	49,895	18,413	10,244
1981	91,297	75,117	24,118	1,180	4,304	18,634	11,611	7,023	50,999	18,604	10,364
1982	89,689	73,706	22,550	1,163	4,024	17,363	10,610	6,753	51,156	18,457	10,372
1983	90,295	74,284	22,110	997	4,065	17,048	10,326	6,722	52,174	18,668	10,635
1984	94,548	78,389	23,435	1,014	4,501	17,920	11,050	6,870	54,954	19,653	11,223
1985	97,532	81,000	23,585	974	4,793	17,819	11,034	6,784	57,415	20,379	11,733
1986	99,500	82,661	23,318	829	4,937	17,552	10,795	6,757	59,343	20,795	12,078
1987	102,116	84,960	23,470	771	5,090	17,609	10,767	6,842	61,490	21,302	12,419
1988	105,378	87,838	23,909	770	5,233	17,906	10,969	6,938	63,929	21,974	12,808
1989	108,051	90,124	24,045	750	5,309	17,985	11,004	6,981	66,079	22,510	13,108
1990	109,527	91,112	23,723	765	5,263	17,695	10,737	6,958	67,389	22,666	13,182
1991	108,427	89,881	22,588	739	4,780	17,068	10,220	6,848	67,293	22,281	12,896
1992	108,802	90,015	22,095	689	4,608	16,799	9,946	6,853	67,921	22,125	12,828
1993	110,935	91,946	22,219	666	4,779	16,774	9,901	6,872	69,727	22,378	13,021
1994	114,398	95,124	22,774	659	5,095	17,020	10,132	6,889	72,350	23,128	13,491
1995	117,407	97,975	23,156	641	5,274	17,241	10,373	6,868	74,819	23,834	13,897
1996	119,836	100,297	23,409	637	5,536	17,237	10,486	6,751	76,888	24,239	14,143
1997	122,951	103,287	23,886	654	5,813	17,419	10,705	6,714	79,401	24,700	14,389
1998	126,157	106,248	24,354	645	6,149	17,560	10,911	6,649	81,894	25,186	14,609
1999	129,240	108,933	24,465	598	6,545	17,322	10,831	6,491	84,468	25,771	14,970
2000	132,024	111,235	24,649	599	6,787	17,263	10,877	6,386	86,585	26,225	15,280
2001	132,087	110,969	23,873	606	6,826	16,441	10,336	6,105	87,096	25,983	15,239
2002	130,649	109,136	22,557	583	6,716	15,259	9,485	5,774	86,579	25,497	15,025
2003	130,347	108,764	21,816	572	6,735	14,509	8,964	5,546	86,948	25,287	14,917
2004	131,787	110,166	21,882	591	6,976	14,315	8,925	5,390	88,284	25,533	15,058
2005	134,051	112,247	22,190	628	7,336	14,227	8,956	5,271	90,057	25,959	15,280
2006	136,453	114,479	22,530	684	7,691	14,155	8,981	5,174	91,949	26,276	15,353
2007	137,999	115,781	22,233	724	7,630	13,879	8,808	5,071	93,548	26,630	15,520
2008	137,242	114,732	21,335	767	7,162	13,406	8,463	4,943	93,398	26,293	15,283
2009	131,313	108,758	18,558	694	6,016	11,847	7,284	4,564	90,201	24,906	14,522
2010	130,361	107,871	17,751	705	5,518	11,528	7,064	4,464	90,120	24,636	14,440
2011	131,932	109,845	18,047	788	5,533	11,726	7,273	4,453	91,798	25,065	14,668
2012	134,175	112,255	18,420	848	5,646	11,927	7,470	4,457	93,834	25,476	14,841
2013	136,381	114,529	18,738	863	5,856	12,020	7,548	4,472	95,791	25,862	15,079
2014	138,958	117,076	19,226	891	6,151	12,185	7,674	4,512	97,850	26,383	15,357
2015	141,865	119,859	19,584	820	6,446	12,318	7,756	4,562	100,275	26,920	15,641
2015: Jan	140,623	118,669	19,552	890	6,351	12,311	7,764	4,547	99,117	26,698	15,510
Feb	140,888	118,921	19,568	875	6,378	12,315	7,769	4,546	99,353	26,750	15,539
Mar	140,972	119,011	19,548	859	6,371	12,318	7,769	4,549	99,463	26,788	15,564
Apr	141,223	119,252	19,569	844	6,409	12,316	7,765	4,551	99,683	26,815	15,578
May	141,496	119,508	19,574	824	6,426	12,324	7,767	4,557	99,934	26,861	15,605
June	141,724	119,734	19,571	820	6,426	12,325	7,765	4,560	100,163	26,909	15,640
July	142,001	119,979	19,585	812	6,437	12,336	7,762	4,574	100,394	26,963	15,671
Aug	142,151	120,102	19,562	803	6,441	12,318	7,756	4,562	100,540	26,978	15,675
Sept	142,300	120,264	19,550	790	6,451	12,309	7,749	4,560	100,714	26,987	15,681
Oct	142,595	120,568	19,581	786	6,484	12,311	7,745	4,566	100,987	27,011	15,702
Nov	142,875	120,847	19,634	771	6,549	12,314	7,733	4,581	101,213	27,087	15,754
Dec	143,146	121,106	19,678	761	6,597	12,320	7,731	4,589	101,428	27,114	15,761
2016: Jan	143,314	121,261	19,702	749	6,615	12,338	7,742	4,596	101,559	27,173	15,827
Feb	143,547	121,483	19,682	732	6,628	12,322	7,728	4,594	101,801	27,229	15,879
Mar	143,733	121,650	19,675	717	6,665	12,293	7,703	4,590	101,975	27,280	15,922
Apr	143,877	121,797	19,663	706	6,659	12,298	7,706	4,592	102,134	27,296	15,920
May	143,901	121,796	19,618	696	6,641	12,281	7,686	4,595	102,178	27,292	15,920
June	144,172	122,034	19,613	689	6,635	12,289	7,681	4,608	102,421	27,311	15,942
July	144,424	122,255	19,627	685	6,651	12,291	7,685	4,606	102,628	27,340	15,955
Aug	144,600	122,387	19,601	681	6,645	12,275	7,669	4,606	102,786	27,378	15,972
Sept	144,808	122,592	19,622	682	6,671	12,269	7,663	4,606	102,970	27,409	15,994
Oct [p]	144,950	122,727	19,629	680	6,685	12,264	7,662	4,602	103,098	27,421	15,985
Nov [p]	145,128	122,883	19,646	682	6,704	12,260	7,656	4,604	103,237	27,424	15,977

[1] Includes wholesale trade, transportation and warehousing, and utilities, not shown separately.

Note: Data in Tables B–14 and B–15 are based on reports from employing establishments and relate to full- and part-time wage and salary workers in nonagricultural establishments who received pay for any part of the pay period that includes the 12th of the month. Not comparable with labor force data (Tables B–11 through B–13), which include proprietors, self-employed persons, unpaid family workers, and private household workers; which count persons as

See next page for continuation of table.

TABLE B–14. Employees on nonagricultural payrolls, by major industry, 1972–2016—*Continued*

[Thousands of jobs; monthly data seasonally adjusted]

Year or month	Private industries—Continued						Government			
	Private service-providing industries—Continued									
	Information	Financial activities	Profes-sional and business services	Education and health services	Leisure and hospitality	Other services	Total	Federal	State	Local
1972	2,056	3,784	5,523	4,863	5,121	1,900	13,465	2,815	2,859	7,790
1973	2,135	3,920	5,774	5,092	5,341	1,990	13,862	2,794	2,923	8,146
1974	2,160	4,023	5,974	5,322	5,471	2,078	14,303	2,858	3,039	8,407
1975	2,061	4,047	6,034	5,497	5,544	2,144	14,820	2,882	3,179	8,758
1976	2,111	4,155	6,287	5,756	5,794	2,244	15,001	2,863	3,273	8,865
1977	2,185	4,348	6,587	6,052	6,065	2,359	15,258	2,859	3,377	9,023
1978	2,287	4,599	6,972	6,427	6,411	2,505	15,812	2,893	3,474	9,446
1979	2,375	4,843	7,312	6,768	6,631	2,637	16,068	2,894	3,541	9,633
1980	2,361	5,025	7,544	7,077	6,721	2,755	16,375	3,000	3,610	9,765
1981	2,382	5,163	7,782	7,364	6,840	2,865	16,180	2,922	3,640	9,619
1982	2,317	5,209	7,848	7,526	6,874	2,924	15,982	2,884	3,640	9,458
1983	2,253	5,334	8,039	7,781	7,078	3,021	16,011	2,915	3,662	9,434
1984	2,398	5,553	8,464	8,211	7,489	3,186	16,159	2,943	3,734	9,482
1985	2,437	5,815	8,871	8,679	7,869	3,366	16,533	3,014	3,832	9,687
1986	2,445	6,128	9,211	9,086	8,156	3,523	16,838	3,044	3,893	9,901
1987	2,507	6,385	9,608	9,543	8,446	3,699	17,156	3,089	3,967	10,100
1988	2,585	6,500	10,090	10,096	8,778	3,907	17,540	3,124	4,076	10,339
1989	2,622	6,562	10,555	10,652	9,062	4,116	17,927	3,136	4,182	10,609
1990	2,688	6,614	10,848	11,024	9,288	4,261	18,415	3,196	4,305	10,914
1991	2,677	6,561	10,714	11,556	9,256	4,249	18,545	3,110	4,355	11,081
1992	2,641	6,559	10,970	11,948	9,437	4,240	18,787	3,111	4,408	11,267
1993	2,668	6,742	11,495	12,362	9,732	4,350	18,989	3,063	4,488	11,438
1994	2,738	6,910	12,174	12,872	10,100	4,428	19,275	3,018	4,576	11,682
1995	2,843	6,866	12,844	13,360	10,501	4,572	19,432	2,949	4,635	11,849
1996	2,940	7,018	13,462	13,761	10,777	4,690	19,539	2,877	4,606	12,056
1997	3,084	7,255	14,335	14,185	11,018	4,825	19,664	2,806	4,582	12,276
1998	3,218	7,565	15,147	14,570	11,232	4,976	19,909	2,772	4,612	12,525
1999	3,419	7,753	15,957	14,939	11,543	5,087	20,307	2,769	4,709	12,829
2000	3,630	7,783	16,666	15,252	11,862	5,168	20,790	2,865	4,786	13,139
2001	3,629	7,900	16,476	15,814	12,036	5,258	21,118	2,764	4,905	13,449
2002	3,395	7,956	15,976	16,398	11,986	5,372	21,513	2,766	5,029	13,718
2003	3,188	8,078	15,987	16,835	12,173	5,401	21,583	2,761	5,002	13,820
2004	3,118	8,105	16,394	17,230	12,493	5,409	21,621	2,730	4,982	13,909
2005	3,061	8,197	16,954	17,676	12,816	5,395	21,804	2,732	5,032	14,041
2006	3,038	8,367	17,566	18,154	13,110	5,438	21,974	2,732	5,075	14,167
2007	3,032	8,348	17,942	18,676	13,427	5,494	22,218	2,734	5,122	14,362
2008	2,984	8,206	17,735	19,228	13,436	5,515	22,509	2,762	5,177	14,571
2009	2,804	7,838	16,579	19,630	13,077	5,367	22,555	2,832	5,169	14,554
2010	2,707	7,695	16,728	19,975	13,049	5,331	22,490	2,977	5,137	14,376
2011	2,674	7,697	17,332	20,318	13,353	5,360	22,086	2,859	5,078	14,150
2012	2,676	7,784	17,932	20,769	13,768	5,430	21,920	2,820	5,055	14,045
2013	2,706	7,886	18,515	21,086	14,254	5,483	21,853	2,769	5,046	14,037
2014	2,726	7,977	19,062	21,439	14,696	5,567	21,882	2,733	5,064	14,084
2015	2,750	8,124	19,672	22,055	15,128	5,625	22,007	2,754	5,103	14,149
2015: Jan	2,734	8,061	19,370	21,731	14,924	5,599	21,954	2,743	5,092	14,119
Feb	2,738	8,070	19,409	21,790	14,989	5,607	21,967	2,747	5,096	14,124
Mar	2,735	8,082	19,436	21,828	14,989	5,605	21,961	2,747	5,094	14,120
Apr	2,745	8,089	19,505	21,905	15,010	5,614	21,971	2,750	5,096	14,125
May	2,747	8,098	19,585	21,962	15,059	5,622	21,988	2,752	5,096	14,140
June	2,751	8,117	19,661	22,017	15,089	5,619	21,990	2,752	5,099	14,139
July	2,756	8,137	19,707	22,075	15,125	5,631	22,022	2,751	5,098	14,173
Aug	2,753	8,150	19,742	22,137	15,158	5,622	22,049	2,753	5,106	14,190
Sept	2,766	8,153	19,782	22,192	15,208	5,626	22,036	2,754	5,113	14,169
Oct	2,771	8,164	19,873	22,270	15,261	5,637	22,027	2,752	5,114	14,161
Nov	2,753	8,182	19,921	22,315	15,307	5,648	22,028	2,758	5,110	14,160
Dec	2,763	8,190	19,981	22,378	15,342	5,660	22,040	2,768	5,108	14,164
2016: Jan	2,763	8,207	19,979	22,404	15,376	5,657	22,053	2,763	5,107	14,183
Feb	2,774	8,215	20,014	22,481	15,413	5,675	22,064	2,765	5,108	14,191
Mar	2,782	8,229	20,045	22,527	15,431	5,681	22,083	2,771	5,111	14,201
Apr	2,782	8,250	20,102	22,574	15,446	5,684	22,080	2,767	5,109	14,204
May	2,741	8,266	20,134	22,620	15,449	5,676	22,105	2,783	5,104	14,218
June	2,782	8,283	20,182	22,672	15,502	5,689	22,138	2,787	5,115	14,236
July	2,777	8,300	20,266	22,714	15,538	5,693	22,169	2,790	5,110	14,269
Aug	2,776	8,318	20,294	22,770	15,548	5,702	22,213	2,797	5,116	14,300
Sept	2,781	8,320	20,381	22,808	15,556	5,715	22,216	2,800	5,120	14,296
Oct [p]	2,778	8,329	20,429	22,852	15,571	5,718	22,223	2,808	5,112	14,303
Nov [p]	2,768	8,335	20,492	22,896	15,600	5,722	22,245	2,811	5,117	14,317

Note (cont'd): employed when they are not at work because of industrial disputes, bad weather, etc., even if they are not paid for the time off; which are based on a sample of the working-age population; and which count persons only once—as employed, unemployed, or not in the labor force. In the data shown here, persons who work at more than one job are counted each time they appear on a payroll.

Establishment data for employment, hours, and earnings are classified based on the 2012 North American Industry Classification System (NAICS). For further description and details see *Employment and Earnings*.

Source: Department of Labor (Bureau of Labor Statistics).

Table B–15. Hours and earnings in private nonagricultural industries, 1972–2016

[Monthly data seasonally adjusted]

Year or month	All employees							Production and nonsupervisory employees [1]						
	Average weekly hours	Average hourly earnings		Average weekly earnings				Average weekly hours	Average hourly earnings		Average weekly earnings			
				Level		Percent change from year earlier					Level		Percent change from year earlier	
		Current dollars	1982–84 dollars [2]	Current dollars	1982–84 dollars [2]	Current dollars	1982–84 dollars [2]		Current dollars	1982–84 dollars [3]	Current dollars	1982–84 dollars [3]	Current dollars	1982–84 dollars [3]
1972	.....	.....	.....	.....	.....	.....	.....	36.9	$3.90	$9.26	$143.87	$341.73	8.0	4.4
1973	.....	.....	.....	.....	.....	.....	.....	36.9	4.14	9.26	152.59	341.36	6.1	–.1
1974	.....	.....	.....	.....	.....	.....	.....	36.4	4.43	8.93	161.61	325.83	5.9	–4.5
1975	.....	.....	.....	.....	.....	.....	.....	36.0	4.73	8.74	170.29	314.77	5.4	–3.4
1976	.....	.....	.....	.....	.....	.....	.....	36.1	5.06	8.85	182.65	319.32	7.3	1.4
1977	.....	.....	.....	.....	.....	.....	.....	35.9	5.44	8.93	195.58	321.15	7.1	.6
1978	.....	.....	.....	.....	.....	.....	.....	35.8	5.88	8.96	210.29	320.56	7.5	–.2
1979	.....	.....	.....	.....	.....	.....	.....	35.6	6.34	8.67	225.69	308.74	7.3	–3.7
1980	.....	.....	.....	.....	.....	.....	.....	35.2	6.85	8.26	241.07	290.80	6.8	–5.8
1981	.....	.....	.....	.....	.....	.....	.....	35.2	7.44	8.14	261.53	286.14	8.5	–1.6
1982	.....	.....	.....	.....	.....	.....	.....	34.7	7.87	8.12	273.10	281.84	4.4	–1.5
1983	.....	.....	.....	.....	.....	.....	.....	34.9	8.20	8.22	286.43	287.00	4.9	1.8
1984	.....	.....	.....	.....	.....	.....	.....	35.1	8.49	8.22	298.26	288.73	4.1	.6
1985	.....	.....	.....	.....	.....	.....	.....	34.9	8.74	8.18	304.62	284.96	2.1	–1.3
1986	.....	.....	.....	.....	.....	.....	.....	34.7	8.93	8.22	309.78	285.25	1.7	.1
1987	.....	.....	.....	.....	.....	.....	.....	34.7	9.14	8.12	317.39	282.12	2.5	–1.1
1988	.....	.....	.....	.....	.....	.....	.....	34.6	9.44	8.07	326.48	279.04	2.9	–1.1
1989	.....	.....	.....	.....	.....	.....	.....	34.5	9.80	7.99	338.34	275.97	3.6	–1.1
1990	.....	.....	.....	.....	.....	.....	.....	34.3	10.20	7.91	349.63	271.03	3.3	–1.8
1991	.....	.....	.....	.....	.....	.....	.....	34.1	10.51	7.83	358.46	266.91	2.5	–1.5
1992	.....	.....	.....	.....	.....	.....	.....	34.2	10.77	7.79	368.20	266.43	2.7	–.2
1993	.....	.....	.....	.....	.....	.....	.....	34.3	11.05	7.78	378.89	266.64	2.9	.1
1994	.....	.....	.....	.....	.....	.....	.....	34.5	11.34	7.79	391.17	268.66	3.2	.8
1995	.....	.....	.....	.....	.....	.....	.....	34.3	11.65	7.78	400.04	267.05	2.3	–.6
1996	.....	.....	.....	.....	.....	.....	.....	34.3	12.04	7.81	413.25	268.17	3.3	.4
1997	.....	.....	.....	.....	.....	.....	.....	34.5	12.51	7.94	431.86	274.02	4.5	2.2
1998	.....	.....	.....	.....	.....	.....	.....	34.5	13.01	8.15	448.59	280.90	3.9	2.5
1999	.....	.....	.....	.....	.....	.....	.....	34.3	13.49	8.27	463.15	283.79	3.2	1.0
2000	.....	.....	.....	.....	.....	.....	.....	34.3	14.02	8.30	480.99	284.78	3.9	.3
2001	.....	.....	.....	.....	.....	.....	.....	34.0	14.54	8.38	493.74	284.58	2.7	–.1
2002	.....	.....	.....	.....	.....	.....	.....	33.9	14.96	8.50	506.54	287.97	2.6	1.2
2003	.....	.....	.....	.....	.....	.....	.....	33.7	15.37	8.55	517.76	287.96	2.2	.0
2004	.....	.....	.....	.....	.....	.....	.....	33.7	15.68	8.50	528.81	286.62	2.1	–.5
2005	.....	.....	.....	.....	.....	.....	.....	33.8	16.12	8.44	544.00	284.82	2.9	–.6
2006	.....	.....	.....	.....	.....	.....	.....	33.9	16.75	8.50	567.06	287.70	4.2	1.0
2007	34.4	$20.92	$10.09	$719.88	$347.19	.....	.....	33.8	17.42	8.59	589.18	290.57	3.9	1.0
2008	34.3	21.56	10.01	739.05	343.26	2.7	–1.1	33.6	18.06	8.56	607.42	287.80	3.1	–1.0
2009	33.8	22.18	10.34	750.09	349.63	1.5	1.9	33.1	18.61	8.88	615.96	293.83	1.4	2.1
2010	34.1	22.56	10.35	769.66	352.96	2.6	1.0	33.4	19.05	8.90	636.19	297.33	3.3	1.2
2011	34.3	23.03	10.24	791.07	351.68	2.8	–.4	33.6	19.44	8.77	652.89	294.66	2.6	–.9
2012	34.5	23.50	10.24	809.83	352.72	2.4	.3	33.7	19.74	8.73	665.65	294.24	2.0	–.1
2013	34.4	23.96	10.29	825.37	354.30	1.9	.4	33.7	20.13	8.78	677.73	295.53	1.8	.4
2014	34.5	24.47	10.34	845.00	356.94	2.4	.7	33.7	20.61	8.85	694.91	298.54	2.5	1.0
2015	34.5	25.03	10.56	864.59	364.78	2.3	2.2	33.7	21.04	9.08	709.13	305.91	2.0	2.5
2015: Jan	34.6	24.76	10.54	856.70	364.62	2.8	3.0	33.8	20.81	9.06	703.38	306.13	2.9	3.9
Feb	34.6	24.80	10.53	858.08	364.50	2.8	2.9	33.8	20.83	9.05	704.05	305.73	2.8	3.6
Mar	34.5	24.87	10.54	858.02	363.79	1.9	1.9	33.7	20.89	9.05	703.99	305.05	2.0	2.5
Apr	34.5	24.91	10.55	859.40	363.85	2.3	2.5	33.7	20.93	9.06	705.34	305.26	2.0	2.8
May	34.5	24.97	10.54	861.47	363.68	2.3	2.3	33.6	20.99	9.05	705.26	304.24	1.8	2.3
June	34.5	24.96	10.51	861.12	362.69	2.0	1.8	33.6	21.00	9.04	705.60	303.70	1.7	2.0
July	34.6	25.03	10.53	866.04	364.29	2.5	2.3	33.7	21.05	9.05	709.39	304.91	2.0	2.3
Aug	34.6	25.12	10.57	869.15	365.65	2.6	2.4	33.7	21.11	9.08	711.41	305.91	1.8	2.1
Sept	34.5	25.14	10.59	867.33	365.21	2.4	2.4	33.7	21.12	9.10	711.74	306.62	2.1	2.8
Oct	34.5	25.21	10.59	869.75	365.52	2.6	2.4	33.7	21.21	9.12	714.78	307.34	2.4	2.9
Nov	34.5	25.27	10.60	871.82	365.85	2.1	1.7	33.7	21.23	9.11	715.45	307.16	2.0	2.0
Dec	34.5	25.26	10.61	871.47	366.10	2.3	1.7	33.8	21.26	9.14	718.59	309.05	2.6	2.2
2016: Jan	34.6	25.38	10.66	878.15	368.80	2.5	1.1	33.7	21.33	9.18	718.82	309.26	2.2	1.0
Feb	34.4	25.39	10.68	873.42	367.44	1.8	.8	33.7	21.35	9.21	719.50	310.54	2.2	1.6
Mar	34.4	25.45	10.70	875.48	367.97	2.0	1.1	33.6	21.40	9.22	719.04	309.94	2.1	1.6
Apr	34.4	25.53	10.69	878.23	367.63	2.2	1.0	33.6	21.46	9.21	721.06	309.42	2.2	1.4
May	34.4	25.59	10.69	880.30	367.71	2.2	1.1	33.6	21.48	9.20	721.73	309.08	2.3	1.6
June	34.4	25.62	10.68	881.33	367.36	2.3	1.3	33.6	21.52	9.20	723.07	309.01	2.5	1.7
July	34.4	25.71	10.72	884.42	368.80	2.1	1.2	33.7	21.59	9.24	727.58	311.22	2.6	2.1
Aug	34.3	25.74	10.71	882.88	367.41	1.6	.5	33.6	21.62	9.23	726.43	310.18	2.1	1.4
Sept	34.4	25.81	10.71	887.86	368.40	2.4	.9	33.6	21.67	9.22	728.11	309.85	2.3	1.1
Oct [p]	34.4	25.92	10.72	891.65	368.66	2.5	.9	33.6	21.71	9.20	729.46	309.17	2.1	.6
Nov [p]	34.4	25.89	.....	890.62	.....	2.2	.....	33.6	21.73	.....	730.13	.....	2.1	.....

[1] Production employees in goods-producing industries and nonsupervisory employees in service-providing industries. These groups account for four-fifths of the total employment on private nonfarm payrolls.
[2] Current dollars divided by the consumer price index for all urban consumers (CPI-U) on a 1982–84=100 base.
[3] Current dollars divided by the consumer price index for urban wage earners and clerical workers (CPI-W) on a 1982–84=100 base.

Note: See Note, Table B–14.

Source: Department of Labor (Bureau of Labor Statistics).

TABLE B–16. Productivity and related data, business and nonfarm business sectors, 1967–2016

[Index numbers, 2009=100; quarterly data seasonally adjusted]

Year or quarter	Labor productivity (output per hour)		Output [1]		Hours of all persons [2]		Compensation per hour [3]		Real compensation per hour [4]		Unit labor costs		Implicit price deflator [5]	
	Business sector	Nonfarm business sector	Business sector	Nonfarm business sector	Business sector	Nonfarm business sector	Business sector	Nonfarm business sector	Business sector	Nonfarm business sector	Business sector	Nonfarm business sector	Business sector	Nonfarm business sector
1967	42.1	43.8	27.3	27.3	64.9	62.3	10.4	10.6	61.0	62.2	24.7	24.2	23.0	22.5
1968	43.5	45.4	28.7	28.8	65.9	63.4	11.2	11.4	63.1	64.2	25.7	25.1	23.9	23.4
1969	43.8	45.5	29.6	29.7	67.5	65.2	12.0	12.2	64.0	65.0	27.4	26.8	25.0	24.4
1970	44.6	46.1	29.5	29.6	66.2	64.2	12.9	13.0	65.1	65.8	28.9	28.3	26.1	25.5
1971	46.4	47.9	30.7	30.7	66.0	64.1	13.7	13.8	66.1	66.9	29.4	28.9	27.2	26.6
1972	48.0	49.6	32.7	32.8	68.1	66.1	14.5	14.7	68.0	69.0	30.3	29.7	28.1	27.4
1973	49.4	51.1	34.9	35.2	70.7	68.8	15.7	15.8	69.1	69.9	31.7	31.0	29.6	28.4
1974	48.5	50.2	34.4	34.6	70.8	68.9	17.1	17.3	68.1	68.9	35.3	34.5	32.5	31.4
1975	50.3	51.6	34.0	34.1	67.7	66.0	19.0	19.2	69.1	69.8	37.8	37.2	35.6	34.7
1976	51.9	53.4	36.3	36.5	70.0	68.3	20.5	20.7	70.5	71.1	39.5	38.7	37.5	36.6
1977	52.8	54.3	38.4	38.6	72.7	71.0	22.1	22.4	71.5	72.2	41.9	41.2	39.7	38.9
1978	53.4	55.0	40.8	41.1	76.4	74.7	24.0	24.3	72.4	73.3	44.9	44.1	42.5	41.5
1979	53.5	54.9	42.3	42.5	79.0	77.4	26.3	26.6	72.6	73.3	49.2	48.5	46.1	45.0
1980	53.5	54.8	41.9	42.1	78.3	76.8	29.1	29.5	72.3	73.0	54.5	53.7	50.2	49.3
1981	54.7	55.7	43.1	43.1	78.8	77.3	31.9	32.3	72.3	73.1	58.4	58.0	54.8	54.0
1982	54.2	55.1	41.8	41.7	77.1	75.6	34.2	34.6	73.1	74.0	63.1	62.8	58.0	57.4
1983	56.2	57.6	44.1	44.4	78.4	77.1	35.8	36.2	73.3	74.2	63.7	62.9	60.0	59.2
1984	57.8	58.8	48.0	48.1	83.0	81.8	37.4	37.8	73.5	74.3	64.7	64.2	61.7	60.9
1985	59.1	59.8	50.2	50.2	84.9	84.0	39.3	39.6	74.7	75.3	66.5	66.3	63.5	62.9
1986	60.8	61.6	52.0	52.1	85.6	84.6	41.5	41.9	77.5	78.3	68.3	68.0	64.3	63.8
1987	61.1	61.9	53.9	54.0	88.2	87.2	43.1	43.5	77.8	78.6	70.5	70.2	65.6	65.1
1988	62.0	62.9	56.2	56.4	90.6	89.7	45.3	45.7	79.0	79.7	73.1	72.7	67.7	67.1
1989	62.7	63.5	58.3	58.5	93.0	92.1	46.7	47.0	78.1	78.6	74.5	74.1	70.2	69.5
1990	64.1	64.7	59.3	59.4	92.4	91.8	49.7	50.0	79.2	79.6	77.6	77.2	72.5	71.8
1991	65.3	65.9	58.9	59.0	90.3	89.6	52.2	52.5	80.2	80.6	79.9	79.6	74.5	74.1
1992	68.2	68.8	61.4	61.4	90.1	89.3	55.3	55.6	82.8	83.3	81.0	80.9	75.7	75.3
1993	68.3	68.8	63.2	63.3	92.5	92.0	56.1	56.3	82.0	82.3	82.1	81.8	77.5	77.0
1994	68.8	69.5	66.2	66.3	96.2	95.4	56.6	57.0	81.1	81.6	82.2	82.0	78.9	78.5
1995	69.1	70.0	68.3	68.6	98.9	98.0	57.7	58.1	80.7	81.3	83.6	83.1	80.2	79.8
1996	71.2	71.9	71.5	71.7	100.5	99.7	60.1	60.5	81.9	82.4	84.5	84.2	81.5	80.9
1997	72.5	73.0	75.3	75.4	103.9	103.2	62.3	62.6	83.1	83.5	85.9	85.7	82.7	82.3
1998	74.7	75.3	79.2	79.4	105.9	105.5	66.0	66.2	86.8	87.1	88.3	88.0	83.1	82.8
1999	77.3	77.7	83.6	83.8	108.0	107.8	68.9	69.0	88.7	88.9	89.1	88.8	83.7	83.6
2000	80.0	80.3	87.3	87.5	109.2	108.9	73.9	74.1	92.1	92.3	92.5	92.3	85.3	85.2
2001	82.2	82.5	87.9	88.1	106.9	106.8	77.3	77.4	93.7	93.7	94.1	93.8	86.8	86.6
2002	85.7	86.1	89.5	89.7	104.4	104.2	79.0	79.1	94.3	94.4	92.2	91.9	87.4	87.3
2003	89.0	89.2	92.3	92.5	103.7	103.6	82.0	82.1	95.7	95.7	92.2	92.0	88.6	88.5
2004	91.9	92.0	96.5	96.6	105.0	105.0	85.8	85.8	97.5	97.5	93.4	93.3	90.7	90.3
2005	93.8	93.9	100.1	100.2	106.8	106.8	88.9	88.9	97.7	97.7	94.8	94.7	93.5	93.4
2006	94.7	94.7	103.3	103.4	109.1	109.2	92.4	92.4	98.3	98.3	97.6	97.5	96.0	96.0
2007	96.1	96.3	105.5	105.8	109.7	109.9	96.5	96.4	99.9	99.7	100.4	100.1	98.2	97.9
2008	96.9	97.0	104.2	104.4	107.6	107.7	99.0	99.0	98.7	98.6	102.2	102.1	99.8	99.4
2009	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2010	103.3	103.3	103.2	103.2	99.9	99.9	101.8	101.9	100.2	100.3	98.6	98.7	101.1	101.0
2011	103.3	103.4	105.3	105.5	102.0	102.0	104.0	104.1	99.2	99.4	100.7	100.7	103.3	102.8
2012	104.0	104.3	108.4	108.8	104.2	104.2	106.9	106.9	99.9	99.9	102.7	102.5	105.3	104.7
2013	104.8	104.7	110.8	110.9	105.8	106.0	108.3	108.2	99.8	99.6	103.4	103.3	106.9	106.3
2014	105.4	105.5	114.1	114.3	108.2	108.3	111.1	111.2	100.7	100.8	105.4	105.4	108.5	108.1
2015	106.2	106.5	117.6	117.8	110.7	110.6	114.3	114.5	103.4	103.6	107.5	107.5	109.3	109.2
2013: I	104.3	104.3	109.7	109.9	105.1	105.3	106.9	106.8	98.8	98.6	102.5	102.3	106.4	105.6
II	104.3	104.1	110.0	110.1	105.4	105.7	108.4	108.2	100.3	100.1	104.0	103.9	106.6	105.9
III	104.7	104.6	111.1	111.1	106.1	106.2	108.6	108.6	99.9	99.9	103.7	103.8	107.1	106.5
IV	105.7	105.6	112.6	112.6	106.5	106.6	109.1	109.1	100.0	99.9	103.3	103.3	107.5	107.1
2014: I	104.8	104.7	112.0	112.1	106.9	107.1	110.9	110.8	101.0	100.9	105.8	105.8	107.9	107.5
II	105.2	105.2	113.4	113.5	107.7	107.9	110.4	110.3	100.0	100.0	104.9	104.9	108.5	108.0
III	106.1	106.3	115.1	115.3	108.5	108.5	111.2	111.4	100.6	100.7	104.8	104.8	108.9	108.5
IV	105.6	105.9	115.9	116.1	109.7	109.7	112.1	112.4	101.5	101.7	106.1	106.1	108.9	108.5
2015: I	105.8	106.1	116.6	116.8	110.2	110.1	112.6	112.9	102.6	102.9	106.4	106.3	108.7	108.6
II	106.2	106.4	117.5	117.7	110.6	110.6	114.0	114.2	103.3	103.4	107.3	107.3	109.3	109.1
III	106.8	107.0	118.1	118.2	110.6	110.5	114.8	115.0	103.7	103.8	107.5	107.5	109.5	109.4
IV	106.1	106.3	118.3	118.5	111.5	111.4	115.6	115.9	104.2	104.4	108.9	109.0	109.6	109.5
2016: I	106.0	106.2	118.6	118.7	111.9	111.8	115.3	115.6	104.0	104.3	108.8	108.9	109.7	109.7
II	105.9	106.1	119.1	119.1	112.5	112.3	116.3	116.7	104.2	104.6	109.8	109.9	110.3	110.3
III [p]	106.7	106.9	120.1	120.1	112.5	112.4	117.3	117.6	104.7	105.0	109.9	110.0	110.5	110.7

[1] Output refers to real gross domestic product in the sector.
[2] Hours at work of all persons engaged in sector, including hours of employees, proprietors, and unpaid family workers. Estimates based primarily on establishment data.
[3] Wages and salaries of employees plus employers' contributions for social insurance and private benefit plans. Also includes an estimate of wages, salaries, and supplemental payments for the self-employed.
[4] Hourly compensation divided by consumer price series. The trend for 1978-2015 is based on the consumer price index research series (CPI-U-RS). The change for prior years and recent quarters is based on the consumer price index for all urban consumers (CPI-U).
[5] Current dollar output divided by the output index.

Source: Department of Labor (Bureau of Labor Statistics).

Table B–17. Federal receipts, outlays, surplus or deficit, and debt, fiscal years 1952–2017

[Billions of dollars; fiscal years]

Fiscal year or period	Total			On-budget			Off-budget			Federal debt (end of period)		Addendum: Gross domestic product
	Receipts	Outlays	Surplus or deficit (–)	Receipts	Outlays	Surplus or deficit (–)	Receipts	Outlays	Surplus or deficit (–)	Gross Federal	Held by the public	
1952	66.2	67.7	–1.5	62.6	66.0	–3.4	3.6	1.7	1.9	259.1	214.8	357.5
1953	69.6	76.1	–6.5	65.5	73.8	–8.3	4.1	2.3	1.8	266.0	218.4	382.5
1954	69.7	70.9	–1.2	65.1	67.9	–2.8	4.6	2.9	1.7	270.8	224.5	387.7
1955	65.5	68.4	–3.0	60.4	64.5	–4.1	5.1	4.0	1.1	274.4	226.6	407.0
1956	74.6	70.6	3.9	68.2	65.7	2.5	6.4	5.0	1.5	272.7	222.2	439.0
1957	80.0	76.6	3.4	73.2	70.6	2.6	6.8	6.0	.8	272.3	219.3	464.2
1958	79.6	82.4	–2.8	71.6	74.9	–3.3	8.0	7.5	.5	279.7	226.3	474.3
1959	79.2	92.1	–12.8	71.0	83.1	–12.1	8.3	9.0	–.7	287.5	234.7	505.6
1960	92.5	92.2	.3	81.9	81.3	.5	10.6	10.9	–.2	290.5	236.8	535.1
1961	94.4	97.7	–3.3	82.3	86.0	–3.8	12.1	11.7	.4	292.6	238.4	547.6
1962	99.7	106.8	–7.1	87.4	93.3	–5.9	12.3	13.5	–1.3	302.9	248.0	586.9
1963	106.6	111.3	–4.8	92.4	96.4	–4.0	14.2	15.0	–.8	310.3	254.0	619.3
1964	112.6	118.5	–5.9	96.2	102.8	–6.5	16.4	15.7	.6	316.1	256.8	662.9
1965	116.8	118.2	–1.4	100.1	101.7	–1.6	16.7	16.5	.2	322.3	260.8	710.7
1966	130.8	134.5	–3.7	111.7	114.8	–3.1	19.1	19.7	–.6	328.5	263.7	781.9
1967	148.8	157.5	–8.6	124.4	137.0	–12.6	24.4	20.4	4.0	340.4	266.6	838.2
1968	153.0	178.1	–25.2	128.1	155.8	–27.7	24.9	22.3	2.6	368.7	289.5	899.3
1969	186.9	183.6	3.2	157.9	158.4	–.5	29.0	25.2	3.7	365.8	278.1	982.3
1970	192.8	195.6	–2.8	159.3	168.0	–8.7	33.5	27.6	5.9	380.9	283.2	1,049.1
1971	187.1	210.2	–23.0	151.3	177.3	–26.1	35.8	32.8	3.0	408.2	303.0	1,119.3
1972	207.3	230.7	–23.4	167.4	193.5	–26.1	39.9	37.2	2.7	435.9	322.4	1,219.5
1973	230.8	245.7	–14.9	184.7	200.0	–15.2	46.1	45.7	.3	466.3	340.9	1,356.0
1974	263.2	269.4	–6.1	209.3	216.5	–7.2	53.9	52.9	1.1	483.9	343.7	1,486.2
1975	279.1	332.3	–53.2	216.6	270.8	–54.1	62.5	61.6	.9	541.9	394.7	1,610.6
1976	298.1	371.8	–73.7	231.7	301.1	–69.4	66.4	70.7	–4.3	629.0	477.4	1,790.3
Transition quarter	81.2	96.0	–14.7	63.2	77.3	–14.1	18.0	18.7	–.7	643.6	495.5	472.6
1977	355.6	409.2	–53.7	278.7	328.7	–49.9	76.8	80.5	–3.7	706.4	549.1	2,028.4
1978	399.6	458.7	–59.2	314.2	369.6	–55.4	85.4	89.2	–3.8	776.6	607.1	2,278.2
1979	463.3	504.0	–40.7	365.3	404.9	–39.6	98.0	99.1	–1.1	829.5	640.3	2,570.0
1980	517.1	590.9	–73.8	403.9	477.0	–73.1	113.2	113.9	–.7	909.0	711.9	2,796.8
1981	599.3	678.2	–79.0	469.1	543.0	–73.9	130.2	135.3	–5.1	994.8	789.4	3,138.4
1982	617.8	745.7	–128.0	474.3	594.9	–120.6	143.5	150.9	–7.4	1,137.3	924.6	3,313.9
1983	600.6	808.4	–207.8	453.2	660.9	–207.7	147.3	147.4	–.1	1,371.7	1,137.3	3,541.1
1984	666.4	851.8	–185.4	500.4	685.6	–185.3	166.1	166.2	–.1	1,564.6	1,307.0	3,952.8
1985	734.0	946.3	–212.3	547.9	769.4	–221.5	186.2	176.9	9.2	1,817.4	1,507.3	4,270.4
1986	769.2	990.4	–221.2	568.9	806.8	–237.9	200.2	183.5	16.7	2,120.5	1,740.6	4,536.1
1987	854.3	1,004.0	–149.7	640.9	809.2	–168.4	213.4	194.8	18.6	2,346.0	1,889.8	4,781.9
1988	909.2	1,064.4	–155.2	667.7	860.0	–192.3	241.5	204.4	37.1	2,601.1	2,051.6	5,155.1
1989	991.1	1,143.7	–152.6	727.4	932.8	–205.4	263.7	210.9	52.8	2,867.8	2,190.7	5,570.0
1990	1,032.0	1,253.0	–221.0	750.3	1,027.9	–277.6	281.7	225.1	56.6	3,206.3	2,411.6	5,914.6
1991	1,055.0	1,324.2	–269.2	761.1	1,082.5	–321.4	293.9	241.7	52.2	3,598.2	2,689.0	6,110.1
1992	1,091.2	1,381.5	–290.3	788.8	1,129.2	–340.4	302.4	252.3	50.1	4,001.8	2,999.7	6,434.7
1993	1,154.3	1,409.4	–255.1	842.4	1,142.8	–300.4	311.9	266.6	45.3	4,351.0	3,248.4	6,794.9
1994	1,258.6	1,461.8	–203.2	923.5	1,182.4	–258.8	335.0	279.4	55.7	4,643.3	3,433.1	7,197.8
1995	1,351.8	1,515.7	–164.0	1,000.7	1,227.1	–226.4	351.1	288.7	62.4	4,920.6	3,604.4	7,583.4
1996	1,453.1	1,560.5	–107.4	1,085.6	1,259.6	–174.0	367.5	300.9	66.6	5,181.5	3,734.1	7,978.3
1997	1,579.2	1,601.1	–21.9	1,187.2	1,290.5	–103.2	392.0	310.6	81.4	5,369.2	3,772.3	8,483.2
1998	1,721.7	1,652.5	69.3	1,305.9	1,335.9	–29.9	415.8	316.6	99.2	5,478.2	3,721.1	8,954.8
1999	1,827.5	1,701.8	125.6	1,383.0	1,381.1	1.9	444.5	320.8	123.7	5,605.5	3,632.4	9,510.5
2000	2,025.2	1,789.0	236.2	1,544.6	1,458.2	86.4	480.6	330.8	149.8	5,628.7	3,409.8	10,148.2
2001	1,991.1	1,862.8	128.2	1,483.6	1,516.0	–32.4	507.5	346.8	160.7	5,769.9	3,319.6	10,564.6
2002	1,853.1	2,010.9	–157.8	1,337.8	1,655.2	–317.4	515.3	355.7	159.7	6,198.4	3,540.4	10,876.9
2003	1,782.3	2,159.9	–377.6	1,258.5	1,796.9	–538.4	523.8	363.0	160.8	6,760.0	3,913.4	11,332.4
2004	1,880.1	2,292.8	–412.7	1,345.4	1,913.3	–568.0	534.7	379.5	155.2	7,354.7	4,295.5	12,088.6
2005	2,153.6	2,472.0	–318.3	1,576.1	2,069.7	–493.6	577.5	402.2	175.3	7,905.3	4,592.2	12,888.9
2006	2,406.9	2,655.1	–248.2	1,798.5	2,233.0	–434.5	608.4	422.1	186.3	8,451.4	4,829.0	13,684.7
2007	2,568.0	2,728.7	–160.7	1,932.9	2,275.0	–342.2	635.1	453.6	181.5	8,950.7	5,035.1	14,322.9
2008	2,524.0	2,982.5	–458.6	1,865.9	2,507.8	–641.8	658.0	474.8	183.3	9,986.1	5,803.1	14,752.4
2009	2,105.0	3,517.7	–1,412.7	1,451.0	3,000.7	–1,549.7	654.0	517.0	137.0	11,875.9	7,544.7	14,414.6
2010	2,162.7	3,457.1	–1,294.4	1,531.0	2,902.4	–1,371.4	631.7	554.7	77.0	13,528.8	9,018.9	14,798.5
2011	2,303.5	3,603.1	–1,299.6	1,737.7	3,104.5	–1,366.8	565.8	498.6	67.2	14,764.2	10,128.2	15,379.2
2012	2,450.0	3,537.0	–1,087.0	1,880.5	3,029.4	–1,148.9	569.5	507.6	61.9	16,050.9	11,281.1	16,027.2
2013	2,775.1	3,454.6	–679.5	2,101.8	2,820.8	–719.0	673.3	633.8	39.5	16,719.4	11,982.7	16,498.1
2014	3,021.5	3,506.1	–484.6	2,285.9	2,800.1	–514.1	735.6	706.1	29.5	17,794.5	12,779.9	17,183.5
2015	3,249.9	3,688.3	–438.4	2,479.5	2,945.2	–465.7	770.4	743.1	27.3	18,120.1	13,116.7	17,809.8
2016 (estimates) [1]	3,276.2	3,876.0	–599.8	2,466.0	3,099.9	–633.9	810.2	776.1	34.1	19,451.8	14,127.7	18,348.6
2017 (estimates) [1]	3,632.2	4,073.2	–440.9	2,791.4	3,259.6	–468.2	840.9	813.5	27.3	20,143.6	14,699.8	19,063.2

[1] Estimates from *Mid-Session Review*, Budget of the U.S. Government, Fiscal Year 2017, issued July 2016.

Note: Fiscal years through 1976 were on a July 1–June 30 basis; beginning with October 1976 (fiscal year 1977), the fiscal year is on an October 1–September 30 basis. The transition quarter is the three-month period from July 1, 1976 through September 30, 1976.

See *Budget of the United States Government, Fiscal Year 2017*, for additional information.

Sources: Department of Commerce (Bureau of Economic Analysis), Department of the Treasury, and Office of Management and Budget.

TABLE B–18. Federal receipts, outlays, surplus or deficit, and debt, as percent of gross domestic product, fiscal years 1945–2017

[Percent; fiscal years]

Fiscal year or period	Receipts	Outlays		Surplus or deficit (–)	Federal debt (end of period)	
		Total	National defense		Gross Federal	Held by public
1945	19.9	41.0	36.6	–21.0	114.9	103.9
1946	17.2	24.2	18.7	–7.0	118.9	106.1
1947	16.1	14.4	5.4	1.7	107.6	93.9
1948	15.8	11.3	3.5	4.5	96.0	82.4
1949	14.2	14.0	4.8	.2	91.3	77.4
1950	14.1	15.3	4.9	–1.1	92.1	78.5
1951	15.8	13.9	7.2	1.9	78.0	65.5
1952	18.5	18.9	12.9	–.4	72.5	60.1
1953	18.2	19.9	13.8	–1.7	69.5	57.1
1954	18.0	18.3	12.7	–.3	69.9	57.9
1955	16.1	16.8	10.5	–.7	67.4	55.7
1956	17.0	16.1	9.7	.9	62.1	50.6
1957	17.2	16.5	9.8	.7	58.6	47.2
1958	16.8	17.4	9.9	–.6	59.0	47.7
1959	15.7	18.2	9.7	–2.5	56.9	46.4
1960	17.3	17.2	9.0	.1	54.3	44.3
1961	17.2	17.8	9.1	–.6	53.4	43.5
1962	17.0	18.2	8.9	–1.2	51.6	42.3
1963	17.2	18.0	8.6	–.8	50.1	41.0
1964	17.0	17.9	8.3	–.9	47.7	38.7
1965	16.4	16.6	7.1	–.2	45.4	36.7
1966	16.7	17.2	7.4	–.5	42.0	33.7
1967	17.8	18.8	8.5	–1.0	40.6	31.8
1968	17.0	19.8	9.1	–2.8	41.0	32.2
1969	19.0	18.7	8.4	.3	37.2	28.3
1970	18.4	18.6	7.8	–.3	36.3	27.0
1971	16.7	18.8	7.0	–2.1	36.5	27.1
1972	17.0	18.9	6.5	–1.9	35.7	26.4
1973	17.0	18.1	5.7	–1.1	34.4	25.1
1974	17.7	18.1	5.3	–.4	32.6	23.1
1975	17.3	20.6	5.4	–3.3	33.6	24.5
1976	16.6	20.8	5.0	–4.1	35.1	26.7
Transition quarter	17.2	20.3	4.7	–3.1	34.0	26.2
1977	17.5	20.2	4.8	–2.6	34.8	27.1
1978	17.5	20.1	4.6	–2.6	34.1	26.6
1979	18.0	19.6	4.5	–1.6	32.3	24.9
1980	18.5	21.1	4.8	–2.6	32.5	25.5
1981	19.1	21.6	5.0	–2.5	31.7	25.2
1982	18.6	22.5	5.6	–3.9	34.3	27.9
1983	17.0	22.8	5.9	–5.9	38.7	32.1
1984	16.9	21.5	5.8	–4.7	39.6	33.1
1985	17.2	22.2	5.9	–5.0	42.6	35.3
1986	17.0	21.8	6.0	–4.9	46.7	38.4
1987	17.9	21.0	5.9	–3.1	49.1	39.5
1988	17.6	20.6	5.6	–3.0	50.5	39.8
1989	17.8	20.5	5.4	–2.7	51.5	39.3
1990	17.4	21.2	5.1	–3.7	54.2	40.8
1991	17.3	21.7	4.5	–4.4	58.9	44.0
1992	17.0	21.5	4.6	–4.5	62.2	46.6
1993	17.0	20.7	4.3	–3.8	64.0	47.8
1994	17.5	20.3	3.9	–2.8	64.5	47.7
1995	17.8	20.0	3.6	–2.2	64.9	47.5
1996	18.2	19.6	3.3	–1.3	64.9	46.8
1997	18.6	18.9	3.2	–.3	63.3	44.5
1998	19.2	18.5	3.0	.8	61.2	41.6
1999	19.2	17.9	2.9	1.3	58.9	38.2
2000	20.0	17.6	2.9	2.3	55.5	33.6
2001	18.8	17.6	2.9	1.2	54.6	31.4
2002	17.0	18.5	3.2	–1.5	57.0	32.5
2003	15.7	19.1	3.6	–3.3	59.7	34.5
2004	15.6	19.0	3.8	–3.4	60.8	35.5
2005	16.7	19.2	3.8	–2.5	61.3	35.6
2006	17.6	19.4	3.8	–1.8	61.8	35.3
2007	17.9	19.1	3.8	–1.1	62.5	35.2
2008	17.1	20.2	4.2	–3.1	67.7	39.3
2009	14.6	24.4	4.6	–9.8	82.4	52.3
2010	14.6	23.4	4.7	–8.7	91.4	60.9
2011	15.0	23.4	4.6	–8.5	96.0	65.9
2012	15.3	22.1	4.2	–6.8	100.1	70.4
2013	16.8	20.9	3.8	–4.1	101.3	72.6
2014	17.6	20.4	3.5	–2.8	103.6	74.4
2015	18.2	20.7	3.3	–2.5	101.7	73.6
2016 (estimates)	17.9	21.1	3.2	–3.3	106.0	77.0
2017 (estimates)	19.1	21.4	3.2	–2.3	105.7	77.1

Note: See footnote 1 and Note, Table B–17.

Sources: Department of the Treasury and Office of Management and Budget.

TABLE B–19. Federal receipts and outlays, by major category, and surplus or deficit, fiscal years 1952–2017

[Billions of dollars; fiscal years]

Fiscal year or period	Receipts (on-budget and off-budget)					Outlays (on-budget and off-budget)										Surplus or deficit (–) (on-budget and off-budget)
	Total	Individual income taxes	Corporation income taxes	Social insurance and retirement receipts	Other	Total	National defense		International affairs	Health	Medicare	Income security	Social security	Net interest	Other	
							Total	Department of Defense, military								
1952	66.2	27.9	21.2	6.4	10.6	67.7	46.1	.....	2.7	0.3	.....	3.7	2.1	4.7	8.1	–1.5
1953	69.6	29.8	21.2	6.8	11.7	76.1	52.8	.....	2.1	.3	.....	3.8	2.7	5.2	9.1	–6.5
1954	69.7	29.5	21.1	7.2	11.9	70.9	49.3	.....	1.6	.3	.....	4.4	3.4	4.8	7.1	–1.2
1955	65.5	28.7	17.9	7.9	11.0	68.4	42.7	.....	2.2	.3	.....	5.1	4.4	4.9	8.9	–3.0
1956	74.6	32.2	20.9	9.3	12.2	70.6	42.5	.....	2.4	.4	.....	4.7	5.5	5.1	10.1	3.9
1957	80.0	35.6	21.2	10.0	13.2	76.6	45.4	.....	3.1	.5	.....	5.4	6.7	5.4	10.1	3.4
1958	79.6	34.7	20.1	11.2	13.6	82.4	46.8	.....	3.4	.5	.....	7.5	8.2	5.6	10.3	–2.8
1959	79.2	36.7	17.3	11.7	13.5	92.1	49.0	.....	3.1	.7	.....	8.2	9.7	5.8	15.5	–12.8
1960	92.5	40.7	21.5	14.7	15.6	92.2	48.1	.....	3.0	.8	.....	7.4	11.6	6.9	14.4	.3
1961	94.4	41.3	21.0	16.4	15.7	97.7	49.6	.....	3.2	.9	.....	9.7	12.5	6.7	15.2	–3.3
1962	99.7	45.6	20.5	17.0	16.5	106.8	52.3	50.1	5.6	1.2	.....	9.2	14.4	6.9	17.2	–7.1
1963	106.6	47.6	21.6	19.8	17.6	111.3	53.4	51.1	5.3	1.5	.....	9.3	15.8	7.7	18.3	–4.8
1964	112.6	48.7	23.5	22.0	18.5	118.5	54.8	52.6	4.9	1.8	.....	9.7	16.6	8.2	22.6	–5.9
1965	116.8	48.8	25.5	22.2	20.3	118.2	50.6	48.8	5.3	1.8	.....	9.5	17.5	8.6	25.0	–1.4
1966	130.8	55.4	30.1	25.5	19.8	134.5	58.1	56.6	5.6	2.5	0.1	9.7	20.7	9.4	28.5	–3.7
1967	148.8	61.5	34.0	32.6	20.7	157.5	71.4	70.1	5.6	3.4	2.7	10.3	21.7	10.3	32.1	–8.6
1968	153.0	68.7	28.7	33.9	21.7	178.1	81.9	80.4	5.3	4.4	4.6	11.8	23.9	11.1	35.1	–25.2
1969	186.9	87.2	36.7	39.0	23.9	183.6	82.5	80.8	4.6	5.2	5.7	13.1	27.3	12.7	32.6	3.2
1970	192.8	90.4	32.8	44.4	25.2	195.6	81.7	80.1	4.3	5.9	6.2	15.7	30.3	14.4	37.2	–2.8
1971	187.1	86.2	26.8	47.3	26.8	210.2	78.9	77.5	4.2	6.8	6.6	22.9	35.9	14.8	40.0	–23.0
1972	207.3	94.7	32.2	52.6	27.8	230.7	79.2	77.6	4.8	8.7	7.5	27.7	40.2	15.5	47.3	–23.4
1973	230.8	103.2	36.2	63.1	28.3	245.7	76.7	75.0	4.1	9.4	8.1	28.3	49.1	17.3	52.8	–14.9
1974	263.2	119.0	38.6	75.1	30.6	269.4	79.3	77.9	5.7	10.7	9.6	33.7	55.9	21.4	52.9	–6.1
1975	279.1	122.4	40.6	84.5	31.5	332.3	86.5	84.9	7.1	12.9	12.9	50.2	64.7	23.2	74.8	–53.2
1976	298.1	131.6	41.4	90.8	34.3	371.8	89.6	87.9	6.4	15.7	15.8	60.8	73.9	26.7	82.7	–73.7
Transition quarter	81.2	38.8	8.5	25.2	8.8	96.0	22.3	21.8	2.5	3.9	4.3	15.0	19.8	6.9	21.4	–14.7
1977	355.6	157.6	54.9	106.5	36.6	409.2	97.2	95.1	6.4	17.3	19.3	61.1	85.1	29.9	93.0	–53.7
1978	399.6	181.0	60.0	121.0	37.7	458.7	104.5	102.3	7.5	18.5	22.8	61.5	93.9	35.5	114.6	–59.2
1979	463.3	217.8	65.7	138.9	40.8	504.0	116.3	113.6	7.5	20.5	26.5	66.4	104.1	42.6	120.2	–40.7
1980	517.1	244.1	64.6	157.8	50.6	590.9	134.0	130.9	12.7	23.2	32.1	86.6	118.5	52.5	131.3	–73.8
1981	599.3	285.9	61.1	182.7	69.5	678.2	157.5	153.9	13.1	26.9	39.1	100.3	139.6	68.8	133.0	–79.0
1982	617.8	297.7	49.2	201.5	69.3	745.7	185.3	180.7	12.3	27.4	46.6	108.2	156.0	85.0	125.0	–128.0
1983	600.6	288.9	37.0	209.0	65.6	808.4	209.9	204.4	11.8	28.6	52.6	123.0	170.7	89.8	121.8	–207.8
1984	666.4	298.4	56.9	239.4	71.8	851.8	227.4	220.9	15.9	30.4	57.5	113.4	178.2	111.1	117.8	–185.4
1985	734.0	334.5	61.3	265.2	73.0	946.3	252.7	245.1	16.2	33.5	65.8	129.0	188.6	129.5	130.9	–212.3
1986	769.2	349.0	63.1	283.9	73.2	990.4	273.4	265.4	14.1	35.9	70.2	120.7	198.8	136.0	141.3	–221.2
1987	854.3	392.6	83.9	303.3	74.5	1,004.0	282.0	273.9	11.6	40.0	75.1	124.1	207.4	138.6	125.2	–149.7
1988	909.2	401.2	94.5	334.3	79.2	1,064.4	290.4	281.9	10.5	44.5	78.9	130.4	219.3	151.8	138.7	–155.2
1989	991.1	445.7	103.3	359.4	82.7	1,143.7	303.6	294.8	9.6	48.4	85.0	137.6	232.5	169.0	158.1	–152.6
1990	1,032.0	466.9	93.5	380.0	91.5	1,253.0	299.3	289.7	13.8	57.7	98.1	148.8	248.6	184.3	202.3	–221.0
1991	1,055.0	467.8	98.1	396.0	93.1	1,324.2	273.3	262.3	15.8	71.2	104.5	172.6	269.0	194.4	223.3	–269.2
1992	1,091.2	476.0	100.3	413.7	101.3	1,381.5	298.3	286.8	16.1	89.5	119.0	199.7	287.6	199.3	171.9	–290.3
1993	1,154.3	509.7	117.5	428.3	98.8	1,409.4	291.1	278.5	17.2	99.4	130.6	210.1	304.6	198.7	157.7	–255.1
1994	1,258.6	543.1	140.4	461.5	113.7	1,461.8	281.6	268.6	17.1	107.1	144.7	217.3	319.6	202.9	171.4	–203.2
1995	1,351.8	590.2	157.0	484.5	120.1	1,515.7	272.1	259.4	16.4	115.4	159.9	223.8	335.8	232.1	160.2	–164.0
1996	1,453.1	656.4	171.8	509.4	115.4	1,560.5	265.7	253.1	13.5	119.4	174.2	229.7	349.7	241.1	167.2	–107.4
1997	1,579.2	737.5	182.3	539.4	120.1	1,601.1	270.5	258.3	15.2	123.8	190.0	235.0	365.3	244.0	157.3	–21.9
1998	1,721.7	828.6	188.7	571.8	132.6	1,652.5	268.2	255.8	13.1	131.4	192.8	237.8	379.2	241.1	188.9	69.3
1999	1,827.5	879.5	184.7	611.8	151.5	1,701.8	274.8	261.2	15.2	141.0	190.4	242.5	390.0	229.8	218.1	125.6
2000	2,025.2	1,004.5	207.3	652.9	160.6	1,789.0	294.4	281.0	17.2	154.5	197.1	253.7	409.4	222.9	239.7	236.2
2001	1,991.1	994.3	151.1	694.0	151.7	1,862.8	304.7	290.2	16.5	172.2	217.4	269.8	433.0	206.2	243.1	128.2
2002	1,853.1	858.3	148.0	700.8	146.0	2,010.9	348.5	331.8	22.3	196.5	230.9	312.7	456.0	170.9	273.1	–157.8
2003	1,782.3	793.7	131.8	713.0	143.9	2,159.9	404.7	387.1	21.2	219.5	249.4	334.6	474.7	153.1	302.6	–377.6
2004	1,880.1	809.0	189.4	733.4	148.4	2,292.8	455.8	436.4	26.9	240.1	269.4	333.1	495.5	160.2	311.8	–412.7
2005	2,153.6	927.2	278.3	794.1	154.0	2,472.0	495.3	474.1	34.6	250.5	298.6	345.8	523.3	184.0	339.8	–318.3
2006	2,406.9	1,043.9	353.9	837.8	171.2	2,655.1	521.8	499.3	29.5	252.7	329.9	352.5	548.5	226.6	393.5	–248.2
2007	2,568.0	1,163.5	370.2	869.6	164.7	2,728.7	551.3	528.5	28.5	266.4	375.4	366.0	586.2	237.1	317.9	–160.7
2008	2,524.0	1,145.7	304.3	900.2	173.7	2,982.5	616.1	594.6	28.9	280.6	390.8	431.3	617.0	252.8	365.2	–458.6
2009	2,105.0	915.3	138.2	890.9	160.5	3,517.7	661.0	636.7	37.5	334.3	430.1	533.2	683.0	186.9	651.6	–1,412.7
2010	2,162.7	898.5	191.4	864.8	207.9	3,457.1	693.5	666.7	45.2	369.1	451.6	622.2	706.7	196.2	372.6	–1,294.4
2011	2,303.5	1,091.5	181.1	818.8	212.1	3,603.1	705.6	678.1	45.7	372.5	485.7	597.3	730.8	230.0	435.5	–1,299.6
2012	2,450.0	1,132.2	242.3	845.3	230.2	3,537.0	677.9	650.9	47.2	346.7	471.8	541.3	773.3	220.4	458.3	–1,087.0
2013	2,775.1	1,316.4	273.5	947.8	237.4	3,454.6	633.4	607.8	46.2	358.3	497.8	536.5	813.6	220.9	347.9	–679.5
2014	3,021.5	1,394.6	320.7	1,023.5	282.7	3,506.1	603.5	577.9	46.7	409.4	511.7	513.6	850.5	229.0	341.7	–484.6
2015	3,249.9	1,540.8	343.8	1,065.3	300.0	3,688.3	589.6	562.5	48.6	482.2	546.2	508.8	887.8	223.2	402.0	–438.4
2016 (estimates) [1]	3,266.7	1,546.1	299.6	1,115.1	306.0	3,854.1	595.3	565.4	45.3	511.3	594.5	514.6	916.1	240.7	436.3	–587.4
2017 (estimates) [2]	3,632.2	1,746.6	409.9	1,158.5	317.2	4,073.2	618.6	588.0	57.0	552.3	598.4	533.0	954.1	265.8	494.1	–440.9

[1] Estimates from *Final Monthly Treasury Statement*, issued October 2016.
[2] Estimates from *Mid-Session Review*, Budget of the U.S. Government, Fiscal Year 2017, issued July 2016.

Note: See Note, Table B–17.

Sources: Department of the Treasury and Office of Management and Budget.

TABLE B–20. Federal receipts, outlays, surplus or deficit, and debt, fiscal years 2011–2016

[Millions of dollars; fiscal years]

Description	Actual					Estimates [1]
	2011	2012	2013	2014	2015	2016
RECEIPTS, OUTLAYS, AND SURPLUS OR DEFICIT						
Total:						
Receipts	2,303,466	2,449,988	2,775,103	3,021,487	3,249,886	3,266,688
Outlays	3,603,056	3,536,951	3,454,647	3,506,114	3,688,292	3,854,100
Surplus or deficit (–)	–1,299,590	–1,086,963	–679,544	–484,627	–438,406	–587,412
On-budget:						
Receipts	1,737,678	1,880,487	2,101,829	2,285,922	2,479,514	2,456,509
Outlays	3,104,450	3,029,363	2,820,836	2,800,061	2,945,215	3,077,747
Surplus or deficit (–)	–1,366,772	–1,148,876	–719,007	–514,139	–465,701	–621,239
Off-budget:						
Receipts	565,788	569,501	673,274	735,565	770,372	810,180
Outlays	498,606	507,588	633,811	706,053	743,077	776,353
Surplus or deficit (–)	67,182	61,913	39,463	29,512	27,295	33,827
OUTSTANDING DEBT, END OF PERIOD						
Gross Federal debt	14,764,222	16,050,921	16,719,434	17,794,483	18,120,106	19,537,417
Held by Federal Government accounts	4,636,035	4,769,790	4,736,721	5,014,584	5,003,414	5,368,993
Held by the public	10,128,187	11,281,131	11,982,713	12,779,899	13,116,692	14,168,425
Federal Reserve System	1,664,660	1,645,285	2,072,283	2,451,743	2,461,947	.....
Other	8,463,527	9,635,846	9,910,430	10,328,156	10,654,745	.....
RECEIPTS BY SOURCE						
Total: On-budget and off-budget	2,303,466	2,449,988	2,775,103	3,021,487	3,249,886	3,266,688
Individual income taxes	1,091,473	1,132,206	1,316,405	1,394,568	1,540,802	1,546,075
Corporation income taxes	181,085	242,289	273,506	320,731	343,797	299,571
Social insurance and retirement receipts	818,792	845,314	947,820	1,023,458	1,065,257	1,115,063
On-budget	253,004	275,813	274,546	287,893	294,885	.....
Off-budget	565,788	569,501	673,274	735,565	770,372	.....
Excise taxes	72,381	79,061	84,007	93,368	98,279	95,045
Estate and gift taxes	7,399	13,973	18,912	19,300	19,232	21,354
Customs duties and fees	29,519	30,307	31,815	33,926	35,041	34,837
Miscellaneous receipts	102,817	106,838	102,638	136,136	147,478	154,743
Deposits of earnings by Federal Reserve System	82,546	81,957	75,767	99,235	96,468	.....
All other	20,271	24,881	26,871	36,901	51,010	.....
OUTLAYS BY FUNCTION						
Total: On-budget and off-budget	3,603,056	3,536,951	3,454,647	3,506,114	3,688,292	3,854,100
National defense	705,554	677,852	633,446	603,457	589,564	595,303
International affairs	45,685	47,184	46,231	46,686	48,576	45,304
General science, space, and technology	29,466	29,060	28,908	28,570	29,412	30,230
Energy	12,174	14,858	11,042	5,270	6,838	3,749
Natural resources and environment	45,473	41,631	38,145	36,171	36,034	37,792
Agriculture	20,662	17,791	29,678	24,386	18,500	20,175
Commerce and housing credit	–12,573	40,647	–83,199	–94,861	–37,905	–32,789
On-budget	–13,381	37,977	–81,286	–92,330	–36,195	.....
Off-budget	808	2,670	–1,913	–2,531	–1,710	.....
Transportation	92,966	93,019	91,673	91,938	89,533	92,941
Community and regional development	23,883	25,132	32,336	20,670	20,670	21,052
Education, training, employment, and social services	101,233	90,823	72,808	90,615	122,061	108,058
Health	372,504	346,742	358,315	409,449	482,223	511,320
Medicare	485,653	471,793	497,826	511,688	546,202	594,535
Income security	597,349	541,344	536,511	513,644	508,843	514,583
Social security	730,811	773,290	813,551	850,533	887,753	916,078
On-budget	101,933	140,387	56,009	25,946	30,990	.....
Off-budget	628,878	632,903	757,542	824,587	856,763	.....
Veterans benefits and services	127,189	124,595	138,938	149,616	159,738	174,515
Administration of justice	56,056	56,277	52,601	50,457	51,903	57,144
General government	27,476	28,041	27,737	26,913	20,969	18,640
Net interest	229,962	220,408	220,885	228,956	223,181	240,722
On-budget	345,943	332,801	326,535	329,222	319,149	.....
Off-budget	–115,981	–112,393	–105,650	–100,266	–95,968	.....
Allowances	.....	.....	.....	.....	.....	.....
Undistributed offsetting receipts	–88,467	–103,536	–92,785	–88,044	–115,803	–95,251
On-budget	–73,368	–87,944	–76,617	–72,307	–99,795	.....
Off-budget	–15,099	–15,592	–16,168	–15,737	–16,008	.....

[1] Estimates from *Final Monthly Treasury Statement*, issued October 2016.

Note: See Note, Table B–17.

Sources: Department of the Treasury and Office of Management and Budget.

TABLE B–21. Federal and State and local government current receipts and expenditures, national income and product accounts (NIPA) basis, 1965–2016

[Billions of dollars; quarterly data at seasonally adjusted annual rates]

Year or quarter	Total government			Federal Government			State and local government			Addendum: Grants-in-aid to State and local governments
	Current receipts	Current expenditures	Net government saving (NIPA)	Current receipts	Current expenditures	Net Federal Government saving (NIPA)	Current receipts	Current expenditures	Net State and local government saving (NIPA)	
1965	179.7	181.0	–1.4	120.4	125.9	–5.5	65.8	61.7	4.1	6.6
1966	202.1	203.9	–1.8	137.4	144.3	–7.0	74.1	68.9	5.2	9.4
1967	216.9	231.7	–14.8	146.3	165.7	–19.5	81.6	76.9	4.7	10.9
1968	251.2	260.7	–9.5	170.6	184.3	–13.7	92.5	88.2	4.3	11.8
1969	282.5	283.5	–1.0	191.8	196.9	–5.1	104.3	100.2	4.1	13.7
1970	285.7	317.5	–31.8	185.1	219.9	–34.8	118.9	115.9	3.0	18.3
1971	302.1	352.4	–50.2	190.7	241.5	–50.8	133.6	133.0	.6	22.1
1972	345.4	385.9	–40.5	219.0	267.9	–48.9	156.9	148.5	8.4	30.5
1973	388.5	416.6	–28.0	249.2	286.9	–37.7	172.8	163.1	9.6	33.5
1974	430.0	468.3	–38.3	278.5	319.1	–40.6	186.4	184.1	2.3	34.9
1975	440.9	543.5	–102.5	276.8	373.8	–97.0	207.7	213.3	–5.6	43.6
1976	505.4	582.4	–77.1	322.6	402.4	–79.9	231.9	229.1	2.8	49.1
1977	567.0	630.5	–63.5	363.9	435.8	–71.9	257.9	249.5	8.4	54.8
1978	645.7	692.0	–46.4	423.8	483.7	–59.8	285.3	271.9	13.4	63.5
1979	728.8	765.1	–36.3	487.0	531.5	–44.5	305.8	297.6	8.2	64.0
1980	799.3	880.2	–80.9	533.7	619.9	–86.3	335.3	329.9	5.4	69.7
1981	918.7	1,000.3	–81.7	621.1	706.9	–85.8	367.0	362.9	4.1	69.4
1982	940.5	1,110.3	–169.7	618.7	783.3	–164.6	388.1	393.2	–5.1	66.3
1983	1,001.7	1,205.4	–203.7	644.8	849.8	–205.0	424.8	423.6	1.3	67.9
1984	1,114.4	1,285.9	–171.4	711.2	903.5	–192.3	475.6	454.7	20.9	72.3
1985	1,216.5	1,391.8	–175.4	775.7	971.3	–195.6	516.9	496.7	20.3	76.2
1986	1,292.3	1,484.5	–192.2	817.9	1,030.6	–212.7	556.8	536.4	20.4	82.4
1987	1,406.1	1,557.2	–151.1	899.5	1,062.7	–163.2	585.0	572.9	12.1	78.4
1988	1,506.5	1,646.9	–140.4	962.4	1,119.8	–157.3	629.9	612.9	17.0	85.7
1989	1,631.4	1,780.6	–149.2	1,042.5	1,199.1	–156.6	680.8	673.4	7.4	91.8
1990	1,712.9	1,920.2	–207.4	1,087.6	1,288.5	–200.9	729.6	736.0	–6.5	104.4
1991	1,763.3	2,034.6	–271.3	1,107.8	1,354.0	–246.2	779.5	804.6	–25.1	124.0
1992	1,848.2	2,218.4	–370.2	1,154.4	1,487.0	–332.7	835.6	873.1	–37.5	141.7
1993	1,952.3	2,301.4	–349.0	1,231.0	1,542.8	–311.8	877.1	914.3	–37.2	155.7
1994	2,096.5	2,377.2	–280.7	1,329.3	1,583.0	–253.7	934.1	961.0	–27.0	166.8
1995	2,222.8	2,495.1	–272.4	1,417.4	1,658.2	–240.8	979.8	1,011.4	–31.5	174.5
1996	2,387.4	2,578.3	–191.0	1,536.3	1,714.8	–178.5	1,032.6	1,045.0	–12.5	181.5
1997	2,565.0	2,654.5	–89.5	1,667.3	1,758.5	–91.2	1,085.8	1,084.1	1.7	188.1
1998	2,737.7	2,719.6	18.1	1,789.8	1,787.0	2.7	1,148.7	1,133.3	15.4	200.8
1999	2,908.1	2,832.2	75.9	1,905.4	1,838.8	66.6	1,221.8	1,212.6	9.2	219.2
2000	3,138.2	2,971.8	166.4	2,068.2	1,911.7	156.5	1,303.1	1,293.2	9.9	233.1
2001	3,123.2	3,174.0	–50.8	2,031.8	2,017.4	14.5	1,352.6	1,417.9	–65.3	261.3
2002	2,971.9	3,363.3	–391.4	1,870.6	2,141.1	–270.5	1,388.4	1,509.4	–120.9	287.2
2003	3,048.0	3,572.2	–524.3	1,895.1	2,297.9	–402.9	1,474.6	1,596.0	–121.4	321.7
2004	3,270.3	3,777.9	–507.6	2,027.4	2,426.6	–399.2	1,575.1	1,683.4	–108.4	332.2
2005	3,669.0	4,040.3	–371.3	2,303.5	2,608.2	–304.7	1,708.8	1,775.4	–66.6	343.4
2006	4,007.9	4,274.3	–266.4	2,537.7	2,764.8	–227.0	1,810.9	1,850.3	–39.4	340.8
2007	4,208.8	4,547.2	–338.4	2,667.2	2,932.8	–265.7	1,900.6	1,973.3	–72.7	359.0
2008	4,117.5	4,916.6	–799.0	2,579.5	3,213.5	–634.0	1,909.1	2,074.1	–165.1	371.0
2009	3,699.5	5,220.3	–1,520.8	2,238.4	3,487.2	–1,248.8	1,919.2	2,191.2	–271.9	458.1
2010	3,936.5	5,502.5	–1,566.0	2,443.3	3,772.0	–1,328.7	1,998.5	2,235.8	–237.3	505.3
2011	4,132.2	5,592.2	–1,460.1	2,574.1	3,818.3	–1,244.1	2,030.5	2,246.4	–215.9	472.5
2012	4,312.3	5,623.1	–1,310.8	2,699.1	3,789.1	–1,090.1	2,057.2	2,277.9	–220.8	444.0
2013	4,825.2	5,659.5	–834.4	3,138.4	3,782.2	–643.8	2,136.8	2,327.3	–190.5	450.0
2014	5,021.4	5,804.1	–782.7	3,288.4	3,901.3	–612.9	2,227.7	2,397.6	–169.8	494.8
2015	5,253.5	5,984.5	–731.0	3,453.3	4,022.9	–569.7	2,331.5	2,492.8	–161.3	531.2
2013: I	4,657.9	5,633.9	–976.0	2,972.8	3,764.6	–791.8	2,123.5	2,307.6	–184.1	438.3
II	4,941.7	5,651.5	–709.7	3,250.8	3,781.7	–530.9	2,144.3	2,323.1	–178.8	453.4
III	4,763.5	5,673.3	–909.8	3,083.2	3,792.9	–709.7	2,138.2	2,338.3	–200.1	457.9
IV	4,937.5	5,679.4	–741.9	3,246.8	3,789.8	–542.9	2,141.1	2,340.1	–199.0	450.4
2014: I	4,960.5	5,731.5	–771.0	3,254.1	3,846.2	–592.1	2,173.6	2,352.4	–178.9	467.1
II	5,017.0	5,784.9	–767.9	3,290.7	3,893.9	–603.2	2,214.8	2,379.5	–164.7	488.5
III	5,050.7	5,847.6	–796.9	3,309.5	3,942.6	–633.1	2,255.4	2,419.2	–163.8	514.2
IV	5,057.4	5,852.5	–795.1	3,299.4	3,922.5	–623.1	2,267.2	2,439.1	–172.0	509.2
2015: I	5,177.3	5,868.9	–691.6	3,410.0	3,944.5	–534.5	2,291.9	2,449.0	–157.1	524.6
II	5,219.3	5,987.2	–767.9	3,439.4	4,018.2	–578.9	2,301.1	2,490.2	–189.0	521.2
III	5,234.9	6,045.2	–810.3	3,447.8	4,070.2	–622.3	2,322.7	2,510.7	–187.9	535.6
IV	5,382.6	6,036.7	–654.2	3,515.9	4,058.9	–543.1	2,410.3	2,521.4	–111.1	543.6
2016: I	5,255.4	6,097.3	–841.9	3,442.5	4,110.8	–668.3	2,354.1	2,527.7	–173.6	541.2
II	5,288.0	6,145.8	–857.8	3,484.7	4,137.1	–652.4	2,342.9	2,548.2	–205.3	539.6
III *p*	5,363.9	6,206.9	–843.0	3,537.1	4,187.5	–650.4	2,387.4	2,580.0	–192.6	560.6

Note: Federal grants-in-aid to State and local governments are reflected in Federal current expenditures and State and local current receipts. Total government current receipts and expenditures have been adjusted to eliminate this duplication.

Source: Department of Commerce (Bureau of Economic Analysis).

TABLE B–22. State and local government revenues and expenditures, fiscal years 1954–2013

[Millions of dollars]

Fiscal year [1]	General revenues by source [2]							General expenditures by function [2]				
	Total	Property taxes	Sales and gross receipts taxes	Individual income taxes	Corporation net income taxes	Revenue from Federal Government	All other [3]	Total [4]	Education	Highways	Public welfare [4]	All other [4, 5]
1954	29,012	9,967	7,276	1,127	778	2,966	6,898	30,701	10,557	5,527	3,060	11,557
1955	31,073	10,735	7,643	1,237	744	3,131	7,583	33,724	11,907	6,452	3,168	12,197
1956	34,670	11,749	8,691	1,538	890	3,335	8,467	36,715	13,224	6,953	3,139	13,399
1957	38,164	12,864	9,467	1,754	984	3,843	9,252	40,375	14,134	7,816	3,485	14,940
1958	41,219	14,047	9,829	1,759	1,018	4,865	9,701	44,851	15,919	8,567	3,818	16,547
1959	45,306	14,983	10,437	1,994	1,001	6,377	10,514	48,887	17,283	9,592	4,136	17,876
1960	50,505	16,405	11,849	2,463	1,180	6,974	11,634	51,876	18,719	9,428	4,404	19,325
1961	54,037	18,002	12,463	2,613	1,266	7,131	12,562	56,201	20,574	9,844	4,720	21,063
1962	58,252	19,054	13,494	3,037	1,308	7,871	13,488	60,206	22,216	10,357	5,084	22,549
1963	62,891	20,089	14,456	3,269	1,505	8,722	14,850	64,815	23,776	11,135	5,481	24,423
1963–64	68,443	21,241	15,762	3,791	1,695	10,002	15,952	69,302	26,286	11,664	5,766	25,586
1964–65	74,000	22,583	17,118	4,090	1,929	11,029	17,251	74,678	28,563	12,221	6,315	27,579
1965–66	83,036	24,670	19,085	4,760	2,038	13,214	19,269	82,843	33,287	12,770	6,757	30,029
1966–67	91,197	26,047	20,530	5,825	2,227	15,370	21,198	93,350	37,919	13,932	8,218	33,281
1967–68	101,264	27,747	22,911	7,308	2,518	17,181	23,599	102,411	41,158	14,481	9,857	36,915
1968–69	114,550	30,673	26,519	8,908	3,180	19,153	26,117	116,728	47,238	15,417	12,110	41,963
1969–70	130,756	34,054	30,322	10,812	3,738	21,857	29,973	131,332	52,718	16,427	14,679	47,508
1970–71	144,927	37,852	33,233	11,900	3,424	26,146	32,372	150,674	59,413	18,095	18,226	54,940
1971–72	167,535	42,877	37,518	15,227	4,416	31,342	36,156	168,549	65,813	19,021	21,117	62,598
1972–73	190,222	45,283	42,047	17,994	5,425	39,264	40,210	181,357	69,713	18,615	23,582	69,447
1973–74	207,670	47,705	46,098	19,491	6,015	41,820	46,542	199,222	75,833	19,946	25,085	78,358
1974–75	228,171	51,491	49,815	21,454	6,642	47,034	51,735	230,722	87,858	22,528	28,156	92,180
1975–76	256,176	57,001	54,547	24,575	7,273	55,589	57,191	256,731	97,216	23,907	32,604	103,004
1976–77	285,157	62,527	60,641	29,246	9,174	62,444	61,125	274,215	102,780	23,058	35,906	112,472
1977–78	315,960	66,422	67,596	33,176	10,738	69,592	68,435	296,984	110,758	24,609	39,140	122,478
1978–79	343,236	64,944	74,247	36,932	12,128	75,164	79,822	327,517	119,448	28,440	41,898	137,731
1979–80	382,322	68,499	79,927	42,080	13,321	83,029	95,467	369,086	133,211	33,311	47,288	155,276
1980–81	423,404	74,969	85,971	46,426	14,143	90,294	111,599	407,449	145,784	34,603	54,105	172,957
1981–82	457,654	82,067	93,613	50,738	15,028	87,282	128,925	436,733	154,282	34,520	57,996	189,935
1982–83	486,753	89,105	100,247	55,129	14,258	90,007	138,008	466,516	163,876	36,655	60,906	205,080
1983–84	542,730	96,457	114,097	64,871	16,798	96,935	153,571	505,008	176,108	39,419	66,414	223,068
1984–85	598,121	103,757	126,376	70,361	19,152	106,158	172,317	553,899	192,686	44,989	71,479	244,745
1985–86	641,486	111,709	135,005	74,365	19,994	113,099	187,314	605,623	210,819	49,368	75,868	269,568
1986–87	686,860	121,203	144,091	83,935	22,425	114,857	200,350	657,134	226,619	52,355	82,650	295,510
1987–88	726,762	132,212	156,452	88,350	23,663	117,602	208,482	704,921	242,683	55,621	89,090	317,527
1988–89	786,129	142,400	166,336	97,806	25,926	125,824	227,838	762,360	263,898	58,105	97,879	342,479
1989–90	849,502	155,613	177,885	105,640	23,566	136,802	249,996	834,818	288,148	61,057	110,518	375,094
1990–91	902,207	167,999	185,570	109,341	22,242	154,099	262,955	908,108	309,302	64,937	130,402	403,467
1991–92	979,137	180,337	197,731	115,638	23,880	179,174	282,376	981,253	324,652	67,351	158,723	430,526
1992–93	1,041,643	189,744	209,649	123,235	26,417	198,663	293,935	1,030,434	342,287	68,370	170,705	449,072
1993–94	1,100,490	197,141	223,628	128,810	28,320	215,492	307,099	1,077,665	353,287	72,067	183,394	468,916
1994–95	1,169,505	203,451	237,268	137,931	31,406	228,771	330,677	1,149,863	378,273	77,109	196,703	497,779
1995–96	1,222,821	209,440	248,993	146,844	32,009	234,891	350,645	1,193,276	398,859	79,092	197,354	517,971
1996–97	1,289,237	218,877	261,418	159,042	33,820	244,847	371,233	1,249,984	418,416	82,062	203,779	545,727
1997–98	1,365,762	230,150	274,883	175,630	34,412	255,048	395,639	1,318,042	450,365	87,214	208,120	572,343
1998–99	1,434,029	239,672	290,993	189,309	33,922	270,628	409,505	1,402,369	483,259	93,018	218,957	607,134
1999–2000	1,541,322	249,178	309,290	211,661	36,059	291,950	443,186	1,506,797	521,612	101,336	237,336	646,512
2000–01	1,647,161	263,689	320,217	226,334	35,296	324,033	477,592	1,626,063	563,572	107,235	261,622	693,634
2001–02	1,684,879	279,191	324,123	202,832	28,152	360,546	490,035	1,736,866	594,694	115,295	285,464	741,413
2002–03	1,763,212	296,683	337,787	199,407	31,369	389,264	508,702	1,821,917	621,335	117,696	310,783	772,102
2003–04	1,887,397	317,941	361,027	215,215	33,716	423,112	536,386	1,908,543	655,182	117,215	340,523	795,622
2004–05	2,026,034	335,779	384,266	242,273	43,256	438,558	581,902	2,012,110	688,314	126,350	365,295	832,151
2005–06	2,197,475	364,559	417,735	268,667	53,081	452,975	640,458	2,123,663	728,917	136,502	373,846	884,398
2006–07	2,330,611	388,905	440,470	290,278	60,955	464,914	685,089	2,264,035	774,170	145,011	389,259	955,595
2007–08	2,421,977	409,540	449,945	304,902	57,231	477,441	722,919	2,406,183	826,061	153,831	408,920	1,017,372
2008–09	2,429,672	434,818	434,128	270,942	46,280	537,949	705,555	2,500,796	851,689	154,338	437,184	1,057,586
2009–10	2,510,846	443,947	435,571	261,510	44,108	623,801	701,909	2,542,231	860,118	155,912	460,230	1,065,971
2010–11	2,618,037	445,771	463,979	285,293	48,422	647,606	726,966	2,583,805	862,271	153,895	494,682	1,072,957
2011–12	2,598,906	447,120	476,544	307,256	48,934	585,128	733,924	2,593,180	869,223	160,327	489,430	1,074,200
2012–13	2,690,427	455,442	496,439	338,471	53,039	584,652	762,383	2,643,122	876,566	158,745	516,389	1,091,421

[1] Fiscal years not the same for all governments. See Note.

[2] Excludes revenues or expenditures of publicly owned utilities and liquor stores and of insurance-trust activities. Intergovernmental receipts and payments between State and local governments are also excluded.

[3] Includes motor vehicle license taxes, other taxes, and charges and miscellaneous revenues.

[4] Includes intergovernmental payments to the Federal Government.

[5] Includes expenditures for libraries, hospitals, health, employment security administration, veterans' services, air transportation, sea and inland port facilities, parking facilities, police protection, fire protection, correction, protective inspection and regulation, sewerage, natural resources, parks and recreation, housing and community development, solid waste management, financial administration, judicial and legal, general public buildings, other government administration, interest on general debt, and other general expenditures, not elsewhere classified.

Note: Except for States listed, data for fiscal years listed from 1963–64 to 2012–13 are the aggregation of data for government fiscal years that ended in the 12-month period from July 1 to June 30 of those years; Texas used August and Alabama and Michigan used September as end dates. Data for 1963 and earlier years include data for government fiscal years ending during that particular calendar year.

Source: Department of Commerce (Bureau of the Census).

TABLE B–23. U.S. Treasury securities outstanding by kind of obligation, 1977–2016

[Billions of dollars]

End of fiscal year or month	Total Treasury securities outstanding [1]	Marketable							Nonmarketable				
		Total [2]	Treasury bills	Treasury notes	Treasury bonds	Treasury inflation-protected securities			Total	U.S. savings securities [3]	Foreign series [4]	Government account series	Other [5]
						Total	Notes	Bonds					
1977	697.8	443.5	156.1	241.7	45.7	.....	.....	.....	254.3	75.6	21.8	140.1	16.8
1978	767.2	485.2	160.9	267.9	56.4	.....	.....	.....	282.0	79.9	21.7	153.3	27.1
1979	819.1	506.7	161.4	274.2	71.1	.....	.....	.....	312.4	80.6	28.1	176.4	27.4
1980	906.8	594.5	199.8	310.9	83.8	.....	.....	.....	312.3	73.0	25.2	189.8	24.2
1981	996.8	683.2	223.4	363.6	96.2	.....	.....	.....	313.6	68.3	20.5	201.1	23.7
1982	1,141.2	824.4	277.9	442.9	103.6	.....	.....	.....	316.8	67.6	14.6	210.5	24.1
1983	1,376.3	1,024.0	340.7	557.5	125.7	.....	.....	.....	352.3	70.6	11.5	234.7	35.6
1984	1,560.4	1,176.6	356.8	661.7	158.1	.....	.....	.....	383.8	73.7	8.8	259.5	41.8
1985	1,822.3	1,360.2	384.2	776.4	199.5	.....	.....	.....	462.1	78.2	6.6	313.9	63.3
1986	2,124.9	1,564.3	410.7	896.9	241.7	.....	.....	.....	560.5	87.8	4.1	365.9	102.8
1987	2,349.4	1,676.0	378.3	1,005.1	277.6	.....	.....	.....	673.4	98.5	4.4	440.7	129.8
1988	2,601.4	1,802.9	398.5	1,089.6	299.9	.....	.....	.....	798.5	107.8	6.3	536.5	148.0
1989	2,837.9	1,892.8	406.6	1,133.2	338.0	.....	.....	.....	945.2	115.7	6.8	663.7	159.0
1990	3,212.7	2,092.8	482.5	1,218.1	377.2	.....	.....	.....	1,119.9	123.9	36.0	779.4	180.6
1991	3,664.5	2,390.7	564.6	1,387.7	423.4	.....	.....	.....	1,273.9	135.4	41.6	908.4	188.5
1992	4,063.8	2,677.5	634.3	1,566.3	461.8	.....	.....	.....	1,386.3	150.3	37.0	1,011.0	188.0
1993	4,410.7	2,904.9	658.4	1,734.2	497.4	.....	.....	.....	1,505.8	169.1	42.5	1,114.3	179.9
1994	4,691.7	3,091.6	697.3	1,867.5	511.8	.....	.....	.....	1,600.1	178.6	42.0	1,211.7	167.8
1995	4,953.0	3,260.4	742.5	1,980.3	522.6	.....	.....	.....	1,692.6	183.5	41.0	1,324.3	143.8
1996	5,220.8	3,418.4	761.2	2,098.7	543.5	.....	.....	.....	1,802.4	184.1	37.5	1,454.7	126.1
1997	5,407.6	3,439.6	701.9	2,122.2	576.2	24.4	24.4	.....	1,968.0	182.7	34.9	1,608.5	141.9
1998	5,518.7	3,331.0	637.6	2,009.1	610.4	58.8	41.9	17.0	2,187.6	180.8	35.1	1,777.3	194.4
1999	5,647.3	3,233.0	653.2	1,828.8	643.7	92.4	67.6	24.8	2,414.3	180.0	31.0	2,005.2	198.1
2000	5,622.1	2,992.8	616.2	1,611.3	635.3	115.0	81.6	33.4	2,629.4	177.7	25.4	2,242.9	183.3
2001 [1]	5,807.5	2,930.7	734.9	1,433.0	613.0	134.9	95.1	39.7	2,876.7	186.5	18.3	2,492.1	179.9
2002	6,228.2	3,136.7	868.3	1,521.6	593.0	138.9	93.7	45.1	3,091.5	193.3	12.5	2,707.3	178.4
2003	6,783.2	3,460.7	918.2	1,799.5	576.9	166.1	120.0	46.1	3,322.5	201.6	11.0	2,912.2	197.7
2004	7,379.1	3,846.1	961.5	2,109.6	552.0	223.0	164.5	58.5	3,533.0	204.2	5.9	3,130.0	192.9
2005	7,932.7	4,084.9	914.3	2,328.8	520.7	307.1	229.1	78.0	3,847.8	203.6	3.1	3,380.6	260.5
2006	8,507.0	4,303.0	911.5	2,447.2	534.7	395.6	293.9	101.7	4,203.9	203.7	3.0	3,722.7	274.5
2007	9,007.7	4,448.1	958.1	2,458.0	561.1	456.9	335.7	121.2	4,559.5	197.1	3.0	4,026.8	332.6
2008	10,024.7	5,236.0	1,489.8	2,624.8	582.9	524.5	380.2	144.3	4,788.7	194.3	3.0	4,297.7	293.8
2009	11,909.8	7,009.7	1,992.5	3,773.8	679.8	551.7	396.2	155.5	4,900.1	192.5	4.9	4,454.3	248.4
2010	13,561.6	8,498.3	1,788.5	5,255.9	849.9	593.8	421.1	172.7	5,063.3	188.7	4.2	4,645.3	225.1
2011	14,790.3	9,624.5	1,477.5	6,412.5	1,020.4	705.7	509.4	196.3	5,165.8	185.1	3.0	4,793.9	183.8
2012	16,066.2	10,749.7	1,616.0	7,120.7	1,198.2	807.7	584.7	223.0	5,316.5	183.8	3.0	4,939.3	190.4
2013	16,738.2	11,596.2	1,530.0	7,758.0	1,366.2	936.4	685.5	250.8	5,142.0	180.0	3.0	4,803.1	156.0
2014	17,824.1	12,294.2	1,411.0	8,167.8	1,534.1	1,044.7	765.2	279.5	5,529.9	176.7	3.0	5,212.5	137.7
2015	18,150.6	12,853.8	1,358.0	8,372.7	1,688.3	1,135.4	832.1	303.3	5,296.9	172.8	.3	5,013.5	110.3
2016	19,573.4	13,660.6	1,647.0	8,631.0	1,825.5	1,210.0	881.6	328.3	5,912.8	167.5	.3	5,604.1	141.0
2015: Jan	18,082.3	12,483.3	1,412.9	8,239.9	1,589.2	1,063.7	779.5	284.2	5,599.0	175.6	.3	5,277.4	145.8
Feb	18,155.9	12,570.3	1,472.9	8,230.1	1,594.6	1,067.1	775.5	291.6	5,585.5	175.3	.3	5,265.2	144.8
Mar	18,152.1	12,643.8	1,477.9	8,264.4	1,607.6	1,075.2	785.0	290.2	5,508.3	174.9	.3	5,183.1	150.0
Apr	18,152.6	12,645.5	1,432.9	8,284.0	1,620.6	1,074.2	782.9	291.3	5,507.1	174.6	.3	5,182.7	149.5
May	18,153.3	12,688.4	1,447.0	8,264.6	1,637.0	1,093.2	800.1	293.0	5,464.8	174.3	.3	5,147.5	142.7
June	18,152.0	12,711.1	1,395.0	8,305.4	1,650.0	1,102.4	801.7	300.7	5,440.9	173.9	.3	5,134.9	131.8
July	18,151.3	12,813.4	1,440.0	8,335.1	1,663.0	1,101.9	799.7	302.2	5,337.9	173.6	.3	5,043.0	121.1
Aug	18,151.2	12,846.5	1,424.0	8,338.8	1,675.3	1,122.1	818.9	303.3	5,304.6	173.2	.3	5,017.9	113.2
Sept	18,150.6	12,853.8	1,358.0	8,372.7	1,688.3	1,135.4	832.1	303.3	5,296.9	172.8	.3	5,013.5	110.3
Oct	18,153.0	12,803.0	1,273.0	8,385.7	1,701.3	1,141.0	831.0	310.0	5,350.0	172.5	.3	5,070.5	106.7
Nov	18,827.3	13,122.6	1,506.0	8,422.6	1,711.8	1,152.2	842.7	309.5	5,704.7	172.1	.3	5,426.3	106.0
Dec	18,922.2	13,206.6	1,514.0	8,456.8	1,724.8	1,167.9	858.6	309.4	5,715.6	171.6	.3	5,436.8	107.0
2016: Jan	19,012.8	13,189.0	1,477.9	8,469.8	1,737.8	1,160.4	851.6	308.8	5,823.9	171.1	.3	5,547.4	105.1
Feb	19,125.5	13,312.7	1,551.9	8,515.9	1,748.5	1,166.0	849.0	317.0	5,812.7	170.8	.3	5,534.3	107.4
Mar	19,264.9	13,446.1	1,618.0	8,543.2	1,760.5	1,181.1	863.6	317.5	5,818.8	170.3	.3	5,533.7	114.6
Apr	19,187.4	13,355.2	1,527.0	8,555.5	1,772.6	1,156.8	839.1	317.8	5,832.2	169.9	.3	5,540.3	121.7
May	19,265.4	13,393.5	1,524.0	8,587.7	1,772.2	1,175.4	856.3	319.1	5,871.9	169.5	.3	5,574.9	127.3
June	19,381.6	13,430.8	1,507.9	8,606.6	1,784.2	1,186.7	860.3	326.4	5,950.8	169.0	.3	5,648.0	133.5
July	19,427.8	13,494.4	1,549.9	8,621.5	1,797.0	1,180.7	853.0	327.7	5,933.5	168.6	.3	5,631.0	133.6
Aug	19,510.3	13,599.1	1,632.9	8,619.2	1,813.5	1,200.0	871.2	328.8	5,911.2	168.0	.3	5,608.2	134.7
Sept	19,573.4	13,660.6	1,647.0	8,631.0	1,825.5	1,210.0	881.6	328.3	5,912.8	167.5	.3	5,604.1	141.0
Oct	19,805.7	13,770.1	1,752.9	8,641.2	1,837.5	1,216.3	882.3	334.0	6,035.6	166.8	.3	5,723.5	145.0

[1] Data beginning with January 2001 are interest-bearing and non-interest-bearing securities; prior data are interest-bearing securities only.

[2] Data from 1986 to 2002 and 2005 forward include Federal Financing Bank securities, not shown separately. Beginning with data for January 2014, includes Floating Rate Notes, not shown separately.

[3] Through 1996, series is U.S. savings bonds. Beginning 1997, includes U.S. retirement plan bonds, U.S. individual retirement bonds, and U.S. savings notes previously included in "other" nonmarketable securities.

[4] Nonmarketable certificates of indebtedness, notes, bonds, and bills in the Treasury foreign series of dollar-denominated and foreign-currency-denominated issues.

[5] Includes depository bonds; retirement plan bonds through 1996; Rural Electrification Administration bonds; State and local bonds; special issues held only by U.S. Government agencies and trust funds and the Federal home loan banks; for the period July 2003 through February 2004, depositary compensation securities; and for the period August 2008 through April 2016, Hope bonds for the HOPE For Homeowners Program.

Note: The fiscal year is on an October 1–September 30 basis.

Source: Department of the Treasury.

Table B–24. Estimated ownership of U.S. Treasury securities, 2003–2016

[Billions of dollars]

End of month	Total public debt [1]	Federal Reserve and Intra-governmental holdings [2]	Held by private investors									
			Total privately held	Depository institutions [3]	U.S. savings bonds [4]	Pension funds		Insurance companies	Mutual funds [6]	State and local governments	Foreign and international [7]	Other investors [8]
						Private [5]	State and local governments					
2003: Mar	6,460.8	3,390.8	3,070.0	162.6	196.9	111.6	162.1	163.5	282.7	350.0	1,275.2	365.3
June	6,670.1	3,505.4	3,164.7	155.0	199.2	115.4	161.3	166.0	285.4	347.9	1,371.9	362.7
Sept	6,783.2	3,515.3	3,267.9	158.0	201.6	112.1	155.5	168.5	271.0	356.2	1,443.3	401.8
Dec	6,998.0	3,620.1	3,377.9	165.3	203.9	116.9	148.6	166.4	271.2	361.8	1,523.1	420.7
2004: Mar	7,131.1	3,628.3	3,502.8	172.7	204.5	114.0	143.6	172.4	275.2	372.8	1,670.0	377.6
June	7,274.3	3,742.8	3,531.5	167.8	204.6	115.4	134.9	174.6	252.3	390.1	1,735.4	356.4
Sept	7,379.1	3,772.0	3,607.1	146.3	204.2	113.6	140.1	182.9	249.4	393.0	1,794.5	383.1
Dec	7,596.1	3,905.6	3,690.5	133.4	204.5	113.0	149.4	188.5	256.1	404.9	1,849.3	391.6
2005: Mar	7,776.9	3,921.6	3,855.3	149.4	204.2	114.4	157.2	193.3	264.3	429.3	1,952.2	391.0
June	7,836.5	4,033.5	3,803.0	135.9	204.2	115.4	165.9	195.0	248.6	461.1	1,877.5	399.4
Sept	7,932.7	4,067.8	3,864.9	134.0	203.6	116.7	161.1	200.7	246.6	493.6	1,929.6	378.9
Dec	8,170.4	4,199.8	3,970.6	129.4	205.2	116.5	154.2	202.3	254.1	512.2	2,033.9	362.7
2006: Mar	8,371.2	4,257.2	4,114.0	113.0	206.0	116.8	152.9	200.3	254.2	515.7	2,082.1	473.0
June	8,420.0	4,389.2	4,030.8	119.5	205.2	117.7	149.6	196.1	243.4	531.6	1,977.8	490.1
Sept	8,507.0	4,432.8	4,074.2	113.6	203.7	125.8	149.3	196.8	234.2	542.3	2,025.3	483.2
Dec	8,680.2	4,558.1	4,122.1	114.8	202.4	139.8	153.4	197.9	248.2	570.5	2,103.1	392.0
2007: Mar	8,849.7	4,576.6	4,273.1	119.8	200.3	139.7	156.3	185.4	263.2	608.3	2,194.8	405.2
June	8,867.7	4,715.1	4,152.6	110.4	198.6	139.9	162.3	168.9	257.6	637.8	2,192.0	285.1
Sept	9,007.7	4,738.0	4,269.7	119.7	197.1	140.5	153.2	155.1	292.7	643.1	2,235.3	332.9
Dec	9,229.2	4,833.5	4,395.7	129.8	196.5	141.0	144.2	141.9	343.5	647.8	2,353.2	297.8
2008: Mar	9,437.6	4,694.7	4,742.9	125.0	195.4	143.7	135.4	152.1	466.7	646.4	2,506.3	371.9
June	9,492.0	4,685.8	4,806.2	112.7	195.0	145.0	135.5	159.4	440.3	635.1	2,587.4	395.9
Sept	10,024.7	4,692.7	5,332.0	130.0	194.3	147.0	136.7	163.4	631.4	614.0	2,802.4	512.9
Dec	10,699.8	4,806.4	5,893.4	105.0	194.1	147.4	129.9	171.4	758.2	601.4	3,077.2	708.9
2009: Mar	11,126.9	4,785.2	6,341.7	125.7	194.0	155.4	137.0	191.0	721.1	588.2	3,265.7	963.7
June	11,545.3	5,026.8	6,518.5	140.8	193.6	164.1	144.6	200.0	711.8	588.5	3,460.8	914.2
Sept	11,909.8	5,127.1	6,782.7	198.2	192.5	167.2	145.6	210.2	668.5	583.6	3,570.6	1,046.3
Dec	12,311.3	5,276.9	7,034.4	202.5	191.3	175.6	151.4	222.0	668.8	585.6	3,685.1	1,152.1
2010: Mar	12,773.1	5,259.8	7,513.3	269.3	190.2	183.0	153.6	225.7	678.5	585.0	3,877.9	1,350.1
June	13,201.8	5,345.1	7,856.7	266.1	189.6	190.8	150.1	231.8	676.8	584.4	4,070.0	1,497.1
Sept	13,561.6	5,350.5	8,211.1	322.8	188.7	198.2	145.2	240.6	671.0	586.0	4,324.2	1,534.4
Dec	14,025.2	5,656.2	8,368.9	319.3	187.9	206.8	153.7	248.4	721.7	595.7	4,435.6	1,499.9
2011: Mar	14,270.0	5,958.9	8,311.1	321.0	186.7	215.8	157.9	253.5	749.4	585.3	4,481.4	1,360.1
June	14,343.1	6,220.4	8,122.7	279.4	186.0	251.8	158.0	254.8	753.7	572.2	4,690.6	976.1
Sept	14,790.3	6,328.0	8,462.4	293.8	185.1	373.6	155.7	259.6	788.7	557.9	4,912.1	935.8
Dec	15,222.8	6,439.6	8,783.3	279.7	185.2	391.9	160.7	271.8	927.9	562.2	5,006.9	997.0
2012: Mar	15,582.3	6,397.2	9,185.1	317.0	184.8	406.6	169.4	271.5	1,015.4	567.2	5,145.1	1,108.1
June	15,855.5	6,475.8	9,379.7	303.2	184.7	427.4	171.2	268.6	997.8	585.1	5,310.9	1,130.8
Sept	16,066.2	6,446.8	9,619.4	338.2	183.8	447.0	171.4	269.5	1,080.7	593.7	5,476.1	1,058.9
Dec	16,432.7	6,523.7	9,909.1	347.7	182.5	467.5	172.9	270.6	1,031.8	606.7	5,573.8	1,255.6
2013: Mar	16,771.6	6,656.8	10,114.8	338.9	181.7	464.6	173.9	266.6	1,066.7	610.7	5,725.0	1,286.7
June	16,738.2	6,773.3	9,964.9	300.2	180.9	454.0	178.7	262.6	1,000.1	608.7	5,595.0	1,384.6
Sept	16,738.2	6,834.2	9,904.0	293.2	180.0	358.6	182.8	262.3	976.2	584.1	5,652.8	1,414.1
Dec	17,352.0	7,205.3	10,146.6	321.1	179.2	478.1	188.3	264.7	975.3	586.7	5,792.6	1,360.6
2014: Mar	17,601.2	7,301.5	10,299.7	368.3	178.3	480.1	189.0	266.7	1,050.1	586.7	5,948.3	1,232.2
June	17,632.6	7,461.0	10,171.6	407.2	177.6	481.1	189.3	273.6	977.9	605.9	6,018.7	1,040.3
Sept	17,824.1	7,490.8	10,333.2	470.9	176.7	485.5	187.1	280.0	1,067.6	602.6	6,069.2	993.5
Dec	18,141.4	7,578.9	10,562.6	513.7	175.9	492.1	181.3	285.4	1,108.3	623.1	6,157.7	1,025.1
2015: Mar	18,152.1	7,521.3	10,630.8	511.7	174.9	442.8	176.4	292.7	1,156.8	640.6	6,172.6	1,062.4
June	18,152.0	7,536.5	10,615.5	515.4	173.9	382.9	178.0	293.2	1,135.9	630.8	6,163.1	1,142.2
Sept	18,150.6	7,488.7	10,661.9	513.6	172.8	318.8	173.5	297.8	1,186.6	643.6	6,105.9	1,249.3
Dec	18,922.2	7,711.2	11,211.0	546.8	171.6	529.2	174.8	298.3	1,315.3	666.4	6,146.3	1,362.3
2016: Mar	19,264.9	7,801.4	11,463.6	555.3	170.3	538.0	175.6	301.5	1,390.7	680.1	6,285.9	1,366.2
June	19,381.6	7,911.2	11,470.4	570.3	169.0	544.4	173.9	304.1	1,378.9	700.0	6,280.0	1,349.8
Sept	19,573.4	7,863.5	11,709.9	.....	167.5	.....	.....	.....	.....	.....	6,154.7	.....

[1] Face value.
[2] Federal Reserve holdings exclude Treasury securities held under repurchase agreements.
[3] Includes U.S. chartered depository institutions, foreign banking offices in U.S., banks in U.S. affiliated areas, credit unions, and bank holding companies.
[4] Current accrual value includes myRA.
[5] Includes Treasury securities held by the Federal Employees Retirement System Thrift Savings Plan "G Fund."
[6] Includes money market mutual funds, mutual funds, and closed-end investment companies.
[7] Includes nonmarketable foreign series, Treasury securities, and Treasury deposit funds. Excludes Treasury securities held under repurchase agreements in custody accounts at the Federal Reserve Bank of New York. Estimates reflect benchmarks to this series at differing intervals; for further detail, see *Treasury Bulletin* and http://www.treasury.gov/resource-center/data-chart-center/tic/pages/index.aspx.
[8] Includes individuals, Government-sponsored enterprises, brokers and dealers, bank personal trusts and estates, corporate and noncorporate businesses, and other investors.

Note: Data shown in this table are as of November 25, 2016.

Source: Department of the Treasury.

TABLE B–25. Bond yields and interest rates, 1947–2016

[Percent per annum]

Year and month	U.S. Treasury securities					Corporate bonds (Moody's)		High-grade municipal bonds (Standard & Poor's)	New-home mortgage yields [4]	Prime rate charged by banks [5]	Discount window (Federal Reserve Bank of New York) [5, 6]		Federal funds rate [7]
	Bills (at auction) [1]		Constant maturities [2]										
	3-month	6-month	3-year	10-year	30-year	Aaa [3]	Baa				Primary credit	Adjustment credit	
1947	0.594	.....	.....	.....	.....	2.61	3.24	2.01	.....	1.50–1.75	.....	1.00	.....
1948	1.040	.....	.....	.....	.....	2.82	3.47	2.40	.....	1.75–2.00	.....	1.34	.....
1949	1.102	.....	.....	.....	.....	2.66	3.42	2.21	.....	2.00	.....	1.50	.....
1950	1.218	.....	.....	.....	.....	2.62	3.24	1.98	.....	2.07	.....	1.59	.....
1951	1.552	.....	.....	.....	.....	2.86	3.41	2.00	.....	2.56	.....	1.75	.....
1952	1.766	.....	.....	.....	.....	2.96	3.52	2.19	.....	3.00	.....	1.75	.....
1953	1.931	.....	2.47	2.85	.....	3.20	3.74	2.72	.....	3.17	.....	1.99	.....
1954	.953	.....	1.63	2.40	.....	2.90	3.51	2.37	.....	3.05	.....	1.60	.....
1955	1.753	.....	2.47	2.82	.....	3.06	3.53	2.53	.....	3.16	.....	1.89	1.79
1956	2.658	.....	3.19	3.18	.....	3.36	3.88	2.93	.....	3.77	.....	2.77	2.73
1957	3.267	.....	3.98	3.65	.....	3.89	4.71	3.60	.....	4.20	.....	3.12	3.11
1958	1.839	.....	2.84	3.32	.....	3.79	4.73	3.56	.....	3.83	.....	2.15	1.57
1959	3.405	3.832	4.46	4.33	.....	4.38	5.05	3.95	.....	4.48	.....	3.36	3.31
1960	2.93	3.25	3.98	4.12	.....	4.41	5.19	3.73	.....	4.82	.....	3.53	3.21
1961	2.38	2.61	3.54	3.88	.....	4.35	5.08	3.46	.....	4.50	.....	3.00	1.95
1962	2.78	2.91	3.47	3.95	.....	4.33	5.02	3.18	.....	4.50	.....	3.00	2.71
1963	3.16	3.25	3.67	4.00	.....	4.26	4.86	3.23	5.89	4.50	.....	3.23	3.18
1964	3.56	3.69	4.03	4.19	.....	4.40	4.83	3.22	5.83	4.50	.....	3.55	3.50
1965	3.95	4.05	4.22	4.28	.....	4.49	4.87	3.27	5.81	4.54	.....	4.04	4.07
1966	4.88	5.08	5.23	4.93	.....	5.13	5.67	3.82	6.25	5.63	.....	4.50	5.11
1967	4.32	4.63	5.03	5.07	.....	5.51	6.23	3.98	6.46	5.63	.....	4.19	4.22
1968	5.34	5.47	5.68	5.64	.....	6.18	6.94	4.51	6.97	6.31	.....	5.17	5.66
1969	6.68	6.85	7.02	6.67	.....	7.03	7.81	5.81	7.81	7.96	.....	5.87	8.21
1970	6.43	6.53	7.29	7.35	.....	8.04	9.11	6.51	8.45	7.91	.....	5.95	7.17
1971	4.35	4.51	5.66	6.16	.....	7.39	8.56	5.70	7.74	5.73	.....	4.88	4.67
1972	4.07	4.47	5.72	6.21	.....	7.21	8.16	5.27	7.60	5.25	.....	4.50	4.44
1973	7.04	7.18	6.96	6.85	.....	7.44	8.24	5.18	7.96	8.03	.....	6.45	8.74
1974	7.89	7.93	7.84	7.56	.....	8.57	9.50	6.09	8.92	10.81	.....	7.83	10.51
1975	5.84	6.12	7.50	7.99	.....	8.83	10.61	6.89	9.00	7.86	.....	6.25	5.82
1976	4.99	5.27	6.77	7.61	.....	8.43	9.75	6.49	9.00	6.84	.....	5.50	5.05
1977	5.27	5.52	6.68	7.42	7.75	8.02	8.97	5.56	9.02	6.83	.....	5.46	5.54
1978	7.22	7.58	8.29	8.41	8.49	8.73	9.49	5.90	9.56	9.06	.....	7.46	7.94
1979	10.05	10.02	9.70	9.43	9.28	9.63	10.69	6.39	10.78	12.67	.....	10.29	11.20
1980	11.51	11.37	11.51	11.43	11.27	11.94	13.67	8.51	12.66	15.26	.....	11.77	13.35
1981	14.03	13.78	14.46	13.92	13.45	14.17	16.04	11.23	14.70	18.87	.....	13.42	16.39
1982	10.69	11.08	12.93	13.01	12.76	13.79	16.11	11.57	15.14	14.85	.....	11.01	12.24
1983	8.63	8.75	10.45	11.10	11.18	12.04	13.55	9.47	12.57	10.79	.....	8.50	9.09
1984	9.53	9.77	11.92	12.46	12.41	12.71	14.19	10.15	12.38	12.04	.....	8.80	10.23
1985	7.47	7.64	9.64	10.62	10.79	11.37	12.72	9.18	11.55	9.93	.....	7.69	8.10
1986	5.98	6.03	7.06	7.67	7.78	9.02	10.39	7.38	10.17	8.33	.....	6.32	6.80
1987	5.82	6.05	7.68	8.39	8.59	9.38	10.58	7.73	9.31	8.21	.....	5.66	6.66
1988	6.69	6.92	8.26	8.85	8.96	9.71	10.83	7.76	9.19	9.32	.....	6.20	7.57
1989	8.12	8.04	8.55	8.49	8.45	9.26	10.18	7.24	10.13	10.87	.....	6.93	9.21
1990	7.51	7.47	8.26	8.55	8.61	9.32	10.36	7.25	10.05	10.01	.....	6.98	8.10
1991	5.42	5.49	6.82	7.86	8.14	8.77	9.80	6.89	9.32	8.46	.....	5.45	5.69
1992	3.45	3.57	5.30	7.01	7.67	8.14	8.98	6.41	8.24	6.25	.....	3.25	3.52
1993	3.02	3.14	4.44	5.87	6.59	7.22	7.93	5.63	7.20	6.00	.....	3.00	3.02
1994	4.29	4.66	6.27	7.09	7.37	7.96	8.62	6.19	7.49	7.15	.....	3.60	4.21
1995	5.51	5.59	6.25	6.57	6.88	7.59	8.20	5.95	7.87	8.83	.....	5.21	5.83
1996	5.02	5.09	5.99	6.44	6.71	7.37	8.05	5.75	7.80	8.27	.....	5.02	5.30
1997	5.07	5.18	6.10	6.35	6.61	7.26	7.86	5.55	7.71	8.44	.....	5.00	5.46
1998	4.81	4.85	5.14	5.26	5.58	6.53	7.22	5.12	7.07	8.35	.....	4.92	5.35
1999	4.66	4.76	5.49	5.65	5.87	7.04	7.87	5.43	7.04	8.00	.....	4.62	4.97
2000	5.85	5.92	6.22	6.03	5.94	7.62	8.36	5.77	7.52	9.23	.....	5.73	6.24
2001	3.44	3.39	4.09	5.02	5.49	7.08	7.95	5.19	7.00	6.91	.....	3.40	3.88
2002	1.62	1.69	3.10	4.61	5.43	6.49	7.80	5.05	6.43	4.67	.....	1.17	1.67
2003	1.01	1.06	2.10	4.01	.....	5.67	6.77	4.73	5.80	4.12	2.12	.....	1.13
2004	1.38	1.57	2.78	4.27	.....	5.63	6.39	4.63	5.77	4.34	2.34	.....	1.35
2005	3.16	3.40	3.93	4.29	.....	5.24	6.06	4.29	5.94	6.19	4.19	.....	3.22
2006	4.73	4.80	4.77	4.80	4.91	5.59	6.48	4.42	6.63	7.96	5.96	.....	4.97
2007	4.41	4.48	4.35	4.63	4.84	5.56	6.48	4.42	6.41	8.05	5.86	.....	5.02
2008	1.48	1.71	2.24	3.66	4.28	5.63	7.45	4.80	6.05	5.09	2.39	.....	1.92
2009	.16	.29	1.43	3.26	4.08	5.31	7.30	4.64	5.14	3.25	.50	.....	.16
2010	.14	.20	1.11	3.22	4.25	4.94	6.04	4.16	4.80	3.25	.72	.....	.18
2011	.06	.10	.75	2.78	3.91	4.64	5.66	4.29	4.56	3.25	.75	.....	.10
2012	.09	.13	.38	1.80	2.92	3.67	4.94	3.14	3.69	3.25	.75	.....	.14
2013	.06	.09	.54	2.35	3.45	4.24	5.10	3.96	4.00	3.25	.75	.....	.11
2014	.03	.06	.90	2.54	3.34	4.16	4.85	3.78	4.22	3.25	.75	.....	.09
2015	.06	.17	1.02	2.14	2.84	3.89	5.00	3.48	4.01	3.26	.76	.....	.13

[1] High bill rate at auction, issue date within period, bank-discount basis. On or after October 28, 1998, data are stop yields from uniform-price auctions. Before that date, they are weighted average yields from multiple-price auctions.

See next page for continuation of table.

TABLE B–25. Bond yields and interest rates, 1947–2016—*Continued*

[Percent per annum]

Year and month	U.S. Treasury securities: Bills (at auction)[1] 3-month	6-month	Constant maturities[2] 3-year	10-year	30-year	Corporate bonds (Moody's) Aaa[3]	Baa	High-grade municipal bonds (Standard & Poor's)	New-home mortgage yields[4]	Prime rate charged by banks[5]	Discount window (Federal Reserve Bank of New York)[5, 6] Primary credit	Adjustment credit	Federal funds rate[7]
										High-low	High-low	High-low	
2012: Jan	0.02	0.06	0.36	1.97	3.03	3.85	5.23	3.43	4.09	3.25–3.25	0.75–0.75	.....	0.08
Feb	.08	.11	.38	1.97	3.11	3.85	5.14	3.25	4.01	3.25–3.25	0.75–0.75	.....	.10
Mar	.09	.14	.51	2.17	3.28	3.99	5.23	3.51	3.72	3.25–3.25	0.75–0.75	.....	.13
Apr	.08	.14	.43	2.05	3.18	3.96	5.19	3.47	3.93	3.25–3.25	0.75–0.75	.....	.14
May	.09	.14	.39	1.80	2.93	3.80	5.07	3.21	3.88	3.25–3.25	0.75–0.75	.....	.16
June	.09	.14	.39	1.62	2.70	3.64	5.02	3.30	3.80	3.25–3.25	0.75–0.75	.....	.16
July	.10	.14	.33	1.53	2.59	3.40	4.87	3.14	3.76	3.25–3.25	0.75–0.75	.....	.16
Aug	.11	.14	.37	1.68	2.77	3.48	4.91	3.07	3.67	3.25–3.25	0.75–0.75	.....	.13
Sept	.10	.13	.34	1.72	2.88	3.49	4.84	3.02	3.62	3.25–3.25	0.75–0.75	.....	.14
Oct	.10	.15	.37	1.75	2.90	3.47	4.58	2.89	3.58	3.25–3.25	0.75–0.75	.....	.16
Nov	.11	.15	.36	1.65	2.80	3.50	4.51	2.68	3.46	3.25–3.25	0.75–0.75	.....	.16
Dec	.08	.12	.35	1.72	2.88	3.65	4.63	2.73	3.40	3.25–3.25	0.75–0.75	.....	.16
2013: Jan	.07	.11	.39	1.91	3.08	3.80	4.73	2.93	3.41	3.25–3.25	0.75–0.75	.....	.14
Feb	.10	.12	.40	1.98	3.17	3.90	4.85	3.09	3.49	3.25–3.25	0.75–0.75	.....	.15
Mar	.09	.11	.39	1.96	3.16	3.93	4.85	3.27	3.61	3.25–3.25	0.75–0.75	.....	.14
Apr	.06	.09	.34	1.76	2.93	3.73	4.59	3.22	3.66	3.25–3.25	0.75–0.75	.....	.15
May	.05	.08	.40	1.93	3.11	3.89	4.73	3.39	3.55	3.25–3.25	0.75–0.75	.....	.11
June	.05	.09	.58	2.30	3.40	4.27	5.19	4.02	3.64	3.25–3.25	0.75–0.75	.....	.09
July	.04	.08	.64	2.58	3.61	4.34	5.32	4.51	4.07	3.25–3.25	0.75–0.75	.....	.09
Aug	.04	.07	.70	2.74	3.76	4.54	5.42	4.77	4.33	3.25–3.25	0.75–0.75	.....	.08
Sept	.02	.04	.78	2.81	3.79	4.64	5.47	4.74	4.44	3.25–3.25	0.75–0.75	.....	.08
Oct	.05	.08	.63	2.62	3.68	4.53	5.31	4.50	4.47	3.25–3.25	0.75–0.75	.....	.09
Nov	.07	.10	.58	2.72	3.80	4.63	5.38	4.51	4.39	3.25–3.25	0.75–0.75	.....	.08
Dec	.07	.09	.69	2.90	3.89	4.62	5.38	4.55	4.37	3.25–3.25	0.75–0.75	.....	.09
2014: Jan	.05	.07	.78	2.86	3.77	4.49	5.19	4.38	4.45	3.25–3.25	0.75–0.75	.....	.07
Feb	.06	.08	.69	2.71	3.66	4.45	5.10	4.25	4.04	3.25–3.25	0.75–0.75	.....	.07
Mar	.05	.08	.82	2.72	3.62	4.38	5.06	4.16	4.35	3.25–3.25	0.75–0.75	.....	.08
Apr	.04	.05	.88	2.71	3.52	4.24	4.90	4.02	4.33	3.25–3.25	0.75–0.75	.....	.09
May	.03	.05	.83	2.56	3.39	4.16	4.76	3.80	4.01	3.25–3.25	0.75–0.75	.....	.09
June	.03	.06	.90	2.60	3.42	4.25	4.80	3.72	4.27	3.25–3.25	0.75–0.75	.....	.10
July	.03	.06	.97	2.54	3.33	4.16	4.73	3.75	4.25	3.25–3.25	0.75–0.75	.....	.09
Aug	.03	.05	.93	2.42	3.20	4.08	4.69	3.53	4.25	3.25–3.25	0.75–0.75	.....	.09
Sept	.02	.05	1.05	2.53	3.26	4.11	4.80	3.55	4.23	3.25–3.25	0.75–0.75	.....	.09
Oct	.02	.05	.88	2.30	3.04	3.92	4.69	3.35	4.23	3.25–3.25	0.75–0.75	.....	.09
Nov	.02	.07	.96	2.33	3.04	3.92	4.79	3.49	4.16	3.25–3.25	0.75–0.75	.....	.09
Dec	.04	.11	1.06	2.21	2.83	3.79	4.74	3.39	4.14	3.25–3.25	0.75–0.75	.....	.12
2015: Jan	.03	.10	.90	1.88	2.46	3.46	4.45	3.16	4.05	3.25–3.25	0.75–0.75	.....	.11
Feb	.02	.07	.99	1.98	2.57	3.61	4.51	3.26	3.91	3.25–3.25	0.75–0.75	.....	.11
Mar	.02	.11	1.02	2.04	2.63	3.64	4.54	3.29	3.93	3.25–3.25	0.75–0.75	.....	.11
Apr	.03	.10	.87	1.94	2.59	3.52	4.48	3.40	3.92	3.25–3.25	0.75–0.75	.....	.12
May	.02	.08	.98	2.20	2.96	3.98	4.89	3.77	3.89	3.25–3.25	0.75–0.75	.....	.12
June	.01	.08	1.07	2.36	3.11	4.19	5.13	3.76	3.98	3.25–3.25	0.75–0.75	.....	.13
July	.03	.12	1.03	2.32	3.07	4.15	5.20	3.73	4.10	3.25–3.25	0.75–0.75	.....	.13
Aug	.09	.21	1.03	2.17	2.86	4.04	5.19	3.57	4.12	3.25–3.25	0.75–0.75	.....	.14
Sept	.06	.23	1.01	2.17	2.95	4.07	5.34	3.56	4.09	3.25–3.25	0.75–0.75	.....	.14
Oct	.01	.10	.93	2.07	2.89	3.95	5.34	3.48	4.02	3.25–3.25	0.75–0.75	.....	.12
Nov	.13	.33	1.20	2.26	3.03	4.06	5.46	3.50	4.00	3.25–3.25	0.75–0.75	.....	.12
Dec	.26	.52	1.28	2.24	2.97	3.97	5.46	3.23	4.03	3.50–3.25	1.00–0.75	.....	.24
2016: Jan	.25	.44	1.14	2.09	2.86	4.00	5.45	3.01	4.04	3.50–3.50	1.00–1.00	.....	.34
Feb	.32	.44	.90	1.78	2.62	3.96	5.34	3.21	4.01	3.50–3.50	1.00–1.00	.....	.38
Mar	.32	.48	1.04	1.89	2.68	3.82	5.13	3.28	3.92	3.50–3.50	1.00–1.00	.....	.36
Apr	.23	.37	.92	1.81	2.62	3.62	4.79	3.04	3.86	3.50–3.50	1.00–1.00	.....	.37
May	.27	.41	.97	1.81	2.63	3.65	4.68	2.95	3.82	3.50–3.50	1.00–1.00	.....	.37
June	.29	.41	.86	1.64	2.45	3.50	4.53	2.84	3.81	3.50–3.50	1.00–1.00	.....	.38
July	.31	.40	.79	1.50	2.23	3.28	4.22	2.57	3.74	3.50–3.50	1.00–1.00	.....	.39
Aug	.30	.43	.85	1.56	2.26	3.32	4.24	2.77	3.68	3.50–3.50	1.00–1.00	.....	.40
Sept	.32	.48	.90	1.63	2.35	3.41	4.31	2.86	3.58	3.50–3.50	1.00–1.00	.....	.40
Oct	.34	.48	.99	1.76	2.50	3.51	4.38	3.13	3.57	3.50–3.50	1.00–1.00	.....	.40
Nov	.44	.57	1.22	2.14	2.86	3.86	4.71	3.36	.....	3.50–3.50	1.00–1.00	.....	.41

[2] Yields on the more actively traded issues adjusted to constant maturities by the Department of the Treasury. The 30-year Treasury constant maturity series was discontinued on February 18, 2002, and reintroduced on February 9, 2006.

[3] Beginning with December 7, 2001, data for corporate Aaa series are industrial bonds only.

[4] Effective rate (in the primary market) on conventional mortgages, reflecting fees and charges as well as contract rate and assuming, on the average, repayment at end of 10 years. Rates beginning with January 1973 not strictly comparable with prior rates.

[5] For monthly data, high and low for the period. Prime rate for 1947–1948 are ranges of the rate in effect during the period.

[6] Primary credit replaced adjustment credit as the Federal Reserve's principal discount window lending program effective January 9, 2003.

[7] Beginning March 1, 2016, the daily effective federal funds rate is a volume-weighted median of transaction-level data collected from depository institutions in the Report of Selected Money Market Rates (FR 2420). Between July 21, 1975 and February 29, 2016, the daily effective rate was a volume-weighted mean of rates on brokered trades. Prior to that, the daily effective rate was the rate considered most representative of the day's transactions, usually the one at which most transactions occurred.

Sources: Department of the Treasury, Board of Governors of the Federal Reserve System, Federal Housing Finance Agency, Moody's Investors Service, Bloomberg, and Standard & Poor's.

Table B–26. Money stock and debt measures, 1975–2016

[Averages of daily figures, except debt end-of-period basis; billions of dollars, seasonally adjusted]

Year and month	M1	M2	Debt	Percent change		
	Sum of currency, demand deposits, travelers checks, and other checkable deposits	M1 plus savings deposits, retail MMMF balances, and small time deposits [1]	Debt of domestic nonfinancial sectors [2]	From year or 6 months earlier [3]		From previous period [4]
				M1	M2	Debt
December:						
1975	287.1	1,016.2	2,311.0	4.7	12.6	9.3
1976	306.2	1,152.0	2,562.9	6.7	13.4	11.0
1977	330.9	1,270.3	2,892.8	8.1	10.3	12.9
1978	357.3	1,366.0	3,286.7	8.0	7.5	13.8
1979	381.8	1,473.7	3,682.2	6.9	7.9	12.0
1980	408.5	1,599.8	4,045.1	7.0	8.6	9.6
1981	436.7	1,755.5	4,459.4	6.9	9.7	10.2
1982	474.8	1,905.9	4,895.6	8.7	8.6	10.5
1983	521.4	2,123.5	5,492.1	9.8	11.4	12.1
1984	551.6	2,306.4	6,302.3	5.8	8.6	14.8
1985	619.8	2,492.1	7,334.6	12.4	8.1	16.1
1986	724.7	2,728.0	8,212.6	16.9	9.5	12.0
1987	750.2	2,826.4	8,930.6	3.5	3.6	9.0
1988	786.7	2,989.3	9,747.9	4.9	5.8	9.2
1989	792.9	3,154.0	10,482.9	.8	5.5	7.4
1990	824.7	3,272.7	11,198.6	4.0	3.8	6.6
1991	897.0	3,372.2	11,722.5	8.8	3.0	4.7
1992	1,024.9	3,424.1	12,278.2	14.3	1.5	4.7
1993	1,129.6	3,473.6	13,020.0	10.2	1.4	5.9
1994	1,150.7	3,483.8	13,701.9	1.9	.3	5.2
1995	1,127.5	3,626.4	14,382.8	–2.0	4.1	4.9
1996	1,081.3	3,805.3	15,135.7	–4.1	4.9	5.2
1997	1,072.3	4,018.0	15,973.9	–.8	5.6	5.6
1998	1,095.0	4,358.5	17,021.7	2.1	8.5	6.6
1999	1,122.2	4,619.0	18,179.6	2.5	6.0	6.6
2000	1,088.5	4,905.0	19,064.4	–3.0	6.2	4.8
2001	1,183.1	5,408.4	20,150.5	8.7	10.3	5.8
2002	1,219.9	5,744.2	21,503.1	3.1	6.2	6.7
2003	1,305.8	6,037.4	23,198.2	7.0	5.1	7.7
2004	1,375.8	6,387.4	26,116.5	5.4	5.8	9.2
2005	1,374.9	6,651.2	28,365.2	–.1	4.1	8.7
2006	1,368.2	7,041.4	30,800.3	–.5	5.9	8.4
2007	1,376.5	7,444.2	33,276.6	.6	5.7	8.1
2008	1,606.8	8,166.6	35,065.4	16.7	9.7	5.8
2009	1,698.5	8,471.0	35,918.6	5.7	3.7	3.5
2010	1,842.5	8,775.2	37,232.9	8.5	3.6	4.4
2011	2,169.8	9,636.2	38,386.5	17.8	9.8	3.5
2012	2,461.4	10,428.7	40,133.1	13.4	8.2	5.0
2013	2,660.3	10,994.7	41,564.0	8.1	5.4	3.8
2014	2,930.2	11,646.9	43,324.4	10.1	5.9	4.3
2015	3,079.7	12,313.5	45,204.4	5.1	5.7	4.5
2015: Jan	2,930.7	11,706.7		6.6	5.2	
Feb	2,984.8	11,803.3		12.6	6.2	
Mar	2,990.7	11,839.2	43,603.6	8.5	6.2	2.7
Apr	2,994.8	11,890.9		8.3	6.1	
May	2,988.6	11,927.8		7.1	6.1	
June	3,015.0	11,975.2	44,073.7	5.8	5.6	4.4
July	3,034.2	12,036.1		7.1	5.6	
Aug	3,041.2	12,100.4		3.8	5.0	
Sept	3,055.5	12,157.7	44,360.5	4.3	5.4	2.7
Oct	3,031.8	12,180.7		2.5	4.9	
Nov	3,083.4	12,266.3		6.3	5.7	
Dec	3,079.7	12,313.5	45,204.4	4.3	5.7	7.7
2016: Jan	3,091.0	12,436.5		3.7	6.7	
Feb	3,104.0	12,485.2		4.1	6.4	
Mar	3,144.5	12,572.7	45,810.6	5.8	6.8	5.4
Apr	3,176.8	12,652.4		9.6	7.7	
May	3,224.6	12,728.9		9.2	7.5	
June	3,231.1	12,803.7	46,300.8	9.8	8.0	4.4
July	3,225.1	12,878.1		8.7	7.1	
Aug	3,312.4	12,987.0		13.4	8.0	
Sept	3,318.0	13,061.0		11.0	7.8	
Oct	3,340.5	13,137.9		10.3	7.7	

[1] Money market mutual fund (MMMF). Savings deposits include money market deposit accounts.
[2] Consists of outstanding debt securities and loans of the U.S. Government, State and local governments, and private nonfinancial sectors. Quarterly data shown in last month of quarter. End-of-year data are for fourth quarter.
[3] Annual changes are from December to December; monthly changes are from six months earlier at a simple annual rate.
[4] Debt growth of domestic nonfinancial sectors is the seasonally adjusted borrowing flow divided by the seasonally adjusted level of debt outstanding in the previous period. Annual changes are from fourth quarter to fourth quarter; quarterly changes are from the previous quarter at an annual rate.

Note: For further information on M1 and M2, see the H.6 release.
For further information on the debt of domestic nonfinancial sectors and the derivation of debt growth, see the Z.1 release.

Source: Board of Governors of the Federal Reserve System.

U.S. Energy Information Administration

Annual Energy Outlook 2018

Full Release Date: February 6, 2018 | **Next Release Date:** February 2019 |

full report

Appendix tables

Appendix A	Reference case
Appendix B	Economic growth cases
Appendix C	Oil Price cases
Appendix D	Oil and gas resource and technology cases
Appendix E	Reference case and Reference case with Clean Power Plan

U.S. Energy Information Administration

Annual Energy Outlook 2018

Table: Macroeconomic Indicators

Case: Reference case

PUBLICATIONS & TABLES

Macroeconomic Indicators: Real Gross Domestic Product

Case: Reference case

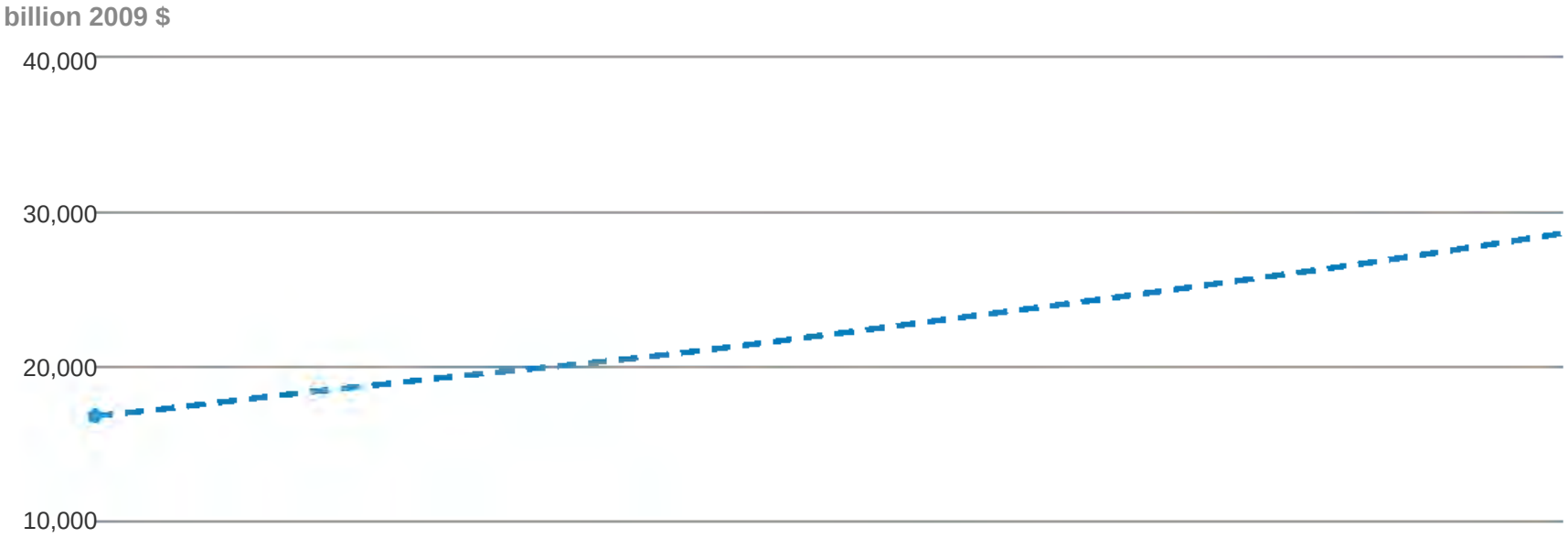
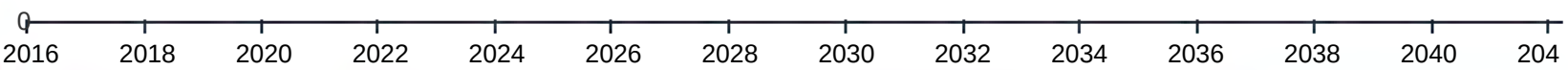


CHART INDEXING OPTIONS: Index to Start as Percent Index to Start as Value



Source: U.S. Energy Information Administration

PUBLICATIONS & TABLES | CASES & SCENARIOS | REGIONS | DOWNLOAD

HELP

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2016 2050

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2016 2017 2018 2019

Real Gross Domestic Product (billion 2009 $)

Components of Real Gross Domestic Product

Real Business Fixed Investment (billion 2009 $)	[redacted]
Real Government Spending (billion 2009 $)	[redacted]
Real Exports (billion 2009 $)	[redacted]
Real Imports (billion 2009 $)	[redacted]
Energy Intensity	
(thousand Btu per 2009 dollar of GDP)	
Delivered Energy (thousand Btu/$ GDP)	[redacted]%
Total Energy (thousand Btu/$ GDP)	[redacted]%
Price Indices	
GDP Chain-type Price Index (2009=1.000) (2009=1.000)	[redacted]
Consumer Price Index (1982-84=1.00)	
All-urban (1982-84=1.00)	[redacted]
Energy Commodities and Services (1982-84=1.00)	[redacted]
Wholesale Price Index (1982=1.00)	
All Commodities (1982=1.00)	[redacted]
Fuel and Power (1982=1.00)	[redacted]
Metals and Metal Products (1982=1.00)	[redacted]
Industrial Commodities excluding Energy (1982=1.00)	[redacted]
Interest Rates (percent, nominal)	
Federal Funds Rate (percent, nominal)	[redacted]
10-Year Treasury Note (percent, nominal)	[redacted]
AA Utility Bond Rate (percent, nominal)	[redacted]
Value of Shipments (billion 2009 dollars)	

GDP = Gross domestic product.
Btu = British thermal unit.
- - = Not applicable.
Sources: 2016 and 2017: IHS Markit, Macroeconomic and Employment models, August 2017; and
IHS Markit, Industry model, May 2017. Projections: U.S. Energy Information Administration, AEO2018 National Energy Modeling System.

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FISCAL YEAR 2019

EFFICIENT, EFFECTIVE, ACCOUNTABLE

AN AMERICAN BUDGET

BUDGET OF THE U.S. GOVERNMENT

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THE BUDGET DOCUMENTS

Budget of the United States Government, Fiscal Year 2019 contains the Budget Message of the President, information on the President's priorities, and summary tables.

Analytical Perspectives, Budget of the United States Government, Fiscal Year 2019 contains analyses that are designed to highlight specified subject areas or provide other significant presentations of budget data that place the budget in perspective. This volume includes economic and accounting analyses; information on Federal receipts and collections; analyses of Federal spending; information on Federal borrowing and debt; baseline or current services estimates; and other technical presentations.

The *Analytical Perspectives* volume also has supplemental materials that are available on the internet at *www.whitehouse.gov/omb/analytical-perspectives/* and on the Budget CD-ROM. These supplemental materials include tables showing the budget by agency and account and by function, subfunction, and program.

Appendix, Budget of the United States Government, Fiscal Year 2019 contains detailed information on the various appropriations and funds that constitute the budget and is designed primarily for the use of the Appropriations Committees. The *Appendix* contains more detailed financial information on individual programs and appropriation accounts than any of the other budget documents. It includes for each agency: the proposed text of appropriations language; budget schedules for each account; legislative proposals; narrative explanations of each budget account; and proposed general provisions applicable to the appropriations of entire agencies or group of agencies. Information is also provided on certain activities whose transactions are not part of the budget totals.

ELECTRONIC SOURCES OF BUDGET INFORMATION

The information contained in these documents is available in electronic format from the following sources:

Internet. All budget documents, including documents that are released at a future date, spreadsheets of many of the budget tables, and a public use budget database are available for downloading in several formats from the internet at *www.whitehouse.gov/omb/budget/*. Links to documents and materials from budgets of prior years are also provided.

Budget CD-ROM. The CD-ROM contains all of the printed budget documents in fully indexed PDF format along with the software required for viewing the documents.

The Internet and CD-ROM also include many of the budget tables in spreadsheet format, and supplemental materials that are part of the *Analytical Perspectives* volume. It also includes *Historical Tables* that provide data on budget receipts, outlays, surpluses or deficits, Federal debt, and Federal employment over an extended time period, generally from 1940 or earlier to 2019 or 2023.

For more information on access to electronic versions of the budget documents (except CD-ROMs), call (202) 512-1530 in the D.C. area or toll-free (888) 293-6498. To purchase the Budget CD-ROM or printed documents call (202) 512-1800.

GENERAL NOTES

1. All years referenced for budget data are fiscal years unless otherwise noted. All years referenced for economic data are calendar years unless otherwise noted.
2. At the time of this writing, none of the full-year appropriations bills for 2018 have been enacted, therefore, the programs and activities normally provided for in the full-year appropriations bills were operating under a continuing resolution (Public Law 115-56, division D, as amended). In addition, the Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2017 (Public Law 115-72, division A) provided additional appropriations for 2018 for certain accounts within the Departments of Agriculture, Homeland Security, and the Interior. The Department of Defense Missile Defeat and Defense Enhancements Appropriations Act, 2018 (Public Law 115-96, division B) also provided additional appropriations for 2018 for certain accounts within the Department of Defense. Accordingly, references to 2018 spending in the text and tables reflect the levels provided by the continuing resolution and, if applicable, Public Laws 115-72 (division A) and 115-96 (division B).
3. The Budget does not incorporate the effects of Public Law 115-120, including the reauthorization of the Children's Health Insurance Program and amendments to the tax code in that law.
4. Detail in this document may not add to the totals due to rounding.

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THE BUDGET MESSAGE OF THE PRESIDENT

TO THE CONGRESS OF THE UNITED STATES:

In one year of working together, we have laid the foundation for a new era of American Greatness. We have boosted economic growth, created more than two million jobs, and added nearly $5 trillion in new wealth to the stock market. Unemployment is at a 17-year low, wages are rising, and jobs are returning to America. Starting this month, hardworking Americans are going to see increased take home pay because of the massive tax cuts and tax reform legislation we enacted at the end of last year.

America is back to winning again. A great spirit of optimism continues to sweep across our Nation. Americans can once again be truly confident that our brightest days are ahead of us.

This year's Budget builds upon our incredible successes over the past year and rests on the following pillars of reform:

Ending Wasteful Spending. The United States is laboring under the highest level of debt held by the public since shortly after the Second World War. The current fiscal path is unsustainable, and future generations deserve better. The Budget makes the hard choices needed to stop wasteful spending, lower the national debt, and focus Government on what matters most—protecting the Nation.

Expanding Economic Growth and Opportunity. The Budget continues our efforts to grow the economy, create millions of new jobs, and raise wages. To accompany our efforts to cut spending and implement massive tax cuts and reforms for American families, workers, and businesses, we will continue to relentlessly target unnecessary regulations for elimination. We will also continue driving America toward energy dominance and making the United States a net energy exporter by 2026.

The Budget also redefines what is possible, by putting the American economy on a path to sustainable 3-percent long-term economic growth. Over the next decade, a steady rate of 3-percent economic growth will infuse trillions of additional dollars into our economy, fueling the dreams of the American people and sustaining a new era of American Greatness.

Preserving Peace Through Strength. The Budget recognizes that we confront political, economic, and military adversaries and competitors that have required us to adjust our national security strategy. Foremost, the Budget rebuilds and modernizes the military—to fulfill a core constitutional responsibility of the Federal Government. The Budget provides resources to enhance missile defense and to build the planes, tanks, warships, and cyber tools that the brave men and women who defend us need to deter aggression and, when necessary, to fight and win. Most importantly, the Budget provides funds to increase the size of our Armed Forces and to give our men and women in uniform a well-earned pay raise. The Budget recognizes that we must deftly employ all of our tools of statecraft—diplomatic, intelligence-related, military, and economic—to compete and

advance American influence. A world that supports American interests and reflects our values makes America more secure and prosperous.

Building the Wall, Dismantling Transnational Criminal Organizations, and Enforcing Our Immigration Laws. The Budget reflects my Administration's serious and ongoing commitment to fully secure our border, take the fight to criminal gangs like MS-13, and make our immigration system work for Americans. The Budget provides funding for a wall on our Southwest border and additional resources for law enforcement at the Departments of Homeland Security and Justice. The Budget also funds an increase in the number of Immigration and Customs Enforcement officers, Border Patrol agents, and immigration judges to improve enforcement at the border and within the United States.

Rebuilding our Infrastructure. World-class infrastructure is possible for the American people. Together we will build stunning new bridges, railways, waterways, tunnels, water treatment facilities, and highways. The Budget reflects a new vision for American infrastructure that would generate $1 trillion in infrastructure investment and speed its delivery to the American people.

Supporting American Working Families. Due to changes in family structures, labor force composition, and participation rates, the demands on American families have never been more complex or expensive to address. In addition to the middle income tax relief achieved with the passage of tax reform, the Budget reflects the importance of investing in American working families by making paid family leave available to new parents, investing in effective approaches to skills training like formal apprenticeships, and maintaining Federal funding and leveraging additional State dollars for programs that help America's working families access and afford child care. With these strategic investments, the Budget empowers Americans to thrive in our modern economy.

Protecting Our Veterans. The Budget fulfills our promise and obligation to care for our veterans and their families—men and women who answered our Nation's call for help and sacrificed so much to defend us. Our veterans have earned nothing less than the absolute best care and benefits after their service has ended, and the Budget provides the funding necessary to treat them with the honor and respect they deserve. It is our Nation's duty to ensure veterans have access to the medical treatment they need, when they need it—and that they have a choice when it comes to their care. The Budget also ensures that veterans receive training and support to re-enter the workforce and find well-paying jobs.

Combatting Opioid Addiction. More Americans died from drug overdoses in 2016 than those who lost their lives in the Vietnam War. Opioids caused the overwhelming majority of these deaths, which is why my Administration has declared a nationwide Public Health Emergency with respect to opioids. The Budget reflects a solemn and unshakable commitment to liberate communities from the scourge of opioids and drug addiction.

Fighting High Medical Drug Prices. Many patients face illness that could be cured or managed with the right medical drugs. But the prices for the drugs they need are often exorbitant. Unnecessarily high drug prices force many patients to choose between going without the medicines they need or making tremendous financial sacrifices. In addition, taxpayers all too often are left to pay inflated prices for drugs for patients who obtain them through Government programs. The Budget proposes new strategies to address high drug prices and increase access to drugs by addressing perverse payment incentives and exposing drug companies to more aggressive competition, all while continuing to promote innovation and extend American dominance in the pharmaceutical field.

Moving from Welfare to Work. Millions of our fellow Americans have been robbed of the dignity and independence that comes through the opportunity to work. Despite significant economic

improvements and a strong recovery in the job market, enrollment in welfare programs remains stubbornly high in many places around the Nation. Millions of Americans are in a tragic state of dependency on a welfare system that does not reward work, and in many cases, pays people not to work. These programs, expanded during the previous administration, must now be reformed. While moving able-bodied Americans back into the workforce, welfare reform must also protect public resources for the truly needy, especially the low-income elderly, children, and Americans with disabilities. The Budget includes sensible reforms to problems in our current welfare system, and aims to end debilitating dependency while ensuring that our safety net is reserved for those Americans who truly need help.

More Pathways to Affordable Education and Well-Paying Jobs. The Budget takes important steps to expand opportunities for Americans to access affordable, employment-relevant education that puts them on the path to a well-paying job and, ultimately, a fulfilling career. The Budget promotes formal apprenticeships, an evidence-based system that allows individuals to "earn-while they learn." The Budget also makes important investments in science, technology, engineering, and mathematics (STEM) education in K-12 schools, and supports career and technical education in high schools and postsecondary institutions.

Promoting School Choice. So many of America's poorest children—especially African-American and Hispanic children—attend failing public schools that afford them little hope of fulfilling their great potential. That is why families should be free to choose the public, private, charter, magnet, religious, or home school option that is right for them. The Budget empowers parents, especially of our disadvantaged youth, to choose the very best school for their children.

* * * * *

The Budget reflects our commitment to the safety, prosperity, and security of the American people. The more room our economy has to grow, and the more American companies are freed from constricting over-regulation, the stronger and safer we become as a Nation.

It is now up to the Congress to act. I pledge my full cooperation in unleashing the incredible and unparalleled potential of the American people. There is no limit to the promise of America when we keep our commitments to our fellow Americans and continue to put their interests first. Working together, we will do just that.

DONALD J. TRUMP

THE WHITE HOUSE,
FEBRUARY 2018

AN AMERICAN BUDGET

The President has placed America on a new course, one that promises an era of a prouder, stronger, and more prosperous Nation. This new course has unleashed liberty and opportunity. It also makes the tough choices to produce a more efficient, effective, and accountable Government.

The engines of America are indeed running again. In his inaugural address, the President envisioned a Nation where "prosperity and strength" would return again. He laid out, in his first words as President, a simple but familiar American strategy: "winning again, winning like never before." Most importantly, the President insisted on a simple, but forgotten principle—America First.

The President's first Budget was built on the principle that Government is a steward of taxpayer dollars, not an owner. That means fiscal responsibility and prioritizing the most effective programs.

To date, the Administration's focus on the economic health of the Nation has resulted in the elimination of 22 costly regulations for every new one created. This represents an important first step in cutting red tape, and getting the Federal Government out of the way of the private enterprise system that has made America the greatest force for prosperity in the world.

Under the leadership of the President, the first major re-write of the tax code in more than three decades has been delivered to the American people. The new tax code is designed to restore a healthy American economy—by putting American taxpayers before the Government.

Tax cuts and deregulation will allow us to unleash the American economy. However, economic growth must be met with spending restraint to ensure long-term fiscal health. The Budget takes a critical step toward balance, and bringing greater security for America's fiscal future.

Washington has a spending problem. Debt and deficits are not only a problem in and of themselves, but they are also the symptoms of something much larger—little appetite in the Congress to restrain spending.

The Budget creates a steady vision inspired by the hardworking spirit of the Nation that will lead us toward prudent spending choices that will promote a safer, more prosperous, and secure America. Economic growth coupled with fiscal restraint is not just the end goal, it is the means by which a vision for a New America can be realized. The pillars of this vision, and thus the Budget, are:

- the safety and security of the American people;
- a stronger, healthier American economy;
- an enhanced quality of life for hardworking Americans; and
- a commitment to a better future.

The safety and security of the American people is the foundation on which the Administration built the Budget. First and foremost, the Federal Government must protect its citizens. This is not just a priority, it is a promise. The Budget makes significant investments in border security, specifically in the Southwest border wall and robust immigration enforcement.

It is imperative to keep those who seek to harm us out of the United States, and the Budget ensures that America can quickly and decisively respond to any threat to U.S. safety, security, and sovereignty.

Furthermore, the Budget rebuilds the military with significant investments dedicated to enhancing the capacity and lethality of America's Armed Forces, missile defense, troop readiness, counterterrorism, and counter proliferation. The Budget strengthens America's capabilities, including nuclear, in space, and cyberspace.

A stronger, healthier American economy promotes opportunity and benefits American families, workers, and companies. When major tax relief and reform are coupled with the elimination of excessive and unnecessary regulations, consumer and business confidence increases and economic prospects rise. The Budget supports important activities aimed at reducing the maze of Federal regulations that often serve as an obstacle to Americans seeking to grow their businesses. When taxpayers are allowed to keep their own money, it not only promotes economic growth, it also rewards the dignity of work. To further support this, the Budget also makes strategic investments in Federal programs that support American workers. For example, the Budget bolsters the workforce by investing in apprenticeships which are a proven strategy for preparing workers to fill high-growth jobs.

An enhanced quality of life for hardworking Americans reassures both those who have worked throughout their lifetime and those who are still working now that prosperity is possible. The Budget protects programs that retirees rely upon by negotiating better deals and leveraging the U.S. Government's buying power. The Budget also avoids more intrusive, crushing Government growth that would result in further crippling debt leaving less for seniors and future generations.

A commitment to a better future is what the Budget provides for all Americans. When this President was elected, bloated budgets and stagnant economic growth painted a grim picture of a bleak future. If the Federal deficit continued to rise without restraint, the future would indeed be desolate and prompt future calls for tax increases. The Budget shines a light through that darkness. The Budget is a plan that secures generations of Americans through efficient, effective, and accountable Government.

MODERNIZING GOVERNMENT FOR THE 21ST CENTURY

WHERE WE ARE: FEDERAL CONTEXT

When America's Founders established the Constitution, they laid out a clear mission for the Federal Government, from providing for the common defense to securing the blessings of liberty. To this day, the business of Government remains to serve the American people by meeting their expectations in these foundational mission areas.

Nearly two decades into the 21st Century, the public still believes that the Federal Government serves critical roles and, in some areas, does them well.[1] Yet public trust in the Federal Government continues to decline, sitting at near-historic lows.[2] The Nation faces a significant national debt and annual deficits that require Government to change how it operates.

HOW WE GOT HERE: ROOT CAUSE CHALLENGES AND EFFECTS

Many of the Federal Government's challenges and shortcomings arise from practices designed in the past and trends that can no longer be sustained. Major root cause challenges facing the Federal Government include:

Accumulated Regulatory Burden. Over many decades, Federal agencies have imposed countless regulatory requirements on individuals, businesses, landowners, and State and local governments. Some of these regulations serve important public purposes. Many regulations, however, are outdated, duplicative, or unnecessary, yet continue to impose costly burdens. Careful reconsideration of the regulatory burden is necessary to promote economic growth and individual freedom.

Structural Issues. Silos across Federal agencies and offices can stymie collaboration, resulting in fragmented services and piecemeal efforts. Greater coordination is needed among and within agencies and also with the Congress to improve management of the Federal Government and to remove outdated regulations and other obstacles to change.

Decision-Making and Processes. The public lacks sufficient opportunities to give feedback on Federal programs and services, making it harder to identify weaknesses and make improvements. Smarter use of data and evidence is needed to orient decisions and accountability around service and results.

Leadership and Culture. Achieving beneficial outcomes that serve the public should be the Federal Government's primary focus. Yet service delivery sometimes suffers due to checking unnecessary bureaucratic boxes. Managers need greater discretion to execute programs effectively, foster the highest-performing workforce, and solve real-time problems.

Capabilities and Competencies. Antiquated, unsecure technology risks can leave the public frustrated and vulnerable. Too many Federal employees perform outdated duties that rely on outdated skillsets, and Government too often struggles to award effective, timely contracts. A more nimble and effective approach is needed to keep technologies and workforce skills current and to ensure that the Federal workforce can meet future needs.

[1] Pew Research Center, December 2017, "Government Gets Lower Ratings for Handling Health Care, Environment, Disaster Response."

[2] Pew Research Center, May 2017, "Public Trust in Government Remains Near Historic Lows as Partisan Attitudes Shift."

WHERE WE ARE HEADED: A MULTI-GENERATIONAL VISION FOR REFORM

The vision for reform must be multi-generational, enabling the Federal Government to continue adapting to changing needs over time. The Administration cannot pursue short-term fixes only to see Government quickly become outdated once again. Deep-seated transformation takes time and will not happen in one or two years.

In March, the Administration will announce the President's Management Agenda, which will set forth a long-term vision for an effective Government that works on behalf of the American people and is focused on the following:

Mission: The American people count on the Federal Government every day, from national security to infrastructure to food and water safety. Public servants must be accountable for mission-driven results and have the necessary tools to deliver.

Service: Federal customers range from small businesses seeking loans, to families receiving disaster support, to veterans owed proper benefits and medical care. They deserve a customer experience that compares to—or exceeds—that of leading private organizations.

Stewardship: Effective stewardship of taxpayer funds is a crucial responsibility, from preventing fraud to maximizing impact. Taxpayer dollars must go to effective programs that efficiently produce results. The Budget conservatively projects that $139 billion in savings can be achieved over the next decade through the prevention of improper payments alone.

HOW WE WILL GET THERE: KEY DRIVERS OF REFORM

The Federal Government's challenges have not arisen in isolation, and cannot be solved through isolated efforts. The Administration will drive Government modernization by working at the junctions where these drivers intersect, rather than working in silos. Over time, it will target broad impacts on underlying issues, including legislative changes.

While challenges are complex, a few key drivers will determine the Administration's success at reform. Modernizing and strengthening these drivers will bolster results throughout Federal agencies and mission areas.

Modern information technology will function as the backbone of how Government serves the public in ways that meet their expectations and keep sensitive data and systems secure.

Data, accountability, and transparency will provide the tools to deliver visibly better results to the public and hold agencies accountable to taxpayers.

A modern workforce will enable senior leaders and front line managers to align staff skills with evolving mission needs. This will require more nimble and agile management of the workforce, including reskilling and redeploying existing workers to keep pace with an environment of change.

FROM VISION TO ACTION: COMMITMENTS

The Administration will make aggressive down payments on this vision, paving the way for sustained improvement over time that is efficient, effective, and accountable. The Administration will carry out this important work through multiple channels that, together, will yield tangible

improvements for the Nation, its people, and the economy.

The President's Management Agenda. In March, the Administration will announce specific efforts to advance the vision and improve the three drivers of reform. The Administration will name senior accountable officials and establish concrete goals and trackable metrics to ensure public accountability. This agenda will address critical challenges where Government as a whole still operates in the past. Specific goal areas will include:

- **Modernizing Information Technology (IT) to Increase Productivity and Security.** Although the Federal Government spends roughly $90 billion annually on IT, these systems remain outdated and poorly protected. The Administration will increase the use of modern technologies, retire highly insecure and outdated systems, and direct modernization cost savings to mission-driven outcomes. The Administration will improve its ability to identify and combat cybersecurity risks to agencies' data, systems, and networks.

- **Creating a 21st Century Framework for Data that Drives Efficiency, Accountability, and Transparency.** The Federal Government needs a robust, integrated approach to using data to deliver on mission, serve customers, and steward resources. The Administration will better manage and leverage data as an asset to better grow the economy, increase the effectiveness of Government, facilitate oversight, and promote transparency.

- **Developing a Workforce for the 21st Century.** Outdated rules and technology have often left the Federal Government struggling to attract the best talent, to hire quickly, or to hold workers and leaders accountable. The Administration will modernize processes and practices to bring out the best in employees and enable the Federal workforce to more effectively deliver mission results.

- **Improving the Customer Experience with Federal Services.** The American people expect high-quality customer service from Federal programs. The Administration will ensure that Government no longer lags behind the private sector in customer experience.[3]

- **Shifting from Low-Value to High-Value Work.** Hundreds of burdensome rules and requirements built up over decades force Federal agencies to devote their resources toward meaningless compliance. These resources can be better spent serving citizen needs. The Administration will clear out low-value, unnecessary, and obsolete policies and requirements to shift resources toward high-value work. The Administration has already begun this process by eliminating outdated plans and reports that burden Federal employees with unnecessary hours of paperwork. With the Budget, Federal agencies are also proposing that the Congress eliminate or modify approximately 400 plans and reports because they are outdated or duplicative (a list of these proposals is available on *www.performance.gov*).

- **Improving the Efficiency and Effectiveness of Administrative Services across Government.** Agency missions are imperiled and taxpayer dollars are squandered when administrative functions across agencies—such as IT, human resources, and contracting—are inefficient or fail to take advantage of economies of scale. Half of Federal agencies report low satisfaction with such administrative functions. The Administration will improve the quality and efficiency of administrative services, freeing resources to improve outcomes and accountability for the American people.

To drive these long-term Presidential priorities, the Administration will leverage cross-agency priority (CAP) goals to coordinate and

[3] American Customer Satisfaction Index. *National, Sector, and Industry Results*. December 2017.

publicly track implementation across agencies. CAP goals will also strengthen Federal Government management in other priority areas, such as improving management of major acquisitions, reducing improper payments, increasing transparency of IT costs, enhancing accountability for grant spending, and improving purchasing across Government as an enterprise. CAP goal teams will lead the execution of related Administration priorities, such as implementing the recommendations of the *Report to the President on Federal IT Modernization* focused on Network Modernization, Cybersecurity, and Shared Services. The Administration will establish Centers of Excellence inside the General Services Administration to focus on critical priorities such as cloud migration, data center consolidation, and modernizing call centers to better serve citizens. The Administration will work to strengthen fundamental capabilities, such as the ability to manage data comprehensively and to use data routinely to improve operations, which are the backbone of how business is accomplished in the modern era. In addition to cross-agency efforts, each major Federal agency is publishing an updated strategic plan with the Budget, establishing strategic objectives for the Administration's first term and committing to agency priority goals for the next two years. A full list of agency performance plans is available at *www.performance.gov*.

Reorganization and Reform. Last March, the President sent out a call for change in Executive Order 13781, "Comprehensive Plan for Reorganizing the Executive Branch," where he tasked the Office of Management and Budget (OMB) Director with providing a plan to reorganize the Executive Branch. The Budget is a first step in presenting this plan to the American people. This plan includes changes that can be accomplished with existing authorities as well as others that would require new funding and authorities. These changes also include reforms identified by individual Federal employees, who answered the Administration's request for their best ideas to improve public services or better use taxpayer dollars.

These reforms include, for example: eliminating unnecessary political positions; using shared services to improve IT services and reduce costs through economies of scale; realigning offices and personnel; and revamping regional offices. For instance, in order to improve customer service, the Department of the Interior has already begun to shift employees away from Washington, District of Columbia, closer to the citizens the Agency serves. The Department of Energy is also planning to review its existing laboratory network and identify potential efficiencies.

As part of this plan, the Administration is also planning to review how it can restructure functions across Federal agencies. For instance, it is planning a review of how it can streamline Federal statistical functions across multiple Federal agencies. The Administration is also reviewing Federal development finance activities—currently spread across the Overseas Private Investment Corporation and multiple offices at the United States Agency for International Development and other Federal agencies—to identify ways to reduce duplication and better achieve national security and international development outcomes while supporting U.S. business and jobs. The Budget proposes to consolidate these functions into a new Development Finance Institution, including reforms that protect taxpayer dollars.

In the months ahead, the Administration plans to unveil additional reorganization proposals designed to refocus programs around current and future needs.

Getting Government Out of the Way. Within 10 days of taking office, the President issued Executive Order 13771, "Reducing Regulation and Controlling Regulatory Costs," which directs agencies to reduce regulatory burdens by eliminating two existing regulations for each new one issued and impose no net regulatory burden in 2017.

The Administration recognizes that excessive and unnecessary Federal regulations limit individual freedom and suppress the innovation

and entrepreneurship that make America great. Starting with confidence in private markets and individual choices, this Administration is reassessing existing regulatory burdens. Agencies have identified regulatory actions ripe for reform and are working to eliminate or modify those requirements. The Administration also approaches the imposition of new regulatory requirements with caution to ensure that regulations are consistent with law, necessary to correct a substantial market failure, and net beneficial to the public.

The Administration's regulatory philosophy and approach emphasize the connection between limited Government intervention and individual liberty. Regulatory policy should serve the American people by staying within legal limits and administering the law with respect for due process and fair notice.

In December 2017, OMB released its *Regulatory Reform Status Report: Two-for-One and Regulatory Cost Maps*, which assessed agency performance under Executive Order 13771 during 2017. At the same time, OMB released the *Unified Agenda of Regulatory and Deregulatory Actions and the Regulatory Plan*, which set forth the Administration's roadmap for a more limited, effective, and accountable regulatory policy in 2018 and beyond.

- **Regulatory Reform in 2017.** In just its first eight months, the Administration eliminated 67 regulations and adopted only three significant new regulations. This 22-to-one ratio far exceeds the President's "two-for-one" requirement. It also generated $8.1 billion in net regulatory cost savings (present value), far surpassing the President's requirement to hold net costs to zero. The Administration took further action to withdraw or delay more than 1,500 regulations in the pipeline, and has been transparent about these planned regulatory actions. This pace and scope of deregulation is unprecedented.

- **Regulatory Reform in 2018 and Beyond.** The Administration's *Unified Agenda* currently projects the elimination of approximately 448 regulations and the addition of only 131 new regulations. In 2018, Federal agencies are committed to cutting more than $9.8 billion in lifetime regulatory costs. Across the Government, this Agenda will drive substantial reductions in regulatory costs beyond what has already been accomplished. For additional information, please visit *www.reginfo.gov*.

At its core, regulatory reform not only promotes individual liberty and a flourishing economy, but also supports America's constitutional democracy. OMB's regulatory review process ensures that agencies stay within the legal authority given by the Congress. Where the law leaves discretion, however, the Administration will work with agencies to ensure that regulatory policy reflects Presidential priorities. This executive direction grounds the rulemaking process in democratic accountability.

By starting from a foundation of confidence in markets, individual choice, and the hard-working men and women of America, the Administration has already achieved—and will continue to achieve—dramatic reductions in the regulatory burden on the American economy and individual freedom. The agenda for the coming year promises a regulatory policy that works for the American people.

A Clear Roadmap Ahead. The Federal Government cannot be fully equipped to meet modern management challenges without support from the Congress. In some cases, real change will demand different agency structures. In other cases, the Administration may need to update rigid requirements from the past that hold back Government.

Government must recognize that it can no longer meet modern needs with the same approaches, technology, and skillsets from centuries past. By acknowledging shortcomings, setting a modern vision, and delivering on concrete goals, the Administration can adapt Federal programs, capabilities, and the Federal workforce to more efficiently, effectively and accountably meet mission demands and public expectations.

A NEW FEDERAL BUDGET THAT WORKS FOR THE AMERICAN PEOPLE

The President's first Budget laid the foundation for an era of American greatness. The Budget enshrined fiscal responsibility and fiscal restraint while prioritizing spending to programs Americans need most. The Budget rights the wrongs of previous administrations by reprioritizing spending to protect the American citizen and the homeland, bringing dignity back to the American worker, and strengthening national defense. By building on policies laid out in the President's first Budget, the 2019 Budget provides the gateway to America's future.

KEEPING AMERICA SECURE

As described in the National Security Strategy, the Government's fundamental responsibility is to protect the American people, the homeland, and American way of life. The National Security Strategy recognizes that an America that is strong and prosperous at home is an America capable of defending its interests and advancing its influence abroad. By leading abroad in concert with allies and partners, the United States can help create a world that is aligned with America's interests and values. Such a world makes us more secure and prosperous here at home. While America possesses enduring national strengths, the Nation now faces an era of increased strategic competition, global disorder, and erosion of the U.S. comparative military advantage. To effectively compete, deter, and win in this challenging new era, the United States must continue to invest in and adapt U.S. national security programs.

The Budget invests in protecting America and the homeland, including through a layered missile defense system to defend the homeland against missile attacks. The Budget also requests funds to pursue threats to their sources, so that jihadist terrorists and transnational criminals are stopped before they ever reach the Nation's borders. The Budget supports: efforts by the Department of State, Department of Energy, and Department of Defense (DOD) to strengthen international partnerships to stop the proliferation of the materials, technologies, weapons, and delivery systems necessary to build and deploy weapons of mass destruction; DOD capabilities to disrupt efforts to produce weapons of mass destruction; efforts by the Departments of State of the Treasury to hold accountable those that engage in proliferation activities or support these illicit programs; Department of Homeland Security (DHS) initiatives to identify weapons of mass destruction and their components before they reach the U.S. homeland or can be used on U.S. soil; and Federal Bureau of Investigation and DOD capabilities to thwart terrorists that attempt to use weapons of mass destruction.

The Budget advances the goal of preserving peace through strength by rebuilding the U.S. military so that it remains preeminent, deters adversaries, and if necessary, is able to fight and win. By investing in the capacity, capabilities, and modernization of America's Armed Forces, the Budget would continue to strengthen America's full spectrum of military capabilities and associated personnel—including in space and cyberspace.

To maintain the advantages America's Armed Forces enjoy and build upon its strengths, the Budget requests $716 billion for national defense. These investments fund a military that protects America's vital national interests in an increasingly competitive world. However, America and its allies cannot be defended if the Nation is not both strong and solvent. Recognizing the importance of solvency, the Budget proposes to pay for increases for the military with $65 billion in reductions from the non-Defense discretionary caps in 2019 under current law. DOD will also pursue an aggressive reform agenda to achieve savings that it will reinvest in higher priority needs.

The U.S. military cannot expect success fighting tomorrow's conflicts with yesterday's weapons or equipment. Rather, it will shift to a more lethal, resilient, and agile force able to take on and prevail against any foe, even in the face of aggressive military modernization campaigns on the part of potential adversaries.

To that end, the Budget makes significant investments in the capability of the joint force, and especially in its lethality, resilience, and agility to better deter and, if necessary, fight and prevail against any opponent. In particular, the Budget focuses on improving the joint force's capability to take on potential great power adversaries. At the same time, the Budget invests to recover full-spectrum readiness while acquiring new and improved capabilities, enabling the United States to meet security challenges now and into the future. The Budget ensures U.S. forces are ready to fight by providing critical funding for training, munitions, logistics, and maintenance while also enabling America's forces to recover readiness against high-end adversaries. The Budget also requests funds to selectively increase the size of the Army, Air Force, Navy, and Marine Corps and requests funds for the modernization of equipment, including armored vehicles, artillery, new warships, stealthy fighter aircraft, and the next generation of bombers. These investments would strengthen deterrence by ensuring the military is ready to confront even the most capable adversaries. Deterring adversaries from choosing a military option would support a peaceful and open international order that underpins the prosperity of the United States and its allies.

Although the U.S. military will remain second to none, adversaries and competitors are increasingly challenging the United States across the political, economic, and military arenas. To that end, the Budget supports the missions of the Department of State, U.S. Agency for International Development, and other international programs to help America compete against hostile actors and ideologies and advance American interests. The Budget builds upon key reforms begun in last year's Budget to prioritize civilian activities that support more resilient, democratic, and prosperous societies, leading to a more secure and peaceful world. The Budget prioritizes efforts to ensure that the burden of responding to global crises is borne globally, rather than disproportionately by the people and economy of the United States. By focusing on programs and policies that catalyze other countries' economic and political development, America can help aspiring partners become economic and security partners, shield them from competitors, and promote a stable world reflecting these principles.

In recognition of the dedication and sacrifice of the men and women who have served in the Armed Forces, and those who continue to serve today, the Budget also reflects a renewed commitment to honor the service of veterans. The Budget supports veterans spanning multiple generations including during periods of conflict and peace. Specifically, the Budget would build upon the Veteran's Choice program to improve healthcare and implement a modernized appeals system to provide veterans with better medical options. The Budget would also provide enhanced access to education benefits through the Forever GI Bill signed into law by the President in August 2017. In addition, the Budget funds long-term efforts to improve infrastructure and modernize the Department of Veterans Affairs (VA) to ensure it is positioned to support future generations of veterans.

HELPING AMERICANS MOVE FROM WELFARE TO WORK

More than 20 years have passed since the Congress implemented significant reforms to America's safety net. In 1996, the Congress passed the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), and transformed the way Government provided support to low-income families. Recognizing the value of State innovation, and promoting work as the best pathway out of poverty, PRWORA ushered in an era where success was no longer measured by how many people received welfare assistance but instead by how well Government helped families progress toward self-sufficiency. Building off of this framework, the Budget empowers States to develop innovative strategies to help welfare recipients achieve economic independence through work, while preserving the basic safety net necessary to help those most in need.

Promoting the Value of Work

Work is a fundamental element in moving welfare recipients toward self-sufficiency and economic security. This plan proposes to reinforce one of the original principles of welfare reform—able-bodied people should be required to work or prepare for work in order to receive Government assistance. The Budget, therefore, requires States to ensure that work-capable individuals are on a pathway to work. In addition, an abrupt end to welfare assistance is often an impediment to sustained employment, creating churn on the welfare rolls. To further increase employment outcomes, the Budget also encourages States to provide the support necessary to ease this transition.

Improving Food Assistance

The Budget proposes a bold new approach to administering the Supplemental Nutrition Assistance Program (SNAP) that combines traditional SNAP benefits with 100-percent American grown foods provided directly to households and focuses administrative reforms on outcome-based employment strategies. The Budget expands on previous SNAP proposals to strengthen expectations for work among able-bodied adults, preserves benefits for those most in need, promotes efficiency in State operations, and improves program integrity. Combined, these reforms would maintain the commitment to ensure Americans in need of assistance have access to a nutritious diet while significantly reducing the cost to taxpayers.

Encouraging State Innovation

Today, there are still more than 80 single-purpose welfare programs that comprise a Federal safety net intended to help those living in poverty. This complex and bureaucratic system has proven to be ineffective. The Budget proposes to streamline, simplify, and improve the efficiency of the welfare system by proposing a new approach to assisting low-income Americans rise to their potential.

The Administration recognizes that States and local communities best understand the conditions and circumstances of their economically vulnerable citizens. Therefore, the Budget offers States the opportunity to propose Welfare to Work Projects that streamline funding from multiple welfare programs, and provide services that are tailored to their constituents' specific needs, helping them progress from welfare to work. Reducing burdens and inefficiencies in overlapping—or at times competing—program requirements would remove barriers to employment and self-sufficiency for families dependent on welfare programs.

This new opportunity would be accompanied by a strong accountability framework. Specifically, plans to combine safety net programs would be subject to rigorous, random-assignment evaluations, measuring achievement in targeted outcomes that focus on fostering employment, reducing welfare dependency, and promoting child and family well-being. These projects would serve to build the evidence base of best practices to help low-income individuals and families achieve self-sufficiency, and would inform the design of more comprehensive welfare reform efforts in the future.

Altogether, the Budget offers a bold new vision for America's safety net, and reinforces this Administration's commitment to helping all Americans achieve their full potential.

PROTECTING AMERICANS WHILE ENHANCING LEGAL IMMIGRATION

Since taking office, the President has made clear that he would restore order and integrity to the U.S. immigration system. There are three primary efforts underlying this goal: strengthening border security; ensuring enforcement of immigration laws; and reforming the legal immigration system, while recognizing that legal immigration is an important driver of a thriving economy. The Budget requests more than $28.2 billion for the agencies that have primary responsibility for carrying out immigration programs at DHS and the Department of Justice (DOJ). This includes funding for U.S. Customs and Border Protection (CBP), U.S. Immigration and Customs Enforcement (ICE), and U.S. Citizenship and Immigration Services within DHS, and the Executive Office for Immigration Review (EOIR) within DOJ.

Within the Administration's proposal for $18 billion to fund the border wall, the Budget invests $1.6 billion to support CBP efforts to gain operational control of the Southwest border. Until the porous borders are closed to the criminals, terrorists, and gang members that exploit it, America remains at risk. Furthermore, since most of the illegal drugs that enter the United States come through the Southwest border, a border wall is critical to combating the scourge of drug addiction that leads to thousands of unnecessary deaths. The border wall would stop smugglers in their tracks and help make America safe.

The Budget also requests $211 million for 750 additional Border Patrol agents in 2019, continuing the President's commitment to increase the ranks of the Border Patrol by 5,000 new agents. Funding would be used to recruit, hire, and train new agents, and for staff to support the men and women on the front line of America's border defenses. These new personnel would supplement investments in the border wall by guarding the border and apprehending and swiftly removing illegal aliens at the border.

The Budget furthers investment in CBP technology and targeting systems such as the National Targeting Center (NTC) and the Biometric Entry-Exit System. The Budget requests a total of $253 million for NTC, an increase of $79 million, for its overall mission, including the background vetting of individuals seeking to enter the United States before they arrive. These programs would enable the Government to better identify terrorists and other criminals and prevent their entry into the United States. Completion of the long-required Biometric Entry-Exit System would increase law enforcement's ability to identify and remove those who overstay their visas. Future investments in enhanced vetting and targeting programs would further the Administration's goal of shifting such costs to visa and immigration applicants while continuing to facilitate legitimate travel to the United States.

The Budget makes major investments in immigration law enforcement in the interior of the Nation, focusing on efforts to identify, arrest, prosecute, and remove illegal aliens. Within ICE, the Budget proposes $571 million to hire and support 2,000 new officers and agents, which directly supports the President's order for ICE to arrest all illegal aliens it encounters. Since the President's inauguration, ICE arrests have increased by 42 percent and the Agency has increased requests to local law enforcement to transfer custody of illegal aliens to ICE by 81 percent during the same time period in the previous fiscal year.

As ICE increases its arrests and deportations of illegal aliens, it also requires additional detention and removal capacity. The Budget requests more than $2.5 billion for these critical law enforcement functions, funding an average daily detention capacity of 47,000 illegal aliens in facilities across the United States. To ensure immigration cases are heard expeditiously, the Budget also requests an increase of $40 million for 75 new immigration judge teams at EOIR and nearly $40 million for 338 new prosecuting attorneys at ICE. These investments are critical to the prompt resolution of newly-brought immigration charges and to reduce the 650,000 backlog of cases currently pending in the immigration courts.

The Budget requests $208 million in new funding for 300 additional ICE Special Agents, support staff, and other activities for the Agency's Homeland Security Investigations' (HSI) mission. HSI staff lead efforts to ensure only those with legal permission to work in the United States are employed here, investigate and disrupt transnational criminal organizations (TCOs) that perpetuate human smuggling and trafficking, and stop immigration fraud, which directly facilitates illegal immigration. Because these investigations protect the integrity of the legal immigration system, the Budget proposes collecting the $208 million for these purposes from the immigration applicants who want to come to the United States and benefit from the Nation's opportunities.

The integrity of the immigration system relies upon everyone in the United States doing their part to follow the law. The Budget invests $23 million to expand the E-Verify Program for mandatory nationwide use, ensuring that businesses employ only those authorized to work in the United States. Further, the Budget proposes to amend the Illegal Immigration Reform and Immigrant Responsibility Act to condition DHS and DOJ grants and cooperative agreements on States and local governments agreeing to cooperate with immigration enforcement activities. This proposal takes important steps to mitigate the risk that sanctuary cities pose to public safety and ensures appropriate alignment between State and Federal immigration enforcement.

The Budget supports efforts to reform the legal immigration system by ending family chain migration and the diversity visa lottery and replacing them with a merit-based regime that selects immigrants based on their skills, likelihood to assimilate, and ability to contribute to the economy. This is similar to the approach used by Canada and Australia and would reduce overall immigration while limiting low-skilled and unskilled labor entering the United States. The Budget requests the resources needed to adjudicate immigration and visa applications and identify and counter fraud in the immigration process, ensuring that businesses and individuals petitioning for foreign workers and relatives do so in a manner consistent with the Nation's immigration laws, while ensuring that the American economy continues to access the labor force critically needed for growth.

REBUILDING AMERICA THROUGH THE INFRASTRUCTURE INITIATIVE

America's infrastructure is a key component to its historic success. With the world's most efficient rail and interstate highway systems, America was a fierce global competitor. Local roads and water systems provided a clean and safe environment for communities and families.

In recent decades, however, we have chronically under-invested in public infrastructure, leading to the frustration of long commutes and the loss of life when a lack of maintenance creates safety hazards. The challenge of restoring this infrastructure is complicated by the fact that virtually all public infrastructure is owned by State and local governments, not the Federal Government. Interstate highways, drinking and waste water systems, commuter railroads, airports, power lines, telecommunications, and ports are all non-Federal. While the Federal Government has co-invested in State and local infrastructure, using Federal dollars to pay for non-Federal infrastructure projects has created an unhealthy dynamic in which State and local governments delay projects in the hope of receiving Federal funds.

The Administration's infrastructure initiative would address the imbalances between infrastructure investment, ownership, and responsibility and generate $1 trillion in total infrastructure investment through a combination of direct Federal funding and incentivized non-Federal funding. The Budget requests $200 billion dedicated to this effort, as follows:

- **Incentive Grants**—$100 billion is requested to encourage increased State, local, and private infrastructure investment

by awarding incentives to project sponsors for demonstrating innovative approaches that would generate new revenue streams, prioritize maintenance, modernize procurement practices, and generate a social and economic return on investment. Incentives would be provided in the form of competitive grants.

- **Rural Formula Funds**—$50 billion is requested for this program, which would address the significant need for investment in rural infrastructure, including broadband internet service. Federal funding would be made available to States via formula distribution, along with a bonus competition based on State performance in achieving goals outlined in State-developed rural infrastructure plans. Within this amount, funding is set aside for federally recognized Tribes and U.S. Territories.

- **Transformative Projects**—$20 billion is requested to support bold, innovative, and transformative infrastructure projects that can significantly improve existing infrastructure conditions and services. Funding would be awarded on a competitive basis for commercially viable projects that are capable of generating revenue, provide net public benefits, and would have a significant positive impact on the Nation, a region, State, or metropolitan area.

- **Existing Credit Programs**—$14 billion is requested in additional subsidy funding for the key Federal credit programs providing financing to infrastructure projects. This funding would significantly increase Federal credit assistance to infrastructure via the Department of Transportation's Transportation Infrastructure Finance and Innovation Act (TIFIA) and Railroad Rehabilitation and Improvement Financing programs, the Environmental Protection Agency's Water Infrastructure Finance and Innovation Act program, and the Department of Agriculture's Rural Utilities Service program. For example, historically the TIFIA program has leveraged about $40 in transportation infrastructure improvement for each $1 of TIFIA assistance provided. The initiative would also expand eligibility for these credit programs to include other governmental infrastructure such as airports and ports.

- **Federal Capital Revolving Fund**—$10 billion is requested to establish a mandatory revolving fund to finance purchases, construction, or renovation of federally owned civilian real property. The Federal Government is currently utilizing inefficient leases to access necessary property. Leases are being used due to the unavailability of the large upfront capital needed to acquire real property projects. Upon approval in annual appropriations acts, the revolving fund would transfer money to agencies to finance large-dollar real property projects. Purchasing agencies would then be required to repay the Fund using discretionary appropriations.

- **Private Activity Bonds (PABs)**—the initiative would expand flexibility and broaden eligibility for PABs, which play an important part in delivering many large, regionally- and nationally-significant projects. PABs provided for this broadened definition of "core public infrastructure projects" would not be subject to volume caps, but would require the projects to be available to the public and either Government-owned or privately-owned but subject to Government regulatory or contractual control and approval. The Budget requests $6 billion related to this expansion.

- **Real Property Reforms**—the Budget supports several proposals to streamline and improve the Federal real property disposal processes, Government-wide, including the retention of sales proceeds.

These proposals would increase the opportunities to sell off real property no longer needed by the Federal Government, thereby generating revenue to improve other mission critical Federal facilities. Disposal of unneeded Federal facilities would also allow the disposed buildings to be returned to private use, potentially spurring local economic development. The Budget also supports flexibilities for VA to leverage existing assets to continue its efforts to reduce the number of vacant buildings in its inventory, leverage VA assets for the construction of needed new facilities to serve veterans, and align the VA lease prospectus threshold with the General Services Administration threshold.

- **Reduce Deferred Maintenance on Public Lands**—the Budget also proposes a new Public Lands Infrastructure Fund for the Department of the Interior to support infrastructure investments in national parks, refuges, and Bureau of Indian Education schools. The Fund would be supported by half of the incremental receipts from expanded energy development that exceed previous projections and are not allocated for other purposes.

- **Streamline Permits**—in addition, the infrastructure initiative includes several proposals to streamline permitting decisions to accelerate project delivery while maintaining environmental safeguards. For example, the initiative proposes creating a new "One Federal Decision" structure that includes firm deadlines for completing environmental reviews, eliminating redundant agency reviews, delegating responsibilities to States where appropriate, and pilot programs to experiment with innovative approaches to environmental reviews.

COMBATTING THE DRUG ABUSE AND OPIOID OVERDOSE EPIDEMIC

The drug abuse and overdose epidemic, particularly related to opioids, is tearing apart America's families and devastating communities. Last year, more people died from drug overdoses than traffic accidents. The two million people who are addicted to opioids, a class of drugs that includes both legal and illicit drugs such as certain prescription painkillers, heroin, and synthetic opioids such as fentanyl, are especially at risk. In 2016, approximately 64,000 people died from drug overdoses, 174 lives per day.

In 2017, the President said: "I made a promise to the American people to take action to keep drugs from pouring into our country and to help those who have been so badly affected by them." The Administration has taken a number of significant actions to address the crisis. The President created the Commission on Combating Drug Addiction and the Opioid Crisis and the Administration declared the opioid epidemic a nationwide public health emergency. The Administration provided nearly $500 million in new resources to States to prevent and treat opioid abuse and addiction in 2017, in addition to last year's Budget that requested another $500 million.

As the President noted: "Ending the epidemic will require mobilization of Government, local communities, and private organizations. It will require the resolve of our entire country." The Budget requests more than $30 billion in drug control funding in 2019, of which the Office of National Drug Control Policy estimates that more than $7 billion combats the opioid crisis, with efforts spanning prevention, treatment, interdiction, international operations, and law enforcement across 14 Executive Branch Departments, the Federal Judiciary, and the District of Columbia.

The Budget requests $5 billion in new resources for the Department of Health and Human Services (HHS) over the next five years, including $1 billion in 2019, to combat the opioid epidemic by preventing opioid abuse and helping those who are addicted get access to overdose reversal drugs, treatment, and recovery support

services. The Budget request includes: $50 million for a media campaign; $625 million for States to respond to the crisis; $50 million to improve first responder access to overdose-reversal drugs; $100 million for surveillance and opioid abuse prevention activities, including improving State-based Prescription Drug Monitoring Programs (PDMPs); $20 million for drug courts; $10 million for pregnant and post-partum women treatment programs; $10 million for the Food and Drug Administration's (FDA) regulatory science activities to develop tools to stem the misuse and abuse of opioids; $65 million to support multi-sector, county-level teams in high-risk rural communities to improve access to care, and expand treatment and recovery services; $45 million for supplemental grants for opioid abuse prevention, treatment, and recovery services in American Indian and Alaska Native communities; and $25 million to evaluate the impact of medication assisted treatment on reducing overdose deaths.

In addition to the requested $5 billion, the Budget also continues and expands existing activities in HHS that specifically address key strategies to combat the opioid crisis. The Budget requests $100 million for the National Institutes of Health to support a public-private partnership with the pharmaceutical industry to develop prevention and treatments for addiction, overdose-reversal, and non-addictive therapies for pain. The Budget requests $123 million in the Substance Abuse and Mental Health Services Administration for opioid abuse prevention, treatment, recovery support, and overdose reversal. The Budget also requests $126 million in the Centers for Disease Control and Prevention to support opioid abuse prevention and surveillance activities, including support to States to improve the capabilities and use of State-based PDMPs.

Further, the Administration supports more rigorous research to better understand how existing programs or policies might be contributing to or mitigating the opioid epidemic.

For Medicaid, the Budget calls for expanding coverage of comprehensive and evidence-based medication assisted treatment options, previews forthcoming guidance from the Centers for Medicare and Medicaid Services that would set minimum standards for State Drug Utilization Reviews to reduce clinical abuse, and requires States to track and act on prescribers that do not adopt best practices.

For Medicare, the Budget proposes to test and expand nationwide a bundled payment for community-based medication assisted treatment, including Medicare reimbursement for methadone treatment for the first time. The Budget also proposes to prevent prescription drug abuse in Medicare Part D and protect beneficiaries from potentially harmful drugs by requiring plan participation in a program to prevent prescription drug abuse. In addition, the Budget proposes to authorize the Secretary of HHS to work with the Drug Enforcement Administration (DEA) to revoke a provider's certificate (which allows a provider to prescribe controlled substances) when that provider is barred from billing Medicare based on a pattern of abusive prescribing. Cutting off Medicare funding for abusive prescription practices not only helps bring premiums down for seniors, it promotes sound public health policy.

The President also recognizes that combatting the opioid crisis means not only helping those suffering from drug addiction but also dismantling drug trafficking organizations profiting from this deadly scourge. The Budget requests $2.2 billion for the DEA, including an additional $41 million to enhance efforts to target the illicit drug traffickers that prey on communities. In addition, the Budget requests $103 million within DOJ for opioid-related State and local assistance including: $20 million for the Comprehensive Opioid Abuse Program to support a variety of activities such as treatment and recovery support services, diversion, and alternative to incarceration programs; $59 million for Drug Courts, Mental Health Courts, and Veterans Treatment Courts; $12 million for Residential Substance Abuse Treatment; and $12 million to support PDMPs, in tandem with HHS efforts.

The Budget also requests a range of investments that would strengthen efforts at DHS to

identify, screen, and interdict drug shipments coming into the United States, and to investigate those responsible for bringing illegal drugs into the United States. The Budget request increases funding for CBP's NTC by $79 million, for a total of $253 million, which would also allow the Agency to better target its efforts to stop illicit goods, including illicit drugs, from entering the United States. The Budget also requests a $44 million investment in new Non-Intrusive Inspection technology at Ports of Entry, which is used to examine cargo and conveyances for contraband and weapons of mass effect. The Budget requests an increase of $42 million, funded by both fees and discretionary appropriations, to enable CBP to screen inbound packages at express consignment carrier facilities such as FedEx, UPS, and DHL. The Budget continues investments in presumptive testing devices to improve customs officers' capability to detect and interdict fentanyl and other opioids, and requests an additional $1.2 million, for a total of $46 million, for scientific support to CBP officers for rapid identification of suspected illicit materials, in particular suspected opioids. In addition, the Budget fully supports all 57 ICE Border Enforcement Security Task Force units around the United States, which are the Agency's primary platform to investigate opioid smuggling, and continues support for DHS's Joint Task Force—Investigations, which works to identify, disrupt, and dismantle TCOs that seek to import opioids and other drugs into the United States.

RETHINKING DRUG PRICING TO PUT AMERICAN PATIENTS FIRST

Many drugs are too expensive for Americans and too many patients continue to be priced out of the medicines they need. Lowering prescription drug prices is one of the most important issues facing the Nation. Recent well-publicized instances of price manipulation and the disparity between U.S. drug prices and prices overseas also add to the growing frustration Americans feel. While American innovators bring life-saving pharmaceutical products to the world, drugs are purchased through an inefficient, opaque maze of segmented channels and a poorly understood network of pricing schemes. Complex regulations and barriers to entry for suppliers drive up drug costs for Americans. Americans unfairly shoulder a disproportionate amount of burden for research and development, allowing foreign governments to achieve better deals for their citizens at the expense of the American people. The goal of the Administration's comprehensive strategy is to address the problem of high drug prices, provide greater access to lifesaving medical products, and to ensure that the United States remains the leader in biomedical innovation.

The Administration has already taken a number of significant administrative steps to reduce drug costs. For example, in 2017, FDA approved the highest annual total number of generic drugs (1,027) in the Agency's history. FDA is also increasing competition in the market for prescription drugs, and facilitating entry of lower-cost alternatives, by providing greater transparency and expediting the review of generic drug applications for products with limited competition. CMS modified payment policies for biosimilars to encourage innovation and a robust market, which should encourage competition and innovation and help lower prices in the long run. The Administration also took steps to lower the costs seniors pay for certain drugs in the hospital outpatient setting, so that patients could benefit from the discounts hospitals receive under the 340B Program. This action is expected to save seniors an estimated $320 million on drug copayments in calendar year 2018 alone. In addition, the Budget once again proposes reforms to improve 340B Program integrity to ensure that the benefits derived from participation in the program are used to benefit patients, especially low-income and uninsured populations, and to require entities to report on use of 340B Program savings.

The Budget proposes new strategies to address high drug prices and increase access to lifesaving medicines by: rationalizing the current incentive structure; fostering greater competition; and extending American leadership in innovation to put American patients first.

The Budget calls for new Medicaid demonstration authority for up to five States to test drug coverage and financing reforms that build on private sector best practices. Participating States would determine their own drug formularies, coupled with an appeals process to protect beneficiary access to non-covered drugs based on medical need, and negotiate drug prices directly with manufacturers.

Within the Medicare program, the Budget modernizes the Part D drug benefit, based upon 12 years of program experience, to improve plans' ability to deliver affordable drug coverage for seniors and reduce their costs at the pharmacy counter. Seniors would benefit from the Budget's proposals, which are designed to better protect beneficiaries from high drug prices, give plans more tools to manage spending, and address the misaligned incentives of the Part D drug benefit structure. The proposed changes enhance Part D plans' negotiation power with manufacturers, encourage utilization of higher value drugs, discourage drug manufacturers' price and rebate strategies that increase spending for both beneficiaries and the Government, and provide beneficiaries with more predictable annual drug expenses through the creation of a new out-of-pocket spending cap. The Budget also modifies payment for Part B drugs to discourage manufacturers from increasing prices faster than inflation and improves payment accuracy. In addition, the Budget also modifies hospitals' payment for drugs acquired through the 340B drug discount program by rewarding hospitals that provide charity care and reducing payments to hospitals that provide little to no charity care.

The Budget also proposes to give FDA greater ability to bring generics to the market faster by incentivizing more competition among generic manufacturers. The Budget proposes to ensure that first-to-file generic applicants who have been awarded a 180-day exclusivity period do not unreasonably and indefinitely block subsequent generics from entering the market beyond the exclusivity period.

The Administration is updating a study from 2004 to analyze drug prices paid in countries that are a part of the Organization for Economic Cooperation and Development. HHS, working in conjunction with the Department of Commerce and the U.S. Trade Representative, will develop the knowledge base to understand the unfair disparity between the drug prices in America and other developed countries. The Administration is committed to making the regulatory changes and seeking legislative solutions to put American patients first.

DEPARTMENT OF AGRICULTURE

Highlights:

- The U.S. Department of Agriculture (USDA) provides leadership on issues related to food, agriculture, and natural resources based on sound public policy, the best available science, and efficient management.
- The Budget focuses on core mission-critical activities such as expansion of agricultural production jobs and research, while also supporting the Secretary's Department-wide reorganization efforts. Demonstrating fiscal constraint and responsible use of taxpayer resources, the Budget eliminates funding for unnecessary or lower priority activities and those that are duplicative of private sector efforts.
- The Budget requests $19 billion for USDA (excluding changes in mandatory programs), a $3.7 billion or 16-percent decrease from the 2017 enacted level.

The President's 2019 Budget:

USDA works to expand agriculture productivity and rural prosperity through the development of innovative practices and research, by improving access to technology and by providing financing needed to help grow job prospects, raise income levels and improve housing, utilities, and community infrastructure in rural America. The Department also works to promote sustainable agricultural production to protect natural resources and the long-term availability of safe and affordable food. USDA programs safeguard and protect America's food supply by reducing the incidence of food-borne hazards from farm to table.

The Department's programs also improve nutrition and health through food assistance and nutrition education. USDA works to increase foreign market access for U.S. agricultural products and provides data and analysis of foreign market conditions. This helps U.S. agricultural producers make informed decisions on international trade opportunities, and supports the U.S. economy through increased exports. In addition, USDA manages and protects America's public and private lands by working cooperatively across the Government and the private sector to preserve and conserve the Nation's natural resources through restored forests, improved watersheds, and healthy private working lands. The Budget continues some of the reforms outlined in the 2018 Budget while also streamlining programs to focus on core mission areas.

Safeguards the Nation's Food Supply. The Budget fully funds the costs necessary to support about 8,100 personnel located at more than 6,400 processing and slaughter establishments for meat,

poultry, and egg products in the United States. These personnel act as front line inspectors and investigators; they provide surveillance to protect the Nation's food supply and further the mission of the Food Safety and Inspection Service.

Protects Health Outcomes for Pregnant Women, Infants, and Young Children. The Budget requests $5.8 billion to serve all projected participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). This program provides nutritious supplemental food packages, nutrition education and counseling, and health and immunization referrals to low-income and nutritionally at-risk pregnant and postpartum women, infants, and children.

"Our farmers deserve a Government that serves their interest and empowers them to do the hard work that they love to do so much."

President Donald J. Trump
January 8, 2018

Reforms the Food Safety Net While Promoting Work. The Budget proposes a bold new approach to nutrition assistance that combines traditional Supplemental Nutrition Assistance Program (SNAP) benefits with 100-percent American grown foods provided directly to households and focuses administrative reforms on outcome-based employment strategies. In addition, the Budget expands on previous proposals to strengthen expectations for work among able-bodied adults, preserve benefits for those most in need, promote efficiency in State operations, and improve program integrity. Combined, these reforms maintain the Administration's commitment to ensuring Americans in need of assistance have access to a nutritious diet while significantly reducing the cost to taxpayers.

Reorganizes the Department. The Budget supports the Secretary's efforts to reorganize Agency functions to improve the customer and consumer experience. Under the new structure, the Farm Service Agency, Risk Management Agency, and the Natural Resources Conservation Service would be merged under the Under Secretary for Farm Production and Conservation. In addition, the Secretary has established an Under Secretary of Trade and Foreign Agricultural Affairs to sharpen USDA's focus on increasing agriculture exports to foreign markets. The Budget also supports consolidating fair practices, standards work, and commodity procurement within the Agricultural Marketing Service. These, and other related reorganizations, are expected to improve the way USDA delivers its services. In addition, the Budget supports the creation of a business innovation center in each mission area that would handle support activities in order to avoid duplicative functions and maximize collaboration between agencies.

Improves Customer Service. Modernizing program delivery and improving customer service at USDA is an important focus of the Administration. USDA is partnering with the White House Office of American Innovation to modernize its systems undertaking four key strategies: strengthening strategic IT governance; consolidating end-user services and data centers; enabling a strategic approach to data management and introducing data-driven capabilities; and improving the USDA customer experience. The Budget supports these efforts to improve service delivery by requesting funds to develop a centralized customer service portal for customers served by the Department's three service center agencies. This single, integrated, producer-centric web portal would provide expanded and more effective and efficient access to useful online USDA services to meet the needs of agricultural producers. By optimizing service delivery, USDA can support agricultural producers to reach their productive potential and advance the U.S. economy.

Prioritizes Agricultural Research. USDA research plays a key role in fostering innovation and advancing technologies that increase the efficiency, sustainability, and profitability of American

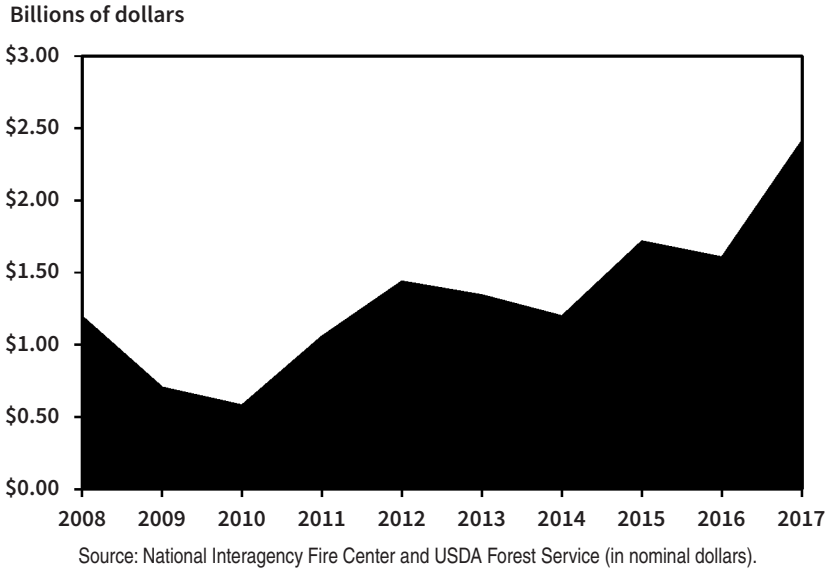
agriculture. As such, the Budget prioritizes the USDA research portfolio by funding competitive research through the Department's flagship competitive research grant program, the Agriculture and Food Research Initiative (AFRI). The Budget requests $375 million for AFRI, consistent with the 2017 enacted level. The Budget also requests formula funding for research and extension activities at land-grant universities at the 2017 enacted level. The Budget proposes more than $1 billion for the Agriculture Research Service, which conducts in-house basic and applied research. Funding is targeted to achieve the President and Secretary's vision of advancing the competitiveness of American agriculture and nutritional security. This funding level would enable USDA to focus on priority research areas in the Farm Bill such as plant and animal health and production. The Budget also proposes to transfer operational responsibility for the National Bio and Agro-Defense Facility (NBAF) from the Department of Homeland Security to USDA and requests $42 million for operations costs in 2019. Once construction is complete, USDA would operate the NBAF and use the facility to study diseases that threaten the animal agricultural industry and public health.

Streamlines and Refocuses USDA Statistical Activities to Core Mission Responsibilities. The Budget proposes to streamline the research efforts of the Economic Research Service by eliminating low priority research that is being conducted within the private sector and by non-profits and focusing on core data analyses in line with priority research areas. The Budget fully funds the anticipated needs for the release of the Census of Agriculture and provides a framework to better streamline the Department's statistical functions, leverage administrative efficiencies, and focus on core data products similar to other statistical agencies elsewhere within the Government.

Educates America's Next Generation of Farmers. The Budget requests $50 million to increase agriculture science literacy programs and other community based efforts, such as 4H Clubs. These programs are a key component in exposing students to agriculture, developing necessary skillsets, and providing an awareness of the vast career opportunities in the agriculture sector. Developing a future agriculture workforce is not only critical to the Nation's food security, but also vital in promoting rural prosperity and improving quality of life.

Supports Trade and U.S. Agriculture Abroad. USDA's Foreign Agricultural Service works to improve foreign market access for U.S. agricultural products, build new markets, improve the competitive position of U.S. agriculture in the global marketplace, and provide technical assistance to foreign countries. The Budget requests funding to support trade policy, trade promotion activities, and capacity building abroad. In addition, the Animal and Plant Health Inspection Service also helps facilitate trade by keeping agricultural industries free from pests and diseases, and certifying that agriculture and food products meet importing countries' entry requirements.

Proposes a Comprehensive Solution to Wildfire Suppression Funding. The Forest Service routinely exceeds the funds appropriated to fight wildfire, covering these



Source: National Interagency Fire Center and USDA Forest Service (in nominal dollars).

costs through transfers from other land management programs. For example, in 2017, Forest Service wildfire suppression spending reached a record $2.4 billion as a result of increasing frequency and severity of wildfires, necessitating transfers of $527 million from other programs. Historically, these transfers have been repaid in subsequent appropriations; however, "fire borrowing" impedes the missions of land management agencies to reduce the risk of catastrophic fire and restore and maintain healthy functioning ecosystems. To resolve concerns about the sufficiency of land management and funding wildfire suppression, the Budget responsibly funds 100 percent of the rolling 10-year average cost for wildfire suppression in the Departments of Agriculture and the Interior within discretionary budget caps. Similar to how unanticipated funding needs for other natural disasters are addressed, the Budget proposes a separate fund that would include an annual cap adjustment appropriation for wildfire suppression operations in order to ensure that adequate resources are available to fight wildland fires, protect communities, and safeguard human life during the most severe wildland fire seasons. In addition, the Administration believes that meaningful forest management reforms to strengthen our ability to restore the Nation's forests and improve their resilience to destructive wildfires should be a part of any permanent solution.

Modernizes Inspection Activities. Currently, the cost to support programs under the Federal Grain Inspection Service is funded with taxpayer dollars. The Budget proposes to offset this cost by assessing a fee to the companies that benefit directly from these programs. Similarly, the Budget proposes a user fee to cover the cost of providing Agricultural Quarantine and Inspections (AQI) within the United States, which is consistent with how AQI activities are funded for passengers and cargo originating outside of the United States.

Supports Farmers and Rural Communities through Lending. USDA invests in rural infrastructure to lift up low-income rural communities through its community facilities and water and wastewater direct loan programs. Through the Secretary's leadership of the Task Force on Agriculture and Rural Prosperity (Task Force), the Department has identified actions to improve the quality of life and expand economic development in rural communities. Many of these actions are supported through investments made in USDA lending activities to rural utilities and communities, and those that strengthen investments in housing programs. The Budget supports a $3.5 billion loan level for community facility direct loans, which provide assistance to rural communities to develop or improve essential public services and facilities across rural America, such as health clinics or fire and rescue stations. The Budget also requests $1.2 billion in direct loans for rural communities unable to get financing elsewhere to build and rehabilitate water and wastewater treatment facilities. USDA assists approved lenders in providing low- to moderate-income households the opportunity to own their primary residence through the single family housing guaranteed loan program. This program works through the private credit market and provides guarantees that collateralize private sector lending. The Budget supports a robust guaranteed single family housing loan level of $24 billion.

In addition, the Budget requests a loan level of $8 billion to support farm lending, providing crucial operating

Promoting Prosperity in Rural America

In April 2017, the President issued Executive Order 13790, "Promoting Agriculture and Rural Prosperity in America," which established an inter-Departmental Task Force.

This Task Force, chaired by the Secretary of Agriculture, has identified barriers to economic prosperity in rural America and made recommendations on how innovation, infrastructure, and technology can assist agriculture and help rural communities thrive.

Supporting this effort, the Budget takes action to address problems by promoting electronic connectivity through broadband grants and loans for rural communities, and reducing regulatory burden for farmers.

capital through the Department's suite of farm loan programs, including loans that aid farmers in owning and operating their farms.

Promotes E-connectivity in Rural Areas. Electronic connectivity is fundamental for economic development, innovation, advancements in technology, workforce readiness, and an improved quality of life—reasons why such access was identified as a critical component by the Task Force. Unfortunately, access to affordable high-speed internet in rural and tribal areas still lags behind that of urban areas. Tremendous opportunities are unlocked when next generation networks connect rural communities, allowing doctors to reach patients, students to access knowledge, and small businesses to expand with access to online marketing, credit card processing, and online banking. To provide rural communities with modern information access, the Budget proposes $30 million to fund broadband grants, $23 million in broadband loans, and $24 million to fund distance learning and telemedicine grants.

Supports Comprehensive Farm Safety Net Reforms and Reduces Waste. The Budget proposes to optimize and improve crop insurance and commodity programs in a way that maintains a strong safety net. The Budget does this while also achieving savings, eliminating subsidies to higher income farmers, and reducing overly generous crop insurance premium subsidies to farmers and payments made to private sector insurance companies. The Budget includes a bold set of proposals, including those that would reduce the average premium subsidy for crop insurance from 62 percent to 48 percent and limit commodity, conservation, and crop insurance subsidies to those producers that have an Adjusted Gross Income of $500,000 or less.

In addition, the Budget proposes reductions to overly generous subsidies provided to participating insurance companies by capping underwriting gains at 12 percent, which would ensure that the companies receive a reasonable rate of return given the risks associated with their participation in the crop insurance program. The Budget proposes to eliminate an unnecessary and separate payment limit for peanut producers and limit eligibility for commodity subsidies to one manager per farm.

The Budget also includes proposals to streamline Federal conservation efforts to focus on programs that protect environmentally sensitive land and increase conservation practice implementation.

DEPARTMENT OF COMMERCE

Highlights:

- The Department of Commerce (DOC) promotes job creation and economic growth by ensuring fair and secure trade, providing the data necessary to support commerce, securing America's national security and technological leadership through export controls and an effective patent system, and fostering innovation by setting standards and conducting foundational research and development.
- The Budget request for DOC prioritizes and protects investments in core Government functions such as preparing for the 2020 Decennial Census, providing the observational infrastructure and personnel to produce timely and accurate weather forecasts, and enforcing laws that promote fair and secure trade.
- The Budget requests $9.8 billion for DOC (including changes in mandatory programs), a $546 million or a 6-percent increase from the 2017 enacted level.

The President's 2019 Budget:

DOC contributes to U.S. economic growth and prosperity through a broad portfolio of business, data, and science-driven programs that are used by American companies, Government officials, and citizens for decision-making every day. The Budget focuses on supporting these core missions in ways that enhance economic security, national security, and technological leadership, and protect the taxpayer through streamlined and effective implementation.

Accordingly, the Budget provides strong support for high priority, mission-critical programs such as the 2020 Decennial Census, trade enforcement, intellectual property, weather and Earth observations, and spectrum management. In order to adequately fund these priorities, the Budget reduces funding for extramural grants, eliminates duplicative or unnecessary programs, and consolidates others. These choices support American prosperity, the national economy, and the interests of all taxpayers.

Supports a Fair, Modern, and Accurate 2020 Decennial Census. The Decennial Census is a constitutional requirement and DOC's highest priority in 2019. The Budget provides $3.8 billion, an increase of more than $2.3 billion, for the U.S. Census Bureau. This additional funding prioritizes fundamental investments in information technology and field infrastructure, which would allow the Bureau to continue preparations to conduct a modern, efficient, and accurate 2020 Decennial

Census. An accurate Decennial Census is imperative because of the important role this data plays in shaping the political landscape and informing the policy making process. Most importantly, the Decennial Census governs the apportionment of seats in the House of Representatives allocated to the States. In addition, Census data is used by governmental entities at the State and local levels for defining the representative boundaries for congressional districts, State legislative districts, school districts, and voting precincts. Further, Census data informs the allocation of slightly more than $675 billion annually in Federal funds to local communities, supporting a wide range of Federal and non-Federal policies, such as homeland security, education, and infrastructure. The Budget's substantial investment in the 2020 Decennial recognizes the importance of this program.

Promotes Free and Fair Trade. The Budget includes an additional $3 million for the Department's International Trade Administration (ITA) to expand and enhance the Department's efforts to level the global playing field for U.S. businesses, and provides slightly more than $90 million total for ITA's Enforcement and Compliance unit. This would allow ITA to conduct robust investigations into alleged trade violations, aggressively advocate for U.S. businesses facing tariff and non-tariff barriers abroad, and increase the capacity to closely review proposed foreign investments in U.S. businesses.

Increasing Trade Enforcement

The Administration has taken strong action to support its commitment to free and fair trade.

Trade Enforcement Activity	2016	2017
Anti-Dumping/ Countervailing Duty Investigations Initiated	52	↑ 82
Trade Agreement Compliance Cases Resolved Successfully	39	↑ 47
Trade Barriers Reduced, Removed or Prevented	79	↑ 92

Source: DOC

In the first year of the Administration, the Department has already initiated almost 60 percent more anti-dumping and countervailing duty investigations than in the previous year. These investigations are key to stemming the surge of unfairly traded imports from entering the United States. The Department has also increased the number of successfully resolved trade agreement compliance cases by 21 percent and the number of trade barriers reduced, removed, or prevented by 16 percent compared to the previous year, demonstrating a commitment to holding trading partners accountable for their free trade commitments. The additional resources requested in the Budget would continue to support the Administration's aggressive approach to a global market that allows U.S. businesses to compete fairly.

Protects Lives and Property. Advance notice provided by weather forecasts enables the Nation's leaders, decision makers, and media to provide better warnings and advisories to first responders, the public, and businesses. Getting this right reduces the catastrophic loss of human life and property and the damaging effects on the national economy. Polar-orbiting satellites are critical to this mission, providing space-based observations that improve the accuracy of weather predictions. In recognition of the value these satellites provide, the Budget includes $878 million for the National Oceanic and Atmospheric Administration's (NOAA) polar weather satellites. These funds would allow NOAA to operate satellites currently in orbit and continue the development of its future polar orbiting satellites, reducing the risk of a devastating gap in coverage.

Advances the Development of Next Generation Communications Technologies. The Budget continues to support the National Telecommunications and Information Administration (NTIA) in representing the U.S. interest at multi-stakeholder forums on internet governance and digital commerce. The Budget supports the commercial sector's development of next generation wireless services, including 5G and the Internet of Things, by funding NTIA's mission of evaluating and ensuring the most efficient use of spectrum resources by Government users. Ensuring adequate access to scarce spectrum resources by both the commercial and Government sectors is a crucial factor for economic growth and national security.

Modernizes Support for Minority Owned Businesses. Minority owned businesses face unique challenges in obtaining the capital and support necessary to start and operate businesses. The Minority Business Development Agency (MBDA) within the Department of Commerce is solely dedicated to addressing these challenges and helping minority businesses thrive. To further this mission, the Budget proposes to reform the operations of MBDA to expand its reach and better help it meet its programmatic objectives. These reforms would eliminate the business outreach centers operated by MBDA, which are duplicative of programs operated by other Federal agencies, but would establish MBDA as a policy office that is positioned to advocate for minority businesses across all Federal programs.

Eliminates Duplicative and Unnecessary Programs. American prosperity depends on fiscal restraint to direct funding to the highest priorities. The Budget eliminates the Economic Development Administration, which provides small grants with limited measurable impacts and duplicates other Federal programs, such as Rural Utilities Service grants at the U.S. Department of Agriculture and formula grants to States from the Department of Transportation. By eliminating this Agency, the Budget reduces waste and saves approximately $300 million from the 2017 enacted level.

The Budget also eliminates Federal funding for the Manufacturing Extension Partnership (MEP) program, which subsidizes up to half the cost of State centers that provide consulting services to small- and medium-sized manufacturers. This proposal saves $125 million, and directs MEP centers to transition solely to non-Federal revenue sources as originally intended when the program was established.

DEPARTMENT OF DEFENSE

Highlights:

- The Department of Defense (DOD) provides the military forces needed to deter war and to protect the security of the United States.
- Aligned with the new National Security and National Defense Strategies, the Budget expands the military's competitive space, builds a more lethal force, achieves greater performance at affordability and speed, and enhances posture for a more capable alliance and partnership network. The Budget is critical for protecting the homeland, promoting American prosperity, preserving peace through strength, and advancing American influence.
- The Budget requests $686 billion for DOD, an $80 billion or 13-percent increase from the 2017 enacted level. This includes $597 billion for the base budget, and $89 billion for Overseas Contingency Operations.

The President's 2019 Budget:

Preserves Peace through Strength

The Budget requests the resources DOD needs to defend the homeland, remain the predominant military power in the world, maintain a world order that reflects America's values, support America's allies and partners, promote America's prosperity, and advance America's security interests. The United States faces an increasingly competitive and dangerous international security environment, characterized by the reemergence of great power competition with China and Russia, dangerous new technologies, empowered non-state actors, and the proliferation of weapons of mass destruction. The Budget requests resources needed to compete with great powers and others, deter conflict, and win the Nation's wars. The Budget builds a more lethal, ready, and larger joint force that, combined with a robust system of allies and partners, would sustain American influence and preserve stable regional balances of power that have proven conducive to peace and prosperity.

The Budget supports the Department's pursuit of innovation and reform, while making disciplined increases to sustain America's military advantage and to account for the long-term costs of contingencies. Over the 10-year budget window, funding for DOD is $1 trillion above projections from the previous administration, dramatically improving the warfighting ability of the joint force. Failure to provide adequate funding to meet these defense objectives would embolden America's

enemies, thereby increasing the risk of armed conflict, and result in decreased U.S. influence which would erode alliances and partnerships, and reduced access to markets which would contribute to a decline in prosperity and standard of living.

Compete—Deter—Win. The surest way to prevent war is to be prepared to win one. The Budget promotes peace through strength, and continues multiyear investments to develop a lethal, agile, and resilient force. Long-term strategic competitions with China and Russia are the principal priorities for the Department. These competitions require both increased and sustained investment, reflected in the Budget request, because of the magnitude of the threats they pose to U.S. security and prosperity today, and the potential for those threats to increase in the future. Concurrently, the Budget requests funding for sustained DOD efforts to deter and counter rogue regimes such as North Korea and Iran, defeat terrorist threats to the United States, and consolidate gains in Iraq and Afghanistan while ensuring these approaches are resource-sustainable. The Budget ensures the United States can maintain a joint force that possesses decisive advantages for any likely conflict, while remaining proficient across the entire spectrum of conflict.

The Budget ensures that DOD has the right force posture and capabilities to account for the uncertainty that exists in the changing global strategic environment. Modern adversaries have built sophisticated anti-access and area-denial networks that require U.S. forces to rely on resiliency, lethality, speed, and surprise to win. The Budget prioritizes maintaining ready forces for major combat, while providing options for proactive and scalable employment of the joint force no matter what mission it is asked to undertake.

In addition, the Budget continues investments to increase U.S. defense posture and presence in the Indo-Pacific Region. The Budget supports the Department's long-term strategy of deterring Chinese military coercion and aggression in the Indo-Pacific region through strengthened forward presence. The Budget request provides the Department with the necessary armament, infrastructure, and logistics to address threats from North Korea, including missile defenses for America's homeland. In addition, the Budget strengthens relationships with allies and partners in the region through continued military exercises and security cooperation.

The Budget also requests the necessary resources to maintain the U.S.'s unwavering commitment to peace and security in Europe. The Budget requests more than $6.3 billion for DOD's European Deterrence Initiative (EDI), a multiyear program that is rebuilding a U.S. combat-credible forward military presence in Europe and building partner capacity in order to better counter Russian coercion and deter Russian aggression in the region. The EDI request maintains a robust heel-to-toe schedule for U.S. forces to train with and advise North Atlantic Treaty Organization (NATO) allies and partners, especially in Eastern Europe, and sustains the United States as a framework nation in NATO's Enhanced Forward Presence mission by maintaining a U.S. battalion in Poland. EDI would also increase prepositioned U.S. stocks, modernize Army equipment in Europe, enhance the Air Force's ability to rapidly scale operations in contested environments, harden communications and logistical infrastructure, catalyze front line allies' and partners' efforts to defend themselves, and provide $250 million to help Ukraine protect its territorial sovereignty.

The Budget supports a U.S. military presence in the Middle East necessary to protect the United States and its allies from terrorist attacks and preserve a favorable regional balance of power. The Budget would enable DOD to assist regional partners in strengthening their institutions and capabilities to conduct counterterrorism and counterinsurgency efforts, procure interoperable missile defense and other capabilities to better defend against active missile threats, and neutralize Iran's malign activities in the region.

Builds a More Lethal, Resilient, and Agile Force for Great Power Competition. The Budget begins what would be a sustained multiyear effort to transition the joint force from its post-Cold War mindset and posture toward a new paradigm of thinking about and preparing for the possibility of major war. History has taught us—from the Civil War through the World Wars of the 20th Century—that wars fought during periods of rapid technological change tend to be deadly and destructive in ways that had previously seemed unimaginable. The Budget begins the process of averting such a catastrophe by preparing the joint force to exploit new technologies and concepts to become more lethal, resilient, and agile.

- Lethality—the Budget invests in a variety of new weapons systems capable of delivering lethal fires in contested domains, while simultaneously developing leap-ahead systems that would enable the joint force to operate in new ways to defeat aggression in the future.

- Resilience—a powerful punch is meaningless if married to a glass jaw. The Budget therefore makes investments to ensure that the joint force can operate effectively while under attack in all domains. This includes investments to: harden and disperse forward bases and posture; make command and control, intelligence, surveillance, reconnaissance, position, navigation, and timing capabilities more resilient to attacks; improve countermeasures; and build up stockpiles of key munitions and materiel.

- Agility—as a global superpower with myriad responsibilities, the United States does not have the luxury of focusing on one problem at a time. The United States must be able to respond to a variety of contingencies simultaneously. While this poses a difficult challenge for the joint force, America's global posture, logistics and sustainment capabilities, and constellation of allies and partners gives the United States a unique advantage that no competitor or adversary can match. The Budget makes investments in logistics, sustainment, forces, and posture that would enable the joint force to operate with agility globally.

Ensures the Readiness of U.S. Armed Forces. The Budget provides the resources necessary to continue rebuilding military readiness, which has been degraded by budget reductions imposed by the Budget Control Act and more than 16 years of warfighting. Increased funding for the U.S. Army would modernize existing forces, provide additional training for U.S. soldiers, and establish new security assistance brigades to support counterterrorism efforts abroad. The Budget funds continuing efforts to improve Navy and Marine Corps aviation readiness, with increases for maintenance, spare parts, and flying hours. In response to recent Navy surface fleet incidents, the Budget requests more than $70 million in additional resources to enhance surface fleet equipment and training. The Budget also fully funds Air Force flight training, provides resources to alleviate pilot shortages, and invests in training for high-end combat to ensure the United States can effectively confront its most technologically advanced adversaries.

Sustains the Defense Industrial Base. At the direction of the President, DOD is undertaking a whole-of-Government assessment of the health and strength of America's manufacturing and defense industrial base and identifying any potential gaps in its capabilities. As part of this broad assessment, the Budget proposes to ensure sustained investment in the defense industrial base as a key component of economic and national security, recognizing that critical facilities, workforce skills, and the long-term health of the defense industrial base are fundamental to economic and national security.

Modernizes the Nuclear Deterrent. A tailored and flexible American nuclear deterrent is key to protecting national security and future prosperity for both the homeland and America's allies and partners. In line with the Nuclear Posture Review, the Budget supports a nuclear enterprise that is appropriately tailored to deter 21st Century threats. To that end, the Budget requests $24 billion to

modernize and sustain the three legs of the nuclear triad—land, sea, and air—as well as nuclear command, control, and communications systems.

Invests in Military Hardware to Meet the Challenges of Tomorrow. The Budget makes significant investments in new, improved hardware to ensure that the Army, Air Force, Navy, and Marine Corps remain lethal and resilient even against technologically advanced adversaries. This includes funding to harden equipment against cyber-attacks. These investments include:

- Funding Cost-Effective Capabilities for Irregular Warfare and Counterterrorism—recognizing the enduring nature of irregular warfare and counterterrorism, the Budget requests funding to develop more cost-effective means of conducting these missions—including Army Security Force Assistance Brigades and Air Force affordable light-attack aircraft. The Budget also prioritizes efforts to ensure that the burden of responding to global crises is borne globally, rather than disproportionately by the people and the economy of the United States.

- Investing in Ground Combat Capabilities—the Budget funds critical ground combat capabilities including new investments in armored vehicles, long-range artillery, amphibious vehicles, rotorcraft, and munitions. The Budget accelerates the modernization of the Army's armored brigades to four over the five-year window and adds a 16th heavy combat team. The Budget also supports the Marine Corps' 24 active infantry battalions and 18 active MV-22 Osprey squadrons.

- Maintaining Control of the Seas—continuing the President's commitment to expand and rebuild the U.S. Navy fleet, the Budget increases the total number of ships by procuring 10 ships in 2019 to deter threats and maintain control of the sea.

- Developing and Procuring Advanced Aircraft—the Budget request supports continued development and procurement of advanced fighter aircraft, bombers, tankers, and other support aircraft. The Air Force's investment focuses on modernization of its tactical fighter aircraft fleet with the advanced F-35A stealth fighter, development of the next generation stealthy bomber, and procurement of the KC-46 aerial refueling tanker. The Budget would enable the Air Force to grow its fighter force from 55 combat squadrons to 58 squadrons by the end of the five-year planning period and would increase procurement of Air Force F-35 fighters from 250 in the five years of the 2018 Budget request to 258 in the five years of the 2019 Budget request. The Budget also accelerates the modernization of the existing F-16 fleet with active electronically scanned array antennas, radar warning systems, and the multifunctional information distribution Line 16 tactical airborne terminal system. The major priority for the Navy and Marine Corps is to modernize their fighter aircraft fleets with procurement of the F-35B and C, and to reduce the strike fighter shortfall through procurement of additional F/A-18E/Fs.

Innovates at the Speed of Relevance. Worldwide advances in technology are regularly changing the nature of the threats America faces and proliferating threats to new actors. Nations that are best able to adapt and integrate new technologies—in order to create speed and surprise across multiple domains in the fight—would prevail. The Budget's key areas of focus include artificial intelligence, autonomous systems, and hypersonics. The Budget requests more than $84 billion in research, engineering, and prototyping activities to maintain technical superiority.

Grows the Military. The Budget increases military personnel by 16,400 servicemembers compared to the end strength level authorized in the National Defense Authorization Act for 2018. These additional servicemembers would allow DOD to fill gaps in combat formations and serve as critical enablers in America's national defense strategy.

Invests in Innovative Defense Intelligence Capabilities. The Budget restores funding to combat support agencies to improve intelligence support to the warfighter and grows the analytical capacity at the Combatant Command Intelligence Centers. The Budget invests in intelligence, surveillance, and reconnaissance capabilities that would expand the competitive space through a more lethal, rapidly innovating defense intelligence enterprise.

Bolsters Missile Defenses. The Budget supports the President's initiative to accelerate and expand urgent missile defeat and defense enhancements, and continues priority investments proposed by the Administration and enacted by the Congress in the Department of Defense Missile Defeat and Defense Enhancements Appropriations Act, 2018. The Budget increases the capability and capacity of the United States to detect, defeat, and defend against any North Korean use of ballistic missiles against the United States, its deployed forces, allies, and partners. For missile defense, the Budget supports the procurement of 20 additional Ground-Based Interceptors (GBIs). The Administration plans to increase the number of deployed GBIs to 64, including the new GBI missile field at Fort Greely, Alaska, to protect the homeland against North Korean and other intermediate- and long-range ballistic missile threats.

Prevents the Resurgence of the Islamic State of Iraq and Syria (ISIS), al Qaeda, and other Jihadist Terrorists. The Budget requests the funding necessary to ensure the lasting defeat of ISIS. Building on ISIS's territorial defeat in Iraq and Syria, DOD would prevent any resurgence by working with partner forces and agencies to stabilize liberated cities, secure borders, retain territorial control, and disrupt ISIS's capability to attack the U.S. homeland and America's allies. The Budget also requests funding for DOD to address the threat from ISIS branches outside Iraq and Syria, and to protect the United States against a resurgence of al Qaeda.

Promotes Stability and Security in South Asia. The Budget furthers the U.S. goal of a stable and secure South Asia by supporting the Afghan government and security forces in their fight against Taliban insurgents and jihadist terrorist organizations such as al Qaeda and ISIS. The Budget requests more than $5 billion for continued U.S. training and assistance for the Afghan security forces and would enable U.S. forces to conduct counterterrorism operations to ensure that the region cannot be used by jihadist terrorist groups to plot transnational attacks against the U.S. homeland, citizens overseas, or allies and partners. The Budget also continues to include funding to support America's partnership with Pakistan, contingent on Pakistan taking appropriate action to expand cooperation in areas where interests converge and to address areas of divergence, in line with the Administration's South Asia strategy.

Renews the Nation's Leadership and Freedom of Action in Space. The Budget accelerates investments in space situational awareness, the Global Positioning System, defensive measures, and other areas to improve the resiliency of DOD space systems in the face of increasing adversarial threats. In combination with architectural diversity and proliferation, the Budget preserves space capabilities for national leaders and combatant commanders in order to maintain strategic stability and ensure battlefield dominance across the spectrum of conflict.

Prioritizes Cyber Activities. The Budget continues to place a high priority on cyber security and those responsible for providing it by requesting more than $8 billion in 2019 to advance DOD's three primary cyber missions: safeguarding DOD's networks, information and systems; supporting military commander objectives; and defending the Nation. This investment would also provide the necessary resources to sustain the 133 Cyber Mission Force (CMF) teams established at Cyber Command. Since their inception in 2013, the CMF teams have grown in capability and capacity, and all teams are on track to be fully operational by the end of 2018.

Enhances the Quality of Life of Servicemembers and their Families

Provides Fair Compensation for Servicemembers and Supporting Military Families. Military compensation must be competitive to recruit and retain the most qualified men and women to serve in an All-Volunteer Force. The Budget proposes a calendar year 2019 military pay raise of 2.6 percent—the largest increase since 2010. The Budget also requests funding for a full range of compensation programs, from monthly incentive pays to recently expanded retirement benefits. In addition, the Budget requests funding to continue important programs that improve the quality of life for military families, and ensure they receive the support they need throughout every stage of their family members' service.

Improves TRICARE. DOD continues to modernize TRICARE to provide greater flexibility and access to medical care for servicemembers and their families. TRICARE Select would replace TRICARE Standard and Extra. As a result, beneficiaries would notice improved coverage for preventive services with TRICARE. The current three Managed Care Regions would be combined into two Managed Care Regions, providing beneficiaries expanded access to network providers. The rollout of GENESIS, DOD's integrated medical and dental electronic health record, would accelerate the sharing of patients' records across military treatment facilities and provide an electronic health record that focuses on quality, safety, and patient outcomes.

Drives Resource Discipline and Accountability

Reforms the Department to Reinvest Resources in Warfighter Priorities. DOD management and support functions must enable and empower the warfighter with the knowledge, equipment, and support systems to fight and win the Nation's wars. DOD will adapt its organizational and support structures to best support the joint force and achieve savings that can be reinvested in higher priority needs, such as force readiness and modernization. For example, DOD is leveraging the scale of its operations to drive greater efficiency in procurement of materials and services, saving billions in 2019. At the same time, DOD is pursuing opportunities to consolidate and streamline contracts for logistics, information technology, and other support services. The Department will also identify options to reduce excess property and infrastructure.

Audits the Department. Better management begins with effective financial stewardship. With more than $2.4 trillion in assets spread across 26 stand-alone reporting entities, the Department's full financial statement audit is the largest ever undertaken by an agency of the U.S. Government. DOD has committed to performing annual financial statement audits to bolster accountability and public confidence in the Department's fiscal discipline and to modernize its business practices and systems. The Budget will mark the release of results from DOD's first-ever consolidated financial statement audit. The Department anticipates this audit will identify procedural and system deficiencies, consistent with the initial audits of other large Chief Financial Officers Act agencies and not unusual for an audit of this scale and complexity. Accordingly, DOD has shifted its focus from audit preparation to remediation of audit findings. Upon release of the audit report, the Department will address findings by holding the military departments and defense agencies accountable for the development and implementation of their corrective actions, with a goal of meaningful, persistent progress toward a clean audit opinion. Armed with audit findings and remediation plans, DOD will provide more sound data to inform decision-making, while enhancing internal controls and business procedures to improve efficiency and effectiveness.

DEPARTMENT OF EDUCATION

Highlights:

- The Department of Education promotes excellence and access to opportunity in elementary, secondary, and postsecondary education. The Department focuses its mission on supporting States and school districts in their efforts to provide high-quality education to all students, on streamlining and simplifying funding for college, and on expanding access to new postsecondary options.
- The Budget maintains funding for essential K-12 formula grant programs that support the Nation's neediest students, while also delivering on the President's commitment to ensure that every child has the opportunity to attend a high-quality school that meets their unique educational needs.
- The Budget proposes to ensure students can successfully pursue various pathways of postsecondary education and training. The Budget invests in career and technical education, streamlines student loan repayment, and offers the opportunity to use Pell Grants for high-quality, short-term training.
- The Budget requests $59.9 billion for the Department of Education, a $7.1 billion or 10.5-percent decrease from the 2017 enacted level.

The President's 2019 Budget:

Quality education exists when parents have a voice in choosing their child's K-12 schools and students have the tools they need to succeed. Decades of investments and billions of dollars in spending have shown that an increase in funding does not guarantee high-quality education. While the Budget reduces the overall Federal role in education, the Budget makes strategic investments to support and empower families and improve access to postsecondary education, ensuring a future of prosperity for all Americans.

K-12 Education

The Budget request for elementary and secondary education reflects the restoration of local control in education provided by the Congress in the reauthorization of the Elementary and Secondary Education Act (ESEA) by the Every Student Succeeds Act (ESSA). ESSA reauthorized the ESEA for the first time in 14 years and recognized that the primary responsibility for creating, improving, and sustaining education systems lies with States and local school districts. The Budget builds on these principles by ensuring the Department focuses on returning decision-making power back to States and districts and by giving parents more control over addressing their child's unique education needs.

The Budget maintains funding for essential formula grant programs that support the Nation's neediest students, including those in low-income communities and students with disabilities. The Budget also streamlines and refocuses the Federal investment in K-12 education by eliminating funding for 17 programs totaling $4.4 billion that are duplicative, ineffective, or more appropriately supported through State, local, or private funds.

Empowers Families to Choose the Schools that are Best for Their Children. The Budget invests $1.1 billion in school choice programs to expand the range of high-quality public and private school options for students, putting more decision-making power in the hands of parents and families. This investment serves as a down payment toward achieving the President's goal of an annual Federal investment of $20 billion—for a total of an estimated $100 billion when including matching State and local funds—in school choice funding. The Budget requests $500 million to establish a new school choice grant program to support a wide range of innovative approaches to school choice. These include expanding existing private school choice programs to serve more low-income and at-risk students, developing new private school choice models, or supporting school districts' efforts to adopt student-based budgeting and open enrollment policies that enable Federal, State and local funding to follow the student to the public school of his or her choice. In addition, States and districts would have opportunities to leverage funding from Title I grants to support public school choice. The Budget requests $500 million to fund the opening, expansion, and replication of high-quality public charter schools and the financing of charter school facilities. The Budget invests $98 million to expand the number of public magnet schools, which offer specialized curricula and instructional programming. In addition, the Tax Cut and Jobs Act expands school choice by enabling families to use 529 savings plans to pay for private school tuition and home schooling costs.

Provides High-Quality Special Education Services to Children with Disabilities. To support State and local education agencies in providing high-quality special education services to more than 6.8 million children with disabilities, the Budget maintains the Federal investment in the Individuals with Disabilities Education Act (IDEA) formula and discretionary grant programs. The Budget invests $12.8 billion for IDEA formula grants to States to support special education and early intervention services. In addition, the Budget requests $222 million for discretionary grants to States, institutions of higher education, and other nonprofit organizations to support research, demonstrations, technical assistance and dissemination, and personnel preparation and development. These investments would ensure that high-quality special education and related services would meet the unique needs of children with disabilities and their families.

Supports Implementation of School-based Opioid Abuse Prevention Strategies. The opioid crisis has devastated families across the United States and strained the capacity of schools in affected communities to meet the academic and mental health needs of their students. To address these issues, the Budget invests $43 million for School Climate Transformation grants to help school districts implement multi-tiered, evidence-based strategies to prevent opioid misuse and address associated behavioral and academic challenges through interventions such as trauma counseling, violence prevention, and targeted academic support. This funding would also support technical assistance centers that develop and provide opioid abuse prevention and treatment resources that would be publicly available to all schools and institutions of higher education.

Higher Education

The Budget continues support for Federal programs that help prepare low-income and minority students for postsecondary education, targeted student financial aid that helps students and families pay rising college costs, and programs that strengthen postsecondary institutions serving large proportions of minority students. The Budget also includes proposals that address student debt by

simplifying student loan repayment and redirecting inefficiencies in the student loan program to prioritize debt relief for undergraduate borrowers. These proposals would support congressional efforts to reauthorize the Higher Education Act to address student debt and higher education costs while reducing the complexity of student financial aid.

Requires Colleges and Universities to Have Shared Accountability for Repayment of Federal Student Loans. Investing in higher education generally provides strong value for students and taxpayers. However, some institutions consistently fail to deliver a quality education that enables students to successfully repay Federal student loans—leaving borrowers and taxpayers holding the bill. A better system would require postsecondary institutions accepting taxpayer funds to share a portion of the financial risk associated with student loans, in consideration of the actual loan repayment rate to ensure that the substantial taxpayer investment in higher education continues to provide strong value for students and the economy. The Administration looks forward to working with the Congress to address these issues.

Reforms Student Loan Programs. In recent years, income-driven repayment (IDR) plans, which offer student borrowers the option of making affordable monthly payments based on factors such as income and family size, have grown in popularity. However, the numerous IDR plans currently offered to borrowers overly complicate choosing and enrolling in the right plan. The Budget proposes to streamline student loan repayment by consolidating multiple IDR plans into a single plan. The single IDR plan would cap a borrower's monthly payment at 12.5 percent of discretionary income. For undergraduate borrowers, any balance remaining after 15 years of repayment would be forgiven. For borrowers with any graduate debt, any balance remaining after 30 years of repayment would be forgiven.

To support this streamlined pathway to debt relief for undergraduate borrowers, and to generate savings that help put the Nation on a more sustainable fiscal path, the Budget eliminates the Public Service Loan Forgiveness program, establishes reforms to guarantee that all borrowers in IDR pay an equitable share of their income, and eliminates subsidized loans. To further improve the implementation and effectiveness of IDR, the Budget proposes auto-enrolling severely delinquent borrowers and instituting a process for borrowers to consent to share income data for multiple years. To facilitate these program improvements and to reduce improper payments, the Budget proposes to streamline the Department of Education's ability to verify applicants' income data held by the Internal Revenue Service. These student loan reforms would reduce inefficiencies and waste in the student loan program, and focus assistance on needy undergraduate student borrowers instead of high-income, high-balance graduate borrowers. All student loan proposals would apply to loans originating on or after July 1, 2019, except those provided to borrowers to finish their current course of study.

Expands Pell Grant Eligibility for Short-Term Programs. There are many paths to a successful career in addition to a four-year degree. The Budget expands Pell Grant eligibility to include high-quality short-term programs. This would help low-income and out-of-work individuals access training programs that can equip them with skills to secure well-paying jobs in high-demand fields more quickly than traditional two-year or four-year degree programs.

Improves Grantmaking and Maintains Support for Minority-Serving Institutions (MSIs) and Historically Black Colleges and Universities (HBCUs). The Budget maintains important investments to support improvements in academic quality, institutional management and capacity, infrastructure, and student support services for MSIs and HBCUs. In particular, the Budget proposes to improve grantmaking by consolidating six MSI programs into a $147.9 million formula grant, providing funds more institutions can count on and yielding program management efficiencies. The Budget continues to recognize the extraordinary contributions of HBCUs and requests more than

$642 million to support HBCU-focused programs that strengthen their capacity to provide the highest quality education.

Invests in Evidence-Based Postsecondary Preparation Programs. The Budget proposes to restructure and streamline the TRIO and GEAR UP programs by consolidating them into a $550 million State formula grant. These grants would support evidence-based postsecondary preparation programs designed to help low-income students progress through the pipeline from middle school to postsecondary opportunities. Given the statutory prohibition limiting the Department's ability to evaluate overall TRIO program effectiveness using the most rigorous methodologies, as well as budget constraints, the Budget supports a restructuring of the programs that leverages evidence-based activities and allows States more flexibility in meeting the unique needs of their students.

Supports a Reauthorized Higher Education Act (HEA). The Administration looks forward to working with the Congress to encourage colleges, universities, and other educational institutions to offer every student an accessible, affordable, and innovative education tailored to their needs that prepares them for lifelong learning and success. The Administration's principles for an HEA reauthorization include:

- expand Pell Grant eligibility for short-term programs;
- reform Federal student loan and repayment options;
- recalibrate the grant allocation process;
- ensure institutional accountability;
- reduce regulatory burdens;
- improve transparency;
- offer administrative updates and financial flexibility; and
- promote free speech on college campuses.

Workforce

In today's rapidly changing economy, it is more important than ever to prepare workers to fill both existing and newly created jobs and to prepare workers for the jobs of the future. The U.S. education system must provide access to affordable and quality education and training that includes career and vocational tracks. The Budget supports reforms to programs that would help students graduate with the skills necessary to secure high-paying jobs in today's workforce and contribute to the Nation's robust economy.

Supports Career and Technical Education (CTE). As part of the Administration's commitment to supporting the Nation's workforce, the Budget maintains $1.1 billion in funding for CTE. This investment recognizes that students should have access to a full menu of postsecondary educational options including certificate programs, community colleges, and apprenticeships. At the secondary and postsecondary levels, CTE prepares students with the skills necessary to succeed in a broad array of careers and provides an alternate pathway to a traditional four-year degree. The Administration also looks forward to working with the Congress to reauthorize the Carl D. Perkins Act. The Administration's principles for Perkins reauthorization include ensuring that CTE programs prepare students for careers in science, technology, engineering, and mathematics fields and other high-demand areas; promoting partnerships between schools, businesses, and other community organizations; and expanding access to apprenticeship and other work-based learning.

Revamps Federal Work Study to Emphasize Workforce Development. The Budget proposes to reform the Federal Work Study program to support workforce and career-oriented training opportunities for low-income undergraduate students, not just subsidized employment as a means of financial aid, in order to create pathways to high-paying jobs. The program would allocate funds to schools based in part on enrollment of Pell recipients. Schools could fund individual students through subsidized employment, paid internships, or other designs, so long as the placements were career or academically relevant. Schools could also fund broader programs that serve multiple students that expose students to or build their preparedness for careers.

Promotes Science, Technology, Engineering, and Mathematics (STEM) Education. Consistent with the 2017 Presidential Memorandum on STEM education, the Budget provides a path forward to direct at least $200 million to STEM education. Supporting STEM education is imperative to better equip America's young people with the relevant knowledge and skills that would enable them to secure high-paying, stable jobs throughout their careers. As the role of technology grows in driving the American economy, many jobs will increasingly require skills in STEM. The Budget supports STEM education through a variety of programs including those that test and replicate what works in education and a new, $20 million grant program for STEM-focused career and technical education programs.

"As part of my Administration's commitment to supporting American workers and increasing economic growth and prosperity, it is critical that we educate and train our future workforce to compete and excel in lucrative and important STEM fields."

STEM Presidential Memorandum
September 25, 2017

Modernizes and Makes Government More Efficient. The Budget reflects a number of reform proposals aimed at streamlining the Department of Education's internal organization and improving the Department's services to States, districts, postsecondary institutions, and the public, while reducing its workforce.

The Budget supports Federal Student Aid (FSA) in undertaking a monumental student loan servicing upgrade. FSA is reorganizing its fragmented servicing and operating infrastructure in order to provide an innovative, world-class financial services experience for its customers. The Next Generation Financial Services Environment at FSA will start with a mobile-first, mobile-complete engagement layer for all customer interactions that will link with an integrated but nimble new system. Integrated into every aspect of this modernization effort will be state-of-the-art cybersecurity protection. This technical reorganization and modernization effort will provide better service for the over 40 million customers served by FSA, including students and institutions, across the student loan lifecycle. The new environment will help increase awareness and understanding of Federal student aid opportunities and responsibilities, improve FSA's operational flexibility, and enhance cost and operational efficiency, producing better outcomes for students and taxpayers.

Reduces Waste: Streamlines or Eliminates Ineffective or Redundant Programs. The Budget eliminates funding for 29 discretionary programs that do not address national needs, duplicate other programs, are ineffective, or are more appropriately supported with State, local, or private funds. These eliminations would decrease taxpayer costs by $5.9 billion and include the Supporting Effective Instruction State Grants, 21st Century Community Learning Centers, and Federal Supplemental Educational Opportunity Grant programs.

The Budget also reduces funding or consolidates 13 programs to yield program management efficiencies, focus on activities that are supported by the highest levels of available evidence, and empower

States and local entities to meet the unique needs of their students. These efficiencies for programs such as those supporting Minority Serving Institutions, TRIO, GEAR UP, and Federal Work Study would reduce costs by $1.8 billion and support more targeted and effective uses of Federal resources. Overall, the Budget reduces waste in 41 discretionary programs, saving taxpayers more than $7.7 billion.

DEPARTMENT OF ENERGY

Highlights:

- The mission of the Department of Energy is to advance U.S. security and economic growth through transformative science and technology innovation that promotes affordable and reliable energy and meets America's nuclear security and environmental clean-up challenges.
- The Budget protects American prosperity by making strategic investments to maintain global leadership in scientific and technological innovation and aggressively modernize the nuclear security enterprise that underpins the safety and security of Americans, both at home and abroad.
- The Budget requests $29 billion for DOE, a more than 3-percent decrease from the 2017 enacted level.

The President's 2019 Budget:

American leadership in science and technology is critical to achieving the Administration's highest priorities: national security; economic growth; and job creation. American ingenuity combined with free-market capitalism have driven, and will continue to drive, tremendous technological breakthroughs. The Budget for the Department of Energy (DOE) demonstrates the Administration's commitment to American energy dominance, making hard choices, and reasserting the proper role of the Federal Government. The Budget focuses resources on early-stage research and development (R&D) of energy technologies and reflects an increased reliance on the private sector to fund later-stage demonstration and commercialization activities. In so doing, the Budget emphasizes energy technologies best positioned to enable American energy independence and domestic job-growth in the near- to mid-term.

The Budget also reflects the critical role DOE has in protecting the safety and security of the American people, including by ensuring that nuclear and radiological materials worldwide remain secured against theft by those who might use them against the U.S. homeland or U.S. interests abroad. The Budget funds the modernization of nuclear weapons and ensures that the U.S. nuclear force is second-to-none. The Budget ensures continued progress on cleaning up sites contaminated from nuclear weapons production, and energy R&D. The Budget also continues support for a robust interim storage program and the licensing of the Yucca Mountain geologic repository, demonstrating the Administration's commitment to nuclear waste management.

In addition to the priorities laid out below, the Budget proposes the elimination of the Title XVII Innovative Technology Loan Guarantee Program, the Advanced Technology Vehicle Manufacturing Loan Program, and the Tribal Energy Loan Guarantee Program because the private sector is better positioned to finance the deployment of commercially viable energy and advanced vehicle manufacturing projects. The Budget also proposes the elimination of Advanced Research Projects Agency-Energy, recognizing the private sector's primary role in taking risks to commercialize breakthrough energy technologies with real market potential.

The Budget includes several reforms that realign, consolidate, or merge functions within the Department to improve efficiency and effectiveness, such as the consolidation of program-level international affairs activities into a single headquarters office. In addition, the Budget proposes a realignment of DOE program offices to elevate cybersecurity and energy security as priorities within the Department, with the goal of ensuring the security of the American people. DOE is also committed to eliminating waste, fraud, and abuse. For example, the Budget would avoid $10 to $12 billion in waste by terminating construction of the Mixed Oxide Fuel Fabrication Facility in favor of a plutonium disposition alternative. DOE will also continue to improve contract management and oversight to address potential fraud and abuse risks raised by the Government Accountability Office.

Modernizes the Nuclear Arsenal. The Budget for DOE nuclear security programs is aligned with Department of Defense requirements for deterring 21st Century threats and reassuring U.S. allies and partners. The Budget increases investments in the nuclear stockpile to guarantee it is modern, robust, flexible, safe, and effective. Specifically, the Budget supports completing production of the W76-1 Life Extension Program (LEP), preparing the B61-12 LEP and the W88 Alteration 370 for production in 2020, and continuing development of the W80-4 LEP.

Revitalizes the Nuclear Security Enterprise's Aging Infrastructure. Safe, secure, and modern infrastructure at the National Nuclear Security Administration's (NNSA) national laboratories, production plants, and Nevada National Security Site is essential to maintaining the U.S. nuclear deterrent and accomplishing DOE's other national security missions. The Budget makes significant investments in design and construction of facilities, with an emphasis on infrastructure related to strategic materials (e.g., uranium, plutonium, tritium, lithium) that are critical to the nuclear weapons stockpile. NNSA infrastructure is also an important part of a whole-of-government approach to supply chain assurance in microelectronics. NNSA must have a modern, secure, streamlined complex that would meet military requirements, keep the nuclear deterrent safe and effective, and enhance worker and public safety.

Reduces Global Nuclear Threats. Nuclear terrorism and the spread of nuclear weapons constitute two of the most critical threats to American safety and prosperity. The Budget invests in nonproliferation, counterterrorism, and emergency response programs to provide for the safety and security of the American people. The Budget accelerates the Cesium Irradiator Replacement Program, which would reduce the threat of radiological terrorism by permanently removing cesium sources that could be used in dirty bombs. The Budget begins procurement of replacement aircraft for NNSA's Aerial Measuring System to ensure the Nation maintains its radiation detection capabilities for emergency preparedness and response missions. In addition, the Budget supports the removal of additional nuclear materials from around the world and helping countries develop strong programs to secure those that remain, reducing opportunities for terrorists to acquire such material for use in a nuclear weapon.

Maintains Safe Naval Nuclear Propulsion. The Budget provides $1.8 billion to support a strong U.S. Navy through NNSA's Naval Reactors (NR) program. NR works to provide the U.S. Navy with safe, reliable nuclear propulsion plants for submarines and aircraft carriers. The Budget includes

major investments to modernize NR's spent fuel handling infrastructure and develop the reactor systems for the *Columbia*-class ballistic missile submarine.

Supports Cutting-Edge Research and Invests in Leading Scientific User Facilities to Enable Future Breakthroughs in Energy. The Budget provides $4.2 billion for the Office of Science to continue its mission to focus on early-stage research, operate the national laboratories, and continue high priority construction projects. Within this amount, $445 million is for Exascale computing to help secure a global leadership role in supercomputing. The Budget would continue to ensure access to critical scientific user facilities including $100 million for the Long Baseline Neutrino Facility/Deep Underground Neutrino Experiment and $75 million to complete the Facility for Rare Isotope Beams.

Continues Support for Cyber and Energy Security Initiatives across the Department. Ranging from cybersecurity of the electrical grid to prioritization of early-stage R&D focused on hardening energy infrastructure, the Budget prioritizes the energy security for all Americans through continued investments that address cyber threats across the Nation's electrical grid. To ensure robust cybersecurity programs across the energy sector, the Budget Request provides funding in multiple programs, including slightly more than $95 million in the reorganized Office of Cybersecurity, Energy Security, and Emergency Response with a renewed focus on early-stage activities that improve cybersecurity and resilience to harden and evolve critical grid infrastructure. These activities include early-stage R&D at national laboratories to develop the next generation of cybersecurity control systems, components, and devices including a greater ability to share time-critical data with industry to detect, prevent, and recover from cyber events.

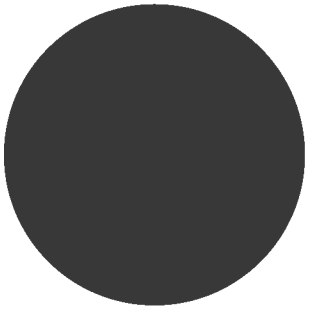
Unleashes an Era of Energy Dominance through Strategic Support for Innovation. The United States has among the most abundant and diverse energy resources in the world, including oil, gas, coal, nuclear, and renewables. The ability of entrepreneurs and businesses to commercialize technologies that take full advantage of those resources is paramount to promoting U.S. economic growth, security, and competitiveness. That is why the Budget provides more than $1.7 billion across the applied energy programs at DOE, which support early-stage R&D that enables the private sector to deploy the next generation of technologies and energy services that usher in a more secure, resilient, and integrated energy system.

> *"When it comes to the future of America's energy needs, we will find it, we will dream it, and we will build it."*
>
> President Donald J. Trump
> June 29, 2017

Within this amount, the Budget provides $757 million for the Office of Nuclear Energy, prioritizing support for early-stage R&D on advanced reactor technologies, including small modular reactors, and advanced instrumentation and manufacturing methods. The Budget also provides more than $300 million for R&D by the Office of Fossil Energy to support national laboratory research on clean, efficient fossil fuels and systems, and bolster early-stage critical materials R&D. In addition, the Budget provides more than $180 million for the Department's Grid Modernization Initiative, a joint effort funded by the Office of Electricity Delivery, the Office of Energy Efficiency and Renewable Energy, and the new Office of Cybersecurity, Energy Security, and Emergency Response. The initiative aims to maintain progress on innovative technologies and operational approaches for achieving a more reliable, resilient, and secure electricity delivery system integrated with energy storage, renewable generation, smart buildings, and electric vehicles.

Implements Reforms in the Environmental Management Program to Accelerate Clean Up of Waste and Contamination from Nuclear Weapons Production. The Budget includes $6.6 billion for 16 sites remaining to be completed. The Budget provides $150 million to carry forward the 2018 Budget initiative to accelerate deactivation and decommissioning of selected high-risk excess facilities to protect human health and the environment, and support modernization of the Nuclear Security Enterprise.

Proposes to Divest Federally Owned and Operated Transmission Assets and Authorize the Power Marketing Administrations (PMAs) to Charge Market Based Rates for Power. The Budget proposes to sell the transmission assets owned and operated by PMAs, including those of Southwestern Power Administration, Western Area Power Administration, and Bonneville Power Administration. The Budget also proposes to authorize PMAs to charge rates based on comparable rates charged by for-profit investor-owned utilities, rather than being limited to cost-based rates, for electricity. The vast majority of the Nation's electricity needs are met through investor owned utilities. Reducing or eliminating the Federal Government's role in electricity transmission infrastructure ownership—thereby increasing the private sector's role—and introducing more market-based incentives, including rates, for power sales from Federal dams, would encourage a more efficient allocation of economic resources and mitigate risk to taxpayers.



DEPARTMENT OF HEALTH AND HUMAN SERVICES

Highlights:

- The Department of Health and Human Services (HHS) works to enhance the health and well-being of Americans by providing effective health and human services and by fostering sound, sustained advances in the sciences underlying medicine, public health, and social services.
- The Budget supports critical investments to enable HHS to deliver on its mission, while also reducing funding or eliminating programs that are ineffective, inefficient, or duplicative. The Budget saves taxpayer dollars and helps move toward the President's vision of an accountable Government that is effective and efficient in its delivery of programs.
- The Budget addresses some of the Nation's most pressing public health needs, investing in efforts to combat the devastating opioid epidemic, making new investments in programs to treat individuals suffering from severe mental illness, and accelerating work on ending infectious diseases. The Budget invests in biomedical research, increases accountability for research dollars, and enhances the Government's preparedness for responding to infectious disease outbreaks or other man-made disasters. The Budget also includes proposals to lower drug costs, strengthen and protect the Medicare program, repeal and replace Obamacare, and provide States more flexibility in Medicaid.
- The Budget continues to invest in key programs and proposes innovative solutions that promote child well-being, build stronger families, and help low-income Americans move from welfare to work.
- The Budget requests $68.4 billion for HHS, a $17.9 billion or 21-percent decrease from the 2017 enacted level. This Budget funding level includes additional funds for program integrity and implementing the 21st Century CURES Act and the 2017 enacted funding levels do not include actual fee collections and contract support costs. The Budget proposes $295 billion in mandatory savings, helping to put Federal spending on a sustainable path. In addition, the Budget includes $675 billion in net mandatory savings across HHS and the Department of the Treasury to repeal and replace Obamacare.

The President's 2019 Budget:

The Budget shows a clear commitment to a better future for all Americans and funds the highest priority HHS activities, such as addressing the opioid crisis, serious mental illness, and emergency preparedness. The Budget strengthens Medicare, repeals and replaces Obamacare, comprehensively reforms Medicaid, and includes a strong focus on program integrity for all health programs.

The Budget delivers on the President's vision to reorganize the Government to improve efficiency, effectiveness, and accountability by putting forward proposals to reorganize HHS. These include: improving the management of the Strategic National Stockpile; streamlining the administrative functions at the National Institutes of Health (NIH); and improving efficiency through examining the effectiveness of the U.S. Public Health Service Commissioned Corps. The Budget also integrates the research of three programs—the Agency for Healthcare Research and Quality, the National Institute for Occupational Safety and Health, and the National Institute on Disability, Independent Living, and Rehabilitation—within NIH to improve coordination and outcomes. Initially, these activities would be established as separate Institutes, but NIH will assess the feasibility of integrating these research activities more fully into existing NIH Institutes and Centers over time.

Combats the Opioid Epidemic. The Budget significantly strengthens efforts to combat the opioid epidemic by including $5 billion in new resources over the next five years. Approximately 64,000 people died in 2016 as the result of drug overdoses, the largest increase in drug deaths ever recorded in a single year in the United States. Deaths from drug overdoses have almost doubled in the last 10 years, and drug overdose is the leading cause of unintentional injury deaths for Americans under the age of 50. A major driver of this crisis is opioids, a class of drugs that includes both legal and illicit drugs such as certain prescription painkillers, heroin, and synthetic opioids such as fentanyl.

The Budget builds upon the Administration's continued efforts—in 2017, the Administration declared a nationwide public health emergency and provided nearly $500 million to States to prevent and treat opioid abuse and addiction; in addition, the 2018 Budget requested another $500 million. The Budget requests $1 billion in new resources for 2019 and a total of $5 billion over the next five years to combat the opioid epidemic by preventing abuse and helping those who are addicted get access to overdose reversal drugs, treatment, and recovery support services.

Where to find help for addiction to opioids and other substances

The Substance Abuse and Mental Health Service Administration's National Helpline, 1-800-662-HELP (4357) provides a free, 24-hour-a-day, 365-day-a-year, information (in English and Spanish) for individuals and family members facing mental illness and/or substance abuse issues. This confidential service provides referrals to local treatment facilities, support groups, and community-based organizations. Callers can also order free publications and other information. Callers are not asked for any personal information other than their zip code or other geographic information in order to accurately identify the local resources appropriate to the caller's needs. Referral information can also be searched online at *https://findtreatment.samhsa.gov/*.

The Administration will increase awareness of the dangers of opioids through a national media campaign, encourage safer prescribing practices to reduce unnecessary prescriptions, and help States improve their Prescription Drug Monitoring Programs. The Administration will continue its work to develop innovative technologies to replace the use of opioids in pain management and to prevent addiction to opioids. In addition, the Administration supports more rigorous research to better understand how existing programs or policies might be contributing to or mitigating the opioid epidemic.

For Medicaid, the Budget proposes expanding coverage of comprehensive and evidence-based Medication Assisted Treatment options, previews forthcoming guidance from the Centers for Medicare & Medicaid Services (CMS) that would set minimum standards for State Drug Utilization Reviews to reduce clinical abuse, and requires States to track and act on high prescribers and utilizers of prescription drugs.

For Medicare, the Budget proposes to test and expand nationwide a bundled payment for community-based medication assisted treatment, including, for the first time, comprehensive Medicare reimbursement for methadone treatment. The Budget also proposes to prevent prescription drug abuse in Medicare Part D and protect beneficiaries from potentially harmful drugs by requiring plan participation in a program to prevent prescription drug abuse, which would promote sound public health policy and help keep premiums down for seniors.

In addition, the Budget proposes to authorize the Secretary to work with the Drug Enforcement Administration to revoke a provider's certificate (which allows a provider to prescribe controlled substances) when that provider is barred from billing Medicare based on a pattern of abusive prescribing.

Reforms Drug Pricing and Payment. The goal of the Administration's comprehensive strategy is to address the problem of high drug prices, provide greater access to lifesaving medical products, and ensure that the United States remains the leader in biomedical innovation. The Budget proposes new strategies to address high drug prices, increase access to lifesaving medicines, rationalize the current payment incentive structure in Medicare Part D and Part B, and foster greater competition among generic pharmaceutical firms.

- Tests Innovative Medicaid Drug Coverage and Financing Reforms—the Budget calls for new Medicaid demonstration authority for up to five States to test drug coverage and financing reforms that build on private sector best practices. Participating States would determine their own drug formularies, coupled with an appeals process to protect beneficiary access to non-covered drugs based on medical need, and negotiate drug prices directly with manufacturers. HHS and participating States would rigorously evaluate these demonstrations, which would provide States with new tools to control drug costs and tailor drug coverage decisions to State needs.

- Speeds Development of More Affordable Generics—the Budget proposes to give the Food and Drug Administration (FDA) greater ability to bring generics to market faster by incentivizing more competition among generic manufacturers. This would lead to greater access for consumers to safe, high-quality, and affordable generic drugs and would improve health and quality of life through FDA's advances in shaping medical practices. The proposal ensures that first-to-file generic applicants who have been awarded a 180-day exclusivity period do not unreasonably and indefinitely block subsequent generics from entering the market beyond the exclusivity period. Under this proposal, when a first-to-file generic application is not yet approved due to deficiencies, FDA would be able to tentatively approve a subsequent generic application, which would start the 180-day exclusivity clock, rather than waiting an indefinite period for the first-to-file applicant to fix the deficiencies in its application. Triggering the start of the 180 day-exclusivity period for first-to-file applicants who "park" their exclusivity would speed delivery of generic drugs and provide substantial cost savings to American consumers.

- Modernizes the Medicare Part D Drug Benefit and Modifies the Part B Drug Payment—the Budget addresses the misaligned incentives of the Part D drug benefit structure and better equips plans with the tools necessary to manage spending. Proposed changes are designed to: lower beneficiary costs at the pharmacy counter by requiring plans to share at the point of sale a portion of rebates that plans receive from drug manufacturers; enhance Part D plans' negotiation power with manufacturers by allowing for additional flexibilities in formulary management; encourage utilization of higher value drugs by eliminating cost-sharing for generic drugs for beneficiaries who receive the low-income subsidy; modify the Part D payment structure to discourage drug manufacturers' price and rebate strategies that increase spending for both beneficiaries and the Government; and provide beneficiaries with more predictable

annual drug expenses through the creation of a new out-of-pocket spending cap. In addition, the Budget modifies payment for Part B drugs to discourage manufacturers from increasing prices faster than inflation and improve payment accuracy. The Budget also modifies hospitals' payment for drugs acquired through the 340B drug discount program by rewarding hospitals that provide charity care and reducing payments to hospitals that provide little to no charity care.

Repeals & Replaces Obamacare and Reforms Medicaid Financing. Obamacare, which substantially shifted regulatory power from the States to the Federal Government in order to standardize coverage, has wreaked havoc on the individual insurance market. Average premiums increased 105 percent from 2013 to 2017 while choices have dwindled. In 2017, people in one-third of U.S. counties only had a single insurer from which to purchase a plan on an exchange. For 2018, approximately 30 percent of enrollees only had choices from a single insurer.

"We will deliver relief to American workers, families, and small businesses, who right now are being crushed by Obamacare, by increasing freedom, choice, and opportunity for the American people."

President Donald J. Trump
March 10, 2017

While many people with expensive medical conditions and those with income sufficiently low enough—below 200 percent of the Federal poverty level—to receive large subsidies have obtained coverage, the exchanges have failed to attract healthier individuals and families with somewhat higher incomes that want affordable options that meet their needs. In addition, the Patient Protection and Affordable Care Act's (PPACA) Medicaid expansion has cost significantly more than expected. For example, in 2015, CMS actuaries increased their estimates of Federal spending for the average Medicaid expansion enrollee in that year by almost 50 percent. Overall, the cost per newly insured individual is far more than what was expected.

The Budget supports a two-part approach to repealing and replacing Obamacare, starting with enactment of legislation modeled closely after the Graham-Cassidy-Heller-Johnson (GCHJ) bill as soon as possible, followed by enactment of additional reforms to help set Government healthcare spending on a sustainable fiscal path that leads to higher value spending. The President is committed to rescuing States, consumers, and taxpayers from the failures of Obamacare, and supporting States as they transition to more sustainable healthcare programs that provide appropriate choices for their citizens. The Budget also provides a path for States and consumers to be relieved from many of the PPACA's insurance rules and pricing restrictions that have resulted in one-size-fits-all plans with soaring premiums and deductibles. This would allow people to buy insurance plans that work for them and that are fairly priced, a substantial benefit to middle class families who do not receive coverage through the workplace.

The Market-Based Health Care Grant Program would provide more equitable and sustainable funding to States to develop affordable healthcare options. The block grant program would promote structural reforms to improve the functioning of the healthcare market through greater choice and competition, with States and consumers in charge rather than the Washington bureaucracy. The Budget would allow States to use the block grant for a variety of approaches in order to help their citizens, including those with high cost medical needs, afford quality healthcare services. The block grant approach also reflects the Administration's view that Government subsidies are better targeted to States and consumers rather than funneled through insurance companies as with the PPACA.

The President is also committed to the comprehensive Medicaid reform in the GCHJ bill, including the repeal of the Obamacare Medicaid expansion and reducing State gimmicks, such as provider taxes, that raise Federal costs. Medicaid financing reform would empower States to design individual, State-based solutions that prioritize Medicaid dollars for the most vulnerable and support innovations such as community engagement initiatives for able-bodied adults. National healthcare spending trends are unsustainable in the long term and the Budget includes additional proposals to build upon the GCHJ bill to make the system more efficient, including proposals to align the Market-Based Health Care Grant Program, Medicaid per capita cap, and block grant growth rates with the Consumer Price Index (CPI-U) and to allow States to share in program savings.

This two-part approach in the Budget ensures that States have the financial support they need to transition away from Obamacare, while allowing greater choice and competition in healthcare markets and more sustainable Government health spending over the long term.

Provides States with Flexibility to Modernize Medicaid. In addition to the program flexibilities included in the Budget proposal to repeal and replace Obamacare, and building on the recent Administration guidance allowing States to explore community engagement requirements for able-bodied adults in Medicaid, the Budget proposes to empower States to further modernize Medicaid benefits and eligibility. The Budget would give States additional flexibility around benefits and cost-sharing, allow States to consider savings and other assets when determining Medicaid eligibility, and reduce waste by counting lottery winnings as income for Medicaid eligibility. These proposals enable the Federal and State governments to be partners in greater fiscal responsibility which would preserve and protect the Medicaid program for Americans who truly need it.

Improves Program Integrity for Medicare, Medicaid, and the Children's Health Insurance Program (CHIP). The Budget includes legislative proposals and administrative actions to strengthen the integrity and sustainability of Medicare, Medicaid, and CHIP. Combined with additional funding investments, these policies would provide CMS with additional resources and tools to combat fraud, waste, and abuse and to promote high-quality and efficient healthcare.

Health Care Fraud and Abuse Control: $5 returned for every $1 spent

Additional funding for the Health Care Fraud and Abuse Control (HCFAC) program has allowed CMS in recent years to shift away from a "pay-and-chase" model toward identifying and preventing fraudulent or improper payments from being paid in the first place. The return on investment for the HCFAC account was $5 returned for every $1 expended from 2014-2016. The Budget proposes HCFAC discretionary funding of $770 million in 2019, which is $45 million higher than the 2017 enacted level.

To improve fiscal integrity and transparency in Medicaid payment policy, CMS will propose guidance to improve timely and complete data collection on Medicaid supplemental payments, including the financing of such payments. In addition, current law allows States to make Medicaid provider payments far in excess of actual service costs. States have used this additional money to leverage Federal reimbursements in excess of their Medicaid matching rate or for other purposes. To avoid this misuse of funds, the Budget also proposes to limit reimbursement to Government providers to no more than the cost of providing services to Medicaid beneficiaries.

Strengthens and Protects the Medicare Program. Consistent with the President's commitment to protect Medicare, the Budget proposes to improve program efficiency, enhance program integrity, and bolster program solvency to ensure the sustainability of the Medicare program for current and future generations. To accomplish this, the Budget works to restructure and bring transparency and accountability to payments that do not directly relate to Medicare's health insurance role,

by financing them outside the Hospital Insurance trust fund and modifying their growth rate. The Budget ensures payments accurately align with the costs of care to address perverse payment incentives identified by non-partisan experts that drive overutilization or clinically inappropriate use of more expensive sites of care. This would improve the quality of care seniors receive and better protect them from excessive out-of-pocket costs. The Budget also supports the Administration's commitment to reduce provider burden by providing hospitals and physicians freedom to use electronic health records as they deem best by removing ineffective Federal penalties and requirements, eliminating reporting burden and low-value metrics in performance-based payment for physicians, improving incentives for physicians to participate in advanced payment models that reward high-value healthcare delivery, and providing CMS with greater flexibility in beneficiary education and quality assurance. The Budget creates a new option for Medicare beneficiaries to save for out of pocket healthcare expenses by allowing tax deductible contributions to health savings accounts associated with high deductible health plans offered by employers or Medicare Advantage. The Budget would extend Medicare's solvency by roughly eight years.

Serves Older Americans. The Budget prioritizes funding for programs that address the needs of older Americans, many of whom require some level of assistance to continue living independently or semi-independently within their communities. This funding provides critical help and support to seniors and caregivers. These programs provide direct services such as respite care, transportation assistance, and personal care services. These services also include $838 million for senior nutrition programs. This funding is estimated to provide 222 million meals to 2.4 million older Americans nationwide.

Improves Treatment for Serious Mental Illness. The Budget requests new investments to improve treatment for individuals suffering from serious mental illness. Approximately 35 percent of the more than 10 million adults in the United States that suffer from serious mental illness did not receive mental health services in the past year. The Budget requests new investments to ensure more adults with serious mental illness receive Assertive Community Treatment, an evidence-based practice that provides a comprehensive array of services to reduce costly hospitalizations. The Budget also increases funding to improve mental health services for seriously mental ill individuals who are involved with the criminal justice system. The Budget maintains funding for the Community Mental Health Services Block Grant, which requires States to support services for first episode psychosis, which is vitally important to ensuring that individuals with serious mental illness receive appropriate treatment in a timely manner.

Enhances Emergency Preparedness and Health Security. The Budget proposes to transfer the Strategic National Stockpile to the HHS' Assistant Secretary for Preparedness and Response from the Centers for Disease Control and Prevention (CDC). This move consolidates strategic decision-making around the development and procurement of medical countermeasures, and streamlines leadership to enable nimble responses to public health emergencies. The Budget also prioritizes funding for the Biomedical Advanced Research and Development Authority, BioShield, and pandemic influenza, to continue to build on investments to protect the civilian population in the event of public health emergencies related to infectious disease outbreaks, and other man-made crises. A disease threat anywhere is a disease threat everywhere, so the United States will continue to support capacity building in other countries so that they can stop outbreaks at their source before they reach the U.S. homeland. Through CDC, the Budget proposes new investments via the Global Health Security Agenda to strengthen countries' abilities to respond to infectious disease outbreaks whether naturally occurring, accidental, or deliberate.

Accelerates Progress on Infectious Disease Elimination. Progress on fighting infectious diseases such as HIV/AIDS, viral hepatitis, sexually transmitted disease, and tuberculosis continues,

but much work remains—approximately 40,000 Americans are newly infected with HIV each year and there were more than two million cases of chlamydia, gonorrhea, and syphilis reported in the United States in 2016—the highest number ever recorded. The Budget requests $40 million for a new demonstration initiative within CDC focused on jointly eliminating multiple infectious diseases using intensive prevention, screening, and treatment/referral as treatment efforts. This initiative would focus on at least five States/jurisdictions, particularly those that are seeing a rise in infectious diseases related to opioid abuse. The Budget also includes a focus on accelerating the elimination of perinatal HIV transmission in the United States.

Reauthorizes the Ryan White HIV/AIDS Program. The Ryan White HIV/AIDS Program provides a comprehensive system of primary medical care, treatment, and supportive services to over half a million people living with HIV, which is more than half of the people in the United States who have been diagnosed with HIV. The Budget supports reauthorizing the Ryan White program to ensure Federal funds are allocated to address the changing landscape of HIV across the United States. Reauthorization of the Ryan White Program should include data-driven programmatic changes as well as simplifying and standardizing certain requirements and definitions. These changes would ensure Federal funds may be allocated to populations experiencing high or increasing levels of HIV infections/diagnoses while continuing to support Americans already living with HIV across the Nation.

Addresses Overlapping and Burdensome Food Regulation. FDA will continue to work with the U.S. Department of Agriculture to streamline regulatory and inspection activities to ease burden on the industry by reducing the number of businesses that are inspected by both agencies. FDA will also support development of a State-based safety infrastructure by evaluating whether States will have an increased role in conducting inspections on larger farms on behalf of FDA and continuing outreach and education to small farms as they prepare for their upcoming compliance dates.

Reforms Federal Investments in the Healthcare Workforce. The Budget proposes to improve the effectiveness of Federal investments in the healthcare workforce to better address provider shortages. To better target Federal spending on graduate medical education (GME) and increase transparency and accountability, the Budget consolidates GME spending in Medicare, Medicaid, and the Children's Hospital GME Payment Program into a new mandatory GME capped grant program. Funding would be distributed to hospitals that are committed to building a strong medical workforce and would be targeted to address medically underserved communities and health professional shortages. The Budget also proposes to eliminate $451 million in other health professions and training programs, which lack evidence that they significantly improve the Nation's health workforce. The Budget continues to fund high value health workforce activities, such as the National Health Service Corps, that provide scholarships and loan repayment in exchange for service in areas of the United States where there is a shortage of health professionals.

Modernizes How the Government Employs Public Health Professionals. The U.S. Public Health Service Commissioned Corps (Corps) consists of over 6,500 uniformed public health professionals who work alongside their equivalent civilian counterparts performing the same day jobs but often receiving higher total compensation. The Corps receives military-like benefits, but has not been incorporated into the Armed Forces since 1952 and generally does not meet the Department of Defense's criteria for the military compensation system. Further, the Corps' mission assignments and functions have not evolved in step with the public health needs of the Nation. It is time for that to change. HHS is committed to providing the best public health services and emergency response at the lowest cost, and is undertaking a comprehensive look at how the Corps is structured. The specific recommendations and plans resulting from this analysis will be released in the months ahead and could range from phasing out unnecessary Corps functions to reinventing the Corps into a smaller, more targeted cadre focused on providing the most vital public health services and emergency response.

The goal of this proposal is to modernize how the Government employs public health professionals and how HHS responds to public health emergencies, saving Federal funds, and reducing duplication while safeguarding the well-being of the Nation.

Prioritizes Direct Health Services for American Indians and Alaska Natives. The Budget increases access to direct health services for American Indians and Alaska Natives by funding the staffing and operations of newly constructed facilities, extending services to three newly recognized Tribes, and increasing resources available for accreditation emergencies to address ongoing health-care delivery challenges in the Great Plains area.

Prohibits Certain Abortion Providers from Receiving Federal Funds. The Budget includes provisions prohibiting certain abortion providers from receiving Federal funds from HHS, including those that receive funding under the Title X Family Planning program and Medicaid, among other HHS programs.

Supports Children and Families in Achieving Their Potential. The Budget continues to invest in programs that help American families and children thrive. The Budget supports States in providing key services to children and youth by increasing State flexibilities and reducing administrative burdens in foster care. These child welfare reforms focus on preventing the need for foster care unless absolutely necessary to ensure families can remain intact. The Budget also helps working families afford and access child care by maintaining Federal funding for key HHS child care programs and using these investments to leverage additional State support for child care. In addition, the Budget promotes evidence-building and innovation to strengthen America's safety net, proposes improvements to the Temporary Assistance for Needy Families program, and supports efforts to get noncustodial parents to work. Together, these proposals reflect the Administration's commitment to helping low-income families end dependency on Government benefits and promote the principle that gainful employment is the best pathway to financial self-sufficiency and family well-being.

Rightsizes the Proper Role of the Federal Government. The Budget continues the 2018 Budget proposals to eliminate low-performing or ineffective programs, such as the Low Income Home Energy Assistance Program (LIHEAP) and the Community Services Block Grant (CSBG). Many States and utility companies currently provide energy assistance services, reducing the need for a distinct Federal program to fulfill this role. Further, LIHEAP is unable to demonstrate strong performance outcomes, and the Government Accountability Office has raised concerns about fraud and abuse in the program in the past. CSBG also has difficulty in demonstrating effective outcomes. In addition, eligible entities that receive funding from CSBG receive funding from many other sources, including other Federal sources. CSBG accounts for just five percent, on average, of total funding that these eligible entities receive, and these funds are distributed by a formula that is not directly tied to performance and outcomes.

DEPARTMENT OF HOMELAND SECURITY

Highlights:

- The mission of the Department of Homeland Security (DHS) is to secure the Nation from the many threats it faces. DHS safeguards the American people, the homeland, and America's values by: preventing terrorism and enhancing security; managing the borders; administering immigration laws; securing cyberspace; and ensuring disaster resilience.
- The Budget requests $46 billion in discretionary appropriations for DHS, a $3.4 billion or 8-percent increase from the 2017 enacted level (excluding updated 2017 receipts). In addition, $6.7 billion is available to help communities overwhelmed by major disasters.
- Critical investments include $1.6 billion for construction of the border wall and $782 million to hire and support 2,750 additional law enforcement officers and agents at U.S. Customs and Border Protection (CBP) and U.S. Immigration and Customs Enforcement (ICE). The Budget also requests $2.5 billion for detaining up to 47,000 illegal aliens on a daily basis.
- The Budget ensures the appropriate use of taxpayer dollars by reducing Federal programs that support activities that are primarily the responsibility of State and local governments.

The President's 2019 Budget:

In the years since the 9/11 terrorist attacks, the Nation has faced numerous ongoing and emerging threats. U.S. adversaries continue to devise new ways to attack and undermine the American way of life. DHS is continuously vigilant in its efforts to protect the Nation, strengthen communities' preparedness and resilience, and respond to and recover from emergencies that occur. The Budget increases funding for border security, immigration enforcement, cybersecurity, and law enforcement capabilities. The Budget fully funds DHS's critical operations to provide the American people the security they expect and deserve.

Secures the Borders of the United States. Each day, DHS works to protect the American people and economy by preventing the illegal movement of people and contraband across U.S. borders, including the materials that could be used to produce weapons of mass destruction. CBP and the U.S. Coast Guard (USCG) patrol more than 5,000 miles of border with Canada, 1,900 miles of border with Mexico, and 95,000 miles of shoreline to intercept threats originating beyond the Nation's borders. The Budget invests in border security to protect the American people, while facilitating

"I could not be prouder to serve alongside the men and women of the Department of Homeland Security. And we, as a Nation, owe them a debt of gratitude for taking on some of the toughest, most important jobs in America. While you're having your morning coffee, the Coast Guard is pulling a fisherman aboard after his boat capsized in stormy seas. While you're deciding what you want for lunch, the Federal Law Enforcement Training Center is teaching law enforcement officers how to respond to an active shooter… While you're zoning out on your commute home, Homeland Security Investigators are closing in on a dangerous child predator. While you're binge-watching Mad Men on Netflix, TSA is stopping an actual mad man with a loaded gun from boarding a flight to Disney World."

John F. Kelly
White House Chief of Staff, as DHS Secretary
April 18, 2017

legitimate trade and travel to advance American prosperity.

As shown in the chart below, since the start of the Administration in 2017, apprehensions of illegal border crossers have dropped between ports of entry. At the same time, DHS has accelerated its apprehension of illegal aliens within the United States.

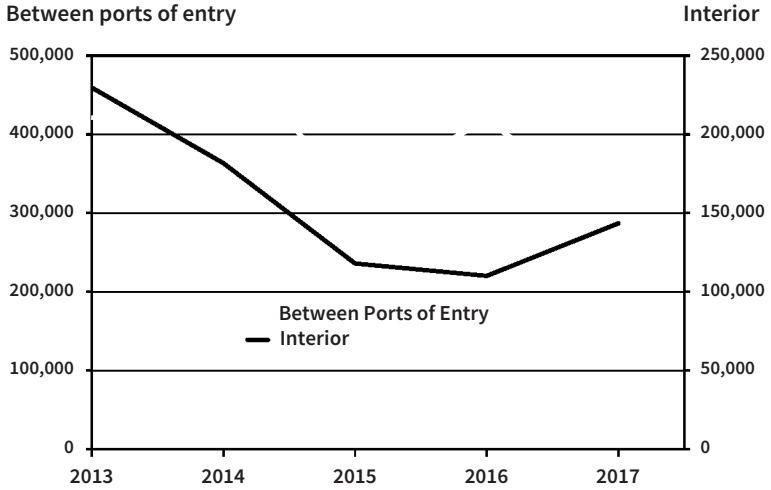
The Budget follows through on the President's commitments on border security. As part of the Administration's proposal for $18 billion to fund the border wall, the Budget requests $1.6 billion to construct approximately 65 miles of border wall in south Texas. The Budget also provides funding to hire 2,000 additional ICE law enforcement officers and 750 Border Patrol agents. The Budget makes these significant investments while continuing to fund surveillance and other border security technologies and initiatives.

The Budget also continues to modernize USCG's vessels and aircraft that patrol the waters off the Nation's coasts. These vessels and aircraft serve as America's first line of defense at sea. USCG works every day to stop illegal aliens traveling by maritime routes, and disrupts the flow of cocaine and other illegal drugs well before they can poison communities. New assets deployed by USCG, such as the National Security Cutter, are also much more effective at detecting threats and stopping them before they reach American shores.

Ensures the Immigration System Works. The Budget invests in critical law enforcement programs that would ensure the immigration system works, including hiring 2,000 new ICE law enforcement officers in 2019. This doubles the number of new ICE officers who would be hired in 2018. These new law enforcement personnel would help fulfill the President's commitment to apprehend and deport illegal aliens, dismantle smuggling networks, and enhance public safety.

In addition, in order to combat immigration fraud, the Budget proposes a new approach to fund ICE investigators by collecting $208 million in fees from immigration

Fewer Illegal Border Apprehensions and Increased Interior Apprehensions



Source: Department of Homeland Security, 2017

applicants. These funds would ensure ICE has what it needs to disrupt criminal enterprises conducting document and benefit fraud, while also stopping unscrupulous employers that hire illegal aliens and undermine job opportunities for Americans.

Companies that employ illegal aliens violate the law, harm U.S. workers, and fuel other crimes such as human smuggling, document fraud, identity theft, money laundering, and labor violations. In order to crack down on illegal employers, the Budget continues to call for mandatory, nationwide use of the E-Verify system. E-Verify is an online tool that allows businesses to determine the eligibility of their employees to work in the United States, can be used at no cost to employers, and has an over 99-percent accuracy rate.[1] The Administration continues to enforce E-Verify use by Federal contractors, which has been required for many years.

Secures Cyberspace. The President has affirmed the important role that DHS plays in combating cyberattacks and protecting the Nation's critical infrastructure. The Budget includes $1.0 billion to support DHS's efforts to safeguard the Federal Government's civilian information technology systems against cybersecurity threats. These funds also support DHS efforts to share cybersecurity information with State, local, and tribal governments, as well as with international partners and the private sector. As these threats continue to evolve, DHS cybersecurity programs are more important than ever.

Secures the Nation's Transportation Systems. The Transportation Security Administration (TSA) ensures the security of the Nation's various transportation systems. In addition to screening more than two million passengers and millions more bags daily, TSA supports security of air cargo, mass transit systems, passenger and freight railways, pipelines, highways, and ports. In 2016, TSA discovered 3,391 firearms in carry-on bags at checkpoints across the United States, averaging more than nine firearms per day. Of those, 83 percent were loaded. The Budget provides approximately $7.7 billion to support the TSA employees and technology that ensure the free movement of people and commerce.

National Flood Insurance Program's Reinsurance Purchase Pays Off During Hurricane Harvey

In January 2017, FEMA purchased reinsurance coverage for the National Flood Insurance Program, which would provide up to $1 billion in payment to FEMA if flood insurance claims from a single event exceeding $4 billion. The reinsurance overage paid off when Hurricane Harvey hit the coast of Texas in August of 2017. This investment gave FEMA nearly $7 for every $1 of reinsurance coverage purchased, keeping the program from falling further into debt and protecting taxpayer funds. FEMA plans to continue purchasing reinsurance as a way to protect against losses resulting from catastrophic disasters.

Protects against Emerging Threats. Within TSA, the Budget invests $71 million in new technology to make airport screening more effective and faster. Computed tomography, used for years in hospital and industrial applications, is being adapted for aviation checkpoints to address emerging threats to passenger flights. The technology provides high-definition 3D images that screeners can zoom and rotate to identify and remove suspicious items before they get onto an airplane.

The Budget also enhances DHS's ability to counter the threat to the homeland from weapons of mass destruction including efforts overseas and domestically. The Budget supports DHS's plans to establish a new Countering Weapons of Mass Destruction Office, which would unify the Department's various chemical, biological, radiological, and nuclear counter-threat missions. This reorganization would allow the Department to protect the United States from weapons of mass destruction more efficiently and effectively.

[1] *https://www.uscis.gov/e-verify/about-program/performance*

> *"State, local, tribal, and territorial governments, along with the residents in the impacted areas, are the true first responders."*
>
> Brock Long
> FEMA Administrator
> October 31, 2017

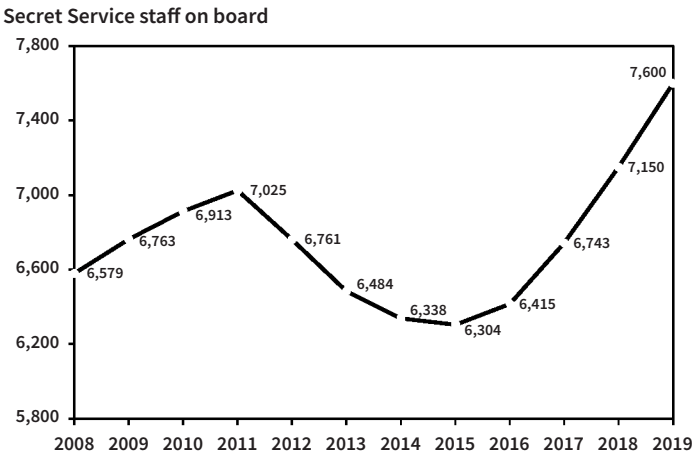
Strengthens State and Local Investments in National Preparedness. The Budget requests $1.9 billion for the Federal Emergency Management Agency (FEMA) for its programs that award grants to State and local governments. These funds help equip emergency responders so they can be prepared for natural or manmade disasters. Responding to and recovering from any disaster is a whole community effort that relies on the strength of Federal agencies such as FEMA, State, local, and tribal governments, and nongovernmental entities and individuals. The Budget also supports efforts by communities to invest their own resources by establishing a non-Federal cost share for certain FEMA grant programs, and proposing to eliminate the National Domestic Preparedness Consortium.

Assists Communities when Disaster Strikes. The Budget proposes $6.9 billion for the FEMA Disaster Relief Fund to ensure effective response to and recovery from emergencies and major disasters. This funding helps survivors get back on their feet while restoring essential community services and facilities. Within these amounts, the Budget provides $24 million to the DHS Office of the Inspector General to exercise robust oversight of disaster-related spending, ensuring accountability for taxpayer dollars.

Catastrophic storms in the fall of 2017 demonstrated the importance of flood insurance in helping individuals quickly recover. However, flood claims for damages from the storms drove the National Flood Insurance Program (NFIP) deeper into debt. The Administration recognizes that flood insurance rates must increase so that policyholders' premiums reflect the risk of living in flood zones. The Administration has proposed various reforms to the Congress that would ensure the continued financial stability of the NFIP while maintaining affordability for low-income policyholders, and expand the private market to get the Federal Government out of the flood insurance business.

Protects the Nation's Leaders by Strengthening the Secret Service. The Budget provides $2.2 billion for the U.S. Secret Service, fully supporting the Agency's dual missions of protecting the Nation's leaders while securing America's financial systems. The Budget proposes hiring an additional 450 special agents, officers, and professional staff at the Secret Service. This would keep the Agency on a path to reach its staffing goal of 7,600 employees by the end of 2019, the highest level ever (see chart). This increase fulfills key recommendations from independent reviews of Secret Service operations, continuing the Administration's progress toward improving the morale of this critical law enforcement agency.

Strengthening Protection of U.S. Leaders



Source: Office of Personnel Management (FedScope), 2017.

Improves the Efficiency of the Federal Government. The Budget proposes transferring operational responsibility for the National Bio and Agro-Defense Facility (NBAF) from the DHS Science and Technology Directorate to the United States Department of Agriculture (USDA). Given that USDA is already responsible for the research programs that would be at this facility once construction is completed, it makes sense for USDA to manage the facility itself. DHS would oversee construction through completion and support USDA transition. Shifting NBAF operations to USDA would allow the Science and Technology Directorate to focus on its primary research and development mission.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Highlights:

- The Department of Housing and Urban Development (HUD) promotes decent, safe, and affordable housing for Americans and provides access to homeownership opportunities.
- The Budget reflects the President's commitment to fiscal responsibility by reforming programs to encourage the dignity of work and self-sufficiency while supporting critical functions that provide assistance to vulnerable households. The Budget recognizes a greater role for State and local governments and the private sector to address community and economic development needs and affordable housing production.
- The Budget requests $39.2 billion in gross discretionary funding for HUD, an $8.8 billion or 18.3-percent decrease from the 2017 enacted level.

The President's 2019 Budget:

HUD promotes affordable housing for low-income families and supports access to homeownership. A secure, healthy housing situation is a foundation on which families can establish economic security, improve their quality of life, and form strong communities. In a fiscally constrained environment, the Budget strategically invests $39.2 billion in programs to support HUD's core functions, and ensures HUD programs remain a vital resource to the most vulnerable households and first-time homeowners. The Budget provides $33.8 billion for HUD's rental assistance programs and requests legislative reforms to place these programs on a more fiscally sound path while encouraging work and self-sufficiency for tenants. The Budget also continues to support efforts across the United States to reduce homelessness and remove lead and other hazards from over 9,500 homes. For first-time and low- to moderate-income homebuyers, HUD's Federal Housing Administration (FHA) remains a critical source of mortgage financing.

The Budget also eliminates programs that are duplicative or have failed to demonstrate effectiveness, such as the Community Development Block Grant (CDBG) program, and devolves responsibility for community and economic development to State and local governments that are better equipped to respond to local conditions.

Reforms Rental Assistance. The Budget requests $33.8 billion across HUD's rental assistance programs, a decrease of 11.2 percent relative to the 2017 enacted level. To address the increasing and unsustainable Federal costs of rental assistance, the Budget requests legislative reforms that

would produce significant cost savings. In addition to these reforms, the Budget proposes program-specific savings in the Housing Voucher and Public Housing programs. The Budget does not request funding for the Public Housing Capital Fund, as the provision of affordable housing should be a responsibility more fully shared with State and local governments. These funding levels, while significantly reduced from the 2017 enacted level, should support currently assisted households while strategically decreasing the Federal footprint of HUD's rental assistance programs over time.

Encourages Work Among HUD-Assisted Households. The Budget proposes legislative reforms to encourage work and self-sufficiency across its core rental assistance programs, consistent with broader Administration goals. Currently, tenants generally pay 30 percent of their adjusted income toward rent. The Administration's reforms require able-bodied individuals to shoulder more of their housing costs and provide an incentive to increase their earnings, while mitigating rent increases for the elderly and people with disabilities. The Administration's legislative proposal would also reduce administrative and regulatory burdens and allow communities further flexibility to develop tenant rent requirements that are consistent with local needs and objectives.

Leverages Private Capital for Housing Improvements. The Budget provides investments and statutory authorities to facilitate a shift from the Public Housing funding platform to Housing Vouchers and Project-Based Rental Assistance (PBRA). The Voucher and PBRA programs benefit from greater private sector involvement and are able to leverage private financing to modernize their units, generally resulting in higher quality housing for assisted low-income families. To further this objective, the Budget requests $100 million for the Rental Assistance Demonstration, which supports the redevelopment of Public Housing units through conversion to the Housing Voucher and PBRA funding platforms. Additional authorities in the Public Housing program, such as tenant protection vouchers and the strategic release of certain public housing assets, would also assist in this effort.

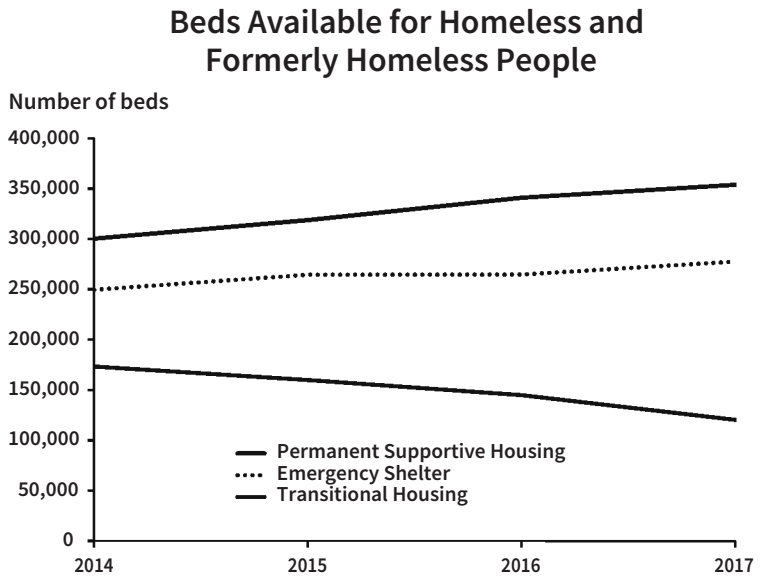
Establishes EnVision Centers for a Holistic Approach to Self-Sufficiency. On December 7, 2017, Secretary Ben Carson announced the launch of EnVision Centers to help HUD-assisted households achieve self-sufficiency and deliver on the President's commitment to a better future. Detroit, Michigan is home to the first of 10 sites that will be part of this demonstration. EnVision Centers will provide communities with a centralized hub for HUD's four pillars of self-sufficiency: 1) Economic Empowerment; 2) Educational Advancement; 3) Health and Wellness; and 4) Character and Leadership. Through partnerships with non-profits, corporations, and State and local governments, these EnVision Centers would leverage private and public resources for maximum community impact. The Budget requests funding to evaluate these EnVision Centers, and adjust the program design and improve implementation if needed to achieve better outcomes for individuals and communities.

"We need to think differently about how we can empower Americans to climb the ladder of success. EnVision Centers are designed to help people take the first few steps towards self-sufficiency."

Ben Carson
Secretary
December 7, 2017

Promotes Economic Mobility and Improves Quality of Life. The Budget requests $75 million for the Family Self-Sufficiency program and $10 million for the Jobs-Plus Initiative. By connecting HUD-assisted households to social services and employment resources, these programs help tenants maximize their earning potential and improve their financial situations and quality of life. Rigorous evaluations have shown that the Jobs-Plus program produces lasting increases in the wage earnings of tenants.

Continues Supporting Communities in their Efforts to Reduce Homelessness. The Budget requests $2.4 billion for the Homeless Assistance Grants (HAG) program, equal to the 2017 enacted level. HAG primarily funds the Continuum of Care program, which is designed to be a coordinated community-based network of programs to prevent and address local homelessness. HUD uses its annual grant competition to encourage grantees to allocate funds to evidence-based and cost-effective strategies. These policies have encouraged communities to increasingly support evidence-based interventions such as permanent supportive housing rather than models such as transitional housing that have been proven less effective. The Budget also requests $255 million for Emergency Solutions Grants, which would enable municipalities to support emergency shelter, rapid re-housing, and homelessness prevention.



Source: HUD's 2017 Annual Homeless Assessment Report to the Congress, December 2017.

Reduces Lead Exposure for Low-Income Children. Lead paint in housing presents a significant threat to the health, safety, and future productivity of America's next generation. The Budget continues to make progress to promote healthy and lead-safe homes by requesting $145 million, equal to the 2017 enacted level, for the mitigation of lead-based paint and other hazards in low-income homes, especially those in which children reside. This funding level also includes resources for enforcement, education, and research activities to further support this goal. Research suggests that this program generates high returns on investment due to higher wages and reduced medical costs.

Supports Sustainable Homeownership Opportunities and Upgrades FHA Operations. The Budget preserves access to sustainable homeownership opportunities for creditworthy borrowers through FHA and Ginnie Mae credit guarantees. FHA provides a crucial source of mortgage financing for first-time homebuyers, who accounted for over 80 percent of FHA-insured home purchase loans in 2017. FHA's activities enable these new homeowners to build wealth and establish economic security. The Budget requests an additional $20 million above the 2017 enacted level of $130 million for FHA to upgrade its operations by investing in information technology and contract support. This additional funding is fully offset by a modest new fee on FHA lenders, better aligning the responsibilities for the costs and benefits of this program.

Eliminates Major Block Grants. Similar to the 2018 Budget, the Administration continues to propose eliminating funding for programs that lack measureable outcomes and are ineffective. The Budget eliminates HUD's community and economic development as well as affordable housing production programs. The Budget eliminates CDBG, a program that has expended more than $150 billion since its inception in 1974, but has not demonstrated sufficient impact. Studies have shown that the allocation formula, which has not been updated since 1978, is ineffective at targeting funds to the areas of greatest need, and many aspects of the program have become outdated. The Budget also eliminates the HOME Investment Partnerships Program, which has not been authorized since 1994. The Budget devolves responsibility to State and local governments, which are better positioned to assess local community needs and address unique market challenges.

DEPARTMENT OF THE INTERIOR

Highlights:

- The Department of the Interior (DOI) conserves and manages natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and evidence-based information about America's natural resources and hazards, supports safe and responsible development of Federal energy resources, and honors the Nation's trust responsibilities and special commitments to American Indians, Alaska Natives, and U.S.-affiliated island communities to help them prosper.
- The Budget request for DOI prioritizes energy development programs, infrastructure improvements on public lands, and DOI-wide reorganization efforts. The Budget eliminates funding for unnecessary or duplicative programs while reducing funds for lower priority activities, including land acquisition and various grant programs.
- The Budget requests $11.3 billion for DOI, a $2.2 billion or 16-percent decrease from the 2017 enacted level. This funding level includes changes in mandatory programs.

The President's 2019 Budget:

DOI's mission affects the lives of all Americans. The Department protects and manages the Nation's natural resources and cultural heritage, manages development of energy and mineral resources on Federal lands and waters, provides scientific and other information about the Nation's natural resources, manages water infrastructure, honors trust responsibilities to American Indians and Alaska Natives, and fulfills commitments to Insular areas. The Budget reflects the Administration's commitment to promoting economic and energy security by developing domestic energy resources. These efforts put the safety and security of America first by reducing U.S. dependency on energy from foreign nations. The Budget also makes investments to improve public lands and water infrastructure, reorganize and reform Departmental operations, streamline administrative functions, improve public access to outdoor recreation, and uphold unique tribal trust responsibilities. At the same time, the Budget reflects the President's commitment to fiscal responsibility by eliminating unnecessary or low priority programs and reducing administrative overhead costs.

Strengthens America's Energy Security. The Budget increases funding for DOI programs that support safe and responsible development of energy on public lands and offshore waters. DOI has proposed an aggressive strategy for leasing offshore oil and gas under its Draft Proposed Program for 2019-2024. Onshore, the Administration is taking steps to initiate oil and gas leasing in

> *"It's important that the taxpayers and Tribes get the full and fair value of traditional and renewable energy produced on public lands and offshore areas."*
>
> Ryan Zinke
> Secretary
> September 1, 2017

the coastal plain of the Arctic National Wildlife Refuge, which was recently authorized by the Congress. The Department will also continue to make new areas available for renewable energy development—both onshore and offshore—and will prioritize renewable project permitting consistent with industry demand. The Budget also maintains funding for scientific research and data collection to inform responsible energy and mineral development, while minimizing the environmental impacts of these activities. Combined with administrative reforms to streamline permitting processes, these efforts would provide industry with access to the energy resources America needs, while ensuring that taxpayers receive a fair return from the development of these public resources.

Supports Historic Effort to Reorganize DOI. The Budget provides $18 million to help initiate DOI's internal reform plan, which would move away from the current bureau and State-based regional system of management toward an integrated Federal land and water management approach organized around watersheds. This "one-agency model" approach proposes to improve cross-bureau collaboration, reduce duplication, and move resources closer to land management units. DOI's reform plan breaks silos among bureaus by creating a common regional structure, co-locating regional offices, and improving coordinated decision-making. On the whole, these efforts are expected to facilitate better management of important resources such as watersheds, wildlife corridors, trail systems, infrastructure assets, and recreational systems.

Launches Public Lands Infrastructure Fund. Interior manages an infrastructure asset portfolio with a replacement value exceeding $300 billion, which includes buildings, housing, trails, roads, water systems, and Bureau of Indian Education (BIE) schools. Many of these assets are deteriorating, with older assets becoming more expensive to repair and maintain in good condition. The Budget would establish a new Public Lands Infrastructure Fund to help pay for repairs and improvements in national parks, wildlife refuges, and at BIE schools, which have more than $12 billion in deferred maintenance. The fund would be derived from 50 percent of incremental energy leasing receipts over 2018 Budget projections that are not otherwise allocated for other purposes. As DOI works to expand Federal energy development on Federal lands and waters, this initiative has the potential to generate up to $18 billion over 10 years for parks and other public lands infrastructure. This investment would significantly improve the Nation's most visible and visited public facilities that support a multi-billion dollar outdoor recreation economy.

Invests in Preservation of National Park Service Assets for Future Generations. For over 100 years, the National Park Service (NPS) has preserved assets in parks and historic sites that represent America's unique history. The Budget provides $257 million to help address the $11 billion NPS deferred maintenance backlog. In conjunction with the mandatory funding provided by the Public Lands Infrastructure Fund, these investments would lead to measurable upgrades on NPS's highest priority assets.

Streamlines Permitting and Reviews. DOI administers several foundational environmental and historic preservation statutes and manages more than 20 percent of the Nation's lands, making it responsible for the review and permitting of actions affecting those responsibilities. The Budget commits to a better future by reducing inefficiencies in the environmental review and permitting processes, which would allow the American people to enjoy improved infrastructure sooner. For example, the Budget maintains core funding for Fish and Wildlife Service Endangered Species Act

consultations and related activities; these consultations help facilitate the delivery of infrastructure projects while ensuring the protection of imperiled species. The Budget also strengthens the Bureau of Land Management's ability to efficiently facilitate and administer development of energy transmission projects.

Improves DOI's Procurement of Goods and Services and Management of Administrative Functions. DOI will realize $50 million in savings through consolidation and sharing of administrative services, such as acquisitions and human resources, and procurement reforms, including multi-agency "Best in Class" contracts that leverage the Federal Government's buying power to bring more value and efficiency to how taxpayer dollars are used.

Proposes a Comprehensive Solution to Wildfire Suppression Funding. The Budget responsibly funds 100 percent of the rolling 10-year average cost for wildfire suppression in the Departments of Agriculture and the Interior within discretionary budget caps. Similar to how unanticipated funding needs for other natural disasters are addressed, the Budget proposes a separate fund that would include an annual cap adjustment appropriation for wildfire suppression operations, in order to ensure that adequate resources are available to fight wildland fires, protect communities, and safeguard human lives during the most severe wildland fire seasons. In addition, the Administration believes that meaningful forest management reforms to strengthen our ability to restore the Nation's forests and improve their resilience to destructive wildfires should be part of any permanent solution.

Prioritizes Land Management Operations of the National Park Service, Fish and Wildlife Service, and Bureau of Land Management. The Budget streamlines operations and eliminates waste while providing the necessary resources for DOI to continue to protect and conserve America's public lands and beautiful natural resources, provide access to public lands for the next generation of outdoor enthusiasts, and ensure visitor safety. The Budget provides $4 billion for land management operations.

Supports Tribal Sovereignty and Self-Determination across Indian Country. The Budget addresses Federal trust responsibilities and tribal needs related to education, social services, infrastructure, and stewardship of land, water, and other natural resources. The Budget prioritizes core funding and services that support tribal government operations, such as full funding for contract support costs. The Budget maintains programmatic eliminations proposed in the 2018 Budget, which reduced funding for more recent demonstration projects and initiatives that only serve a few Tribes, and eliminates additional programs that are not fundamental to the missions of the Bureau of Indian Affairs (BIA) or BIE.

Eliminates Unnecessary, Lower Priority, or Duplicative Programs. The Budget includes elimination of discretionary Abandoned Mine Land grants that overlap with existing mandatory grants, National Heritage Areas that are more appropriately funded locally, and National Wildlife Refuge fund payments to local governments that are duplicative of other payment programs.

Reduces Funding for Land Acquisition. The Budget continues the 2018 Budget proposal to reduce funding for land acquisitions, so that available resources can support existing lands and assets managed by DOI. The Budget reduces land acquisition funding to $8 million, including balance cancellations, and would instead focus available discretionary funds on investing in and maintaining existing national parks, refuges, and public lands.

Supports Law Enforcement capabilities. DOI is the steward of over 600 million acres of public lands, including over 12 million acres on the United States-Mexico border. The Budget supports law enforcement efforts on the Nation's public lands to keep visitors and natural resources safe, including DOI's efforts to collaborate with other agencies supporting border security efforts. The Budget also

invests in the United States Park Police, who safeguard lives and protect America's national treasures. In addition, the Budget invests in Fish and Wildlife Service law enforcement capacity to combat illegal wildlife trafficking, in support of the President's Executive Order on combatting transnational criminal organizations.

Invests in Essential Science Programs. The Budget maintains funding for the Landsat 9 ground system, as well as research and data collection that informs sustainable energy and mineral development, responsible resource management, and natural hazard risk reduction.

Expands Access and Bolsters the Outdoor Recreation Economy. Hundreds of millions of people visit U.S. national parks, wildlife refuges, and other public lands each year to hunt, fish, hike, view wildlife, and participate in other outdoor recreation opportunities. Visitors to public lands spend money in local gateway regions, and these expenditures generate and support economic prosperity within these local economies. In addition, through the purchases of licenses and equipment—and associated excise taxes—sportsmen and women have generated billions of dollars to support conservation of wildlife and habitat. To better serve these visitors, the Budget supports expanded public access to lands and waters administered by DOI. The Budget also invests in increased access to encourage sportsmen and women conservationists, veterans, minorities, and underserved communities that traditionally have low participation in outdoor recreation activities. To further boost hunting opportunities, the Budget invests $34 million in North American Wetlands Conservation Act grants, a program that finances conservation of wetlands and associated uplands habitat to benefit waterfowl.

"Hunting and fishing is a cornerstone of the American tradition and hunters and fishers of America are the backbone of land and wildlife conservation"

Ryan Zinke
Secretary
September 15, 2017

Invests in Water Resources and Infrastructure. The Budget invests in the safe, reliable, and efficient management of water resources throughout the United States. The Budget requests $1 billion for the Bureau of Reclamation. The Budget does not propose any new starts for the Bureau of Reclamation, but rather focuses resources on operating, maintaining, and rehabilitating existing infrastructure. Through the Bureau of Reclamation and BIA, the Budget requests $172 million for the implementation of enacted Indian water rights settlements in support of Federal trust responsibilities to Tribes. The Budget also invests $179 million in water-related science, monitoring, research, and development to better understand the water resources challenges facing the Nation, and develop new technologies to respond to those challenges.

DEPARTMENT OF JUSTICE

Highlights:

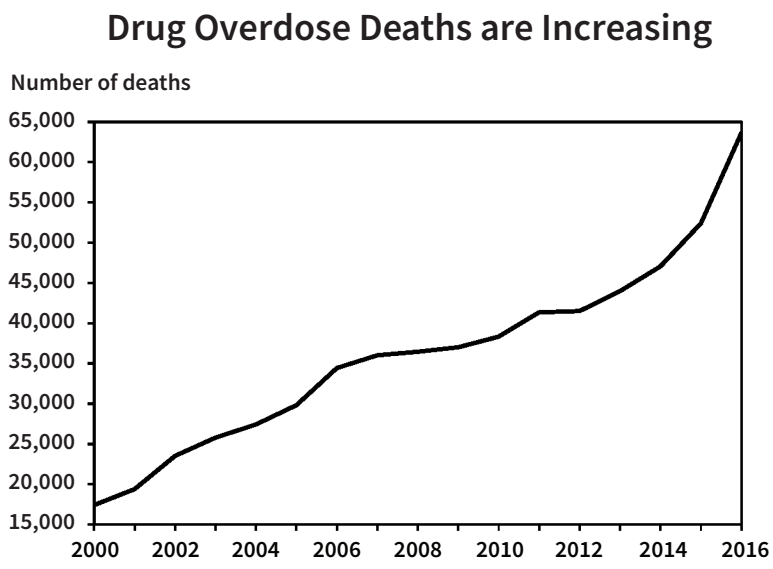
- The Department of Justice defends the interests of the United States and protects all Americans as the chief enforcer of Federal laws.
- The Budget focuses on the Nation's most pressing security needs to reduce violent crime, enforce immigration laws, and continue combatting the opioid epidemic. In light of the Nation's long-term fiscal challenges, the Budget also maintains prior year spending restraints, supports administrative reorganization, and focuses resources on key priorities.
- The Budget requests $28 billion for the Department of Justice, a $345 million or 1.2-percent decrease from the 2017 enacted level. Targeted funding increases are provided to support public safety and national security while identifying savings opportunities.

The President's 2019 Budget:

The Department of Justice is charged with enforcing the laws and defending the interests of the United States, ensuring public safety against foreign and domestic threats, providing Federal leadership in preventing and controlling crime, seeking just punishment for those guilty of crimes, and ensuring the fair and impartial administration of justice for all Americans. With violent crime rates rising across the Nation, the work of the men and women at the Department is more important than ever. The Department is committed to dismantling criminal networks, halting the flow of illegal drugs, and restoring law and order to communities. The Budget requests a total of $28 billion to expand the capacity of key law enforcement agencies and strengthen the Department's ability to address the most pressing public safety needs.

The Department will expand the highest priority programs that have been proven to reduce violence and drug-related crime nationwide, including the Organized Crime Drug Enforcement Task Force and the International Organized Crime Intelligence Operations Center. While today's overall crime rates are near historic lows, recent trends indicate that those levels are on the rise. In addition, national and cyber security threats persist and continue to evolve, reinforcing the Department's commitment to safeguarding American citizens. The Budget includes resources to confront each of these rising threats to the Nation while making challenging decisions to reprioritize funds from lower priority or less effective initiatives.

Tackles the Opioid Epidemic. Today, the United States faces the deadliest drug overdose crisis in American history. Approximately 64,000 Americans lost their lives to drug overdoses in 2016. Over 42,000 of these tragic deaths were caused by fentanyl, heroin, or prescription opioids. The Department of Justice recognizes its critical role in combating opioid misuse and heroin and fentanyl use. The Budget provides $2.2 billion in discretionary resources for the Drug Enforcement Administration (DEA), including an additional $41 million over the $26 million currently provided for specialized efforts to end the opioid epidemic. The Budget also provides $421 million in fee-funded resources for DEA's Diversion Control Fee Account to combat the diversion of licit drugs and precursor chemicals. In addition, the Budget includes $103 million for opioid-related State and local assistance including: $20 million for the Comprehensive Opioid Abuse Program to support a variety of activities such as treatment and recovery support services, diversion, and alternative to incarceration programs; $59 million for Drug Courts, Mental Health Courts, and Veterans Treatment Courts; $12 million for Residential Substance Abuse Treatment; and $12 million for Prescription Drug Monitoring Programs.



Source: Centers for Disease Control WONDER.

Targets Drug Trafficking Organizations. To further enhance the Department's efforts to concentrate law enforcement resources on drug traffickers in the most critical regions, the Budget proposes to transfer the High Intensity Drug Trafficking Areas program from the Office of National Drug Control Policy to the DEA. Consolidating anti-drug law enforcement efforts in the DEA would better focus resources on the most dangerous, complex, and interjurisdictional drug trafficking organizations in the United States.

Combats Violent Crime. As violent crime rates continue to climb, the Department of Justice aims to restore public safety to communities by providing Federal resources where most needed and most effective. The Budget provides $14.2 billion to Federal law enforcement agencies, including the Federal Bureau of Investigation (FBI), the DEA, the United States Marshals Service, the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), and the Organized Crime and Drug Enforcement Task Forces. This represents an increase of 2.4 percent from the 2017 enacted level, and supports the Department's ability to respond to national security crises; investigate violent- and drug-related crime; and apprehend, detain, and prosecute offenders.

ATF would transfer the entirety of its alcohol and tobacco regulatory and enforcement responsibilities to the Alcohol and Tobacco Tax and Trade Bureau (TTB) in the Department of the Treasury. This transfer would enable the ATF to hone its focus on activities that protect U.S. communities from violent criminals and criminal organizations, while consolidating duplicative alcohol and tobacco enforcement mechanisms within the TTB. In addition, the operating capability of the DEA's highly successful Special Investigative Unit program would retain its critical role in enhancing the Federal Government's ability to pursue threat networks to their source, as prioritized in the National Security Strategy.

The Budget also supports key State and local assistance programs, including $333 million for the Byrne Justice Assistance Grants Program, which provides State and local governments with crucial Federal funding to prevent and control crime. These resources also contribute to important officer safety programs serving State and local law enforcement such as the Bulletproof Vest program.

In addition, $70 million is provided for the Violent Gang and Gun Crime Reduction/Project Safe Neighborhoods (PSN) program. PSN is designed to create safer communities through sustained reductions in gang violence and gun crime by leveraging Federal, State, and local partnerships. The Budget also supports $230 million for State and local juvenile justice programs, including programs aimed at delinquency prevention, intervention, and making improvements to the juvenile justice system. Another $5 million is set aside to support the National Public Safety Partnership program, which leverages the Department's resources to reduce violence in cities with the highest violent crime rates in the Nation.

Enforces Immigration Laws. The Administration is committed to strengthening the Nation's security through a more robust enforcement of the Nation's immigration laws. As a result of increased enforcement, this past year the Executive Office for Immigration Review received an approximate 25-percent increase in case receipts from 2016, bringing the pending caseload to over 650,000 cases. In addition, the Agency continues to struggle with a wholly paper-based system that is both cumbersome and inefficient. The Budget provides funding for 75 additional immigration judge teams, as well as $25 million for information technology modernization, including the expansion of electronic case processing. Taken together, these enhancements would expand capacity, improve efficiency, and remove impediments to the timely administration of justice.

Maintains Domestic and Foreign Security. The FBI has responsibility for protecting U.S. citizens from harm both at home and abroad. The Budget supports an increase of $148 million for the FBI to continue to carry out its important dual missions of enforcing the Nation's laws and protecting national security. The FBI fights terrorism and combats foreign intelligence threats, prevents the spread and use of weapons of mass destruction and other emerging threats, and fights cyber-based attacks and high-technology crimes. In addition, the FBI fights public corruption, protects civil rights, combats homegrown violent extremism and domestic terrorism, and fights transnational criminal organizations, white-collar crime, violent crime, and gangs. To protect against biological threats, the Budget proposes a cost-sharing agreement between the FBI and the Department of Homeland Security for the National Biodefense Analysis and Countermeasures Center. The National Security Division is also provided with an additional $5 million more than the 2017 enacted level to continue expanding coordination between the Federal intelligence communities to combat terrorism.

Increases Prosecutorial Support. Increased Assistant United States Attorney hiring in prior years has helped to expand immigration and violent crime prosecutions across the Nation. The Budget provides the United States Attorneys with $2.1 billion, $70 million above the 2017 enacted level, to support retention of these hires and to allow for $4.7 million in additional paralegal support.

Reprioritizes Prison Spending. The Bureau of Prisons (BOP) is responsive to Federal efforts to fight violent crime and prosecute high priority offenders. Recent declines in the prison population coupled with the continuation of contracts with privately-operated facilities ensure that BOP has the necessary space to absorb population fluctuations. The Budget maintains this capacity by funding BOP at $7.1 billion, approximately equal to the 2017 enacted level. In addition, the Budget proposes to leverage economies of scale by closing two standalone minimum security camps and instead transferring inmates to larger Federal complexes. The Budget also proposes to realign regional offices to eliminate duplication and reduce bureaucracy.

Expanding Apprenticeships in America

"Today's apprentices will construct the roads and bridges that move our citizens, they will bend the metal and steel that shape our cities, and they will pioneer the new technology that drives our commerce."

President Donald J. Trump
June 15, 2017

The Presidential Executive Order "Expanding Apprenticeships in America," directed agencies to prioritize effective, evidence-based workforce development programs through the promotion of apprenticeship. Accordingly, the Budget provides $10 million for expansion of effective apprenticeship programs in the Bureau of Prisons, giving inmates the necessary skills for lucrative employment in the sectors employers—and our economy—most need.

Strengthens Prisoner Reentry Programming. In addition to prosecuting crime and enforcing the Nation's laws, the Administration proposes to promote public safety by preventing individuals who have reentered society from returning to criminal activity. Approximately 95 percent of people in State or Federal prison will be released at some point, and two-thirds are rearrested for a new offense within three years. The Administration is committed to breaking this cycle of crime and preparing returning citizens for lives as responsible, contributing members of society. The Budget provides approximately $739 million for reentry programming in BOP, including funding for education, career and technical training, substance abuse, and residential reentry centers. In addition, through State and local assistance programs, the Budget provides $48 million for the Second Chance Act Grant program to reduce recidivism and help ex-offenders return to productive lives.

Expands Efforts to Combat Violence Against Women. The Budget provides $486 million to reinforce efforts to combat and respond to violent crimes against women, including $215 million for Services, Training, Officers, and Prosecutors Grants. Domestic and sexual violence persist as serious threats to community safety and public health, with current estimates showing that 19.1 percent of women and 1.5 percent of men have been raped, and 23.2 percent of women and 13.9 percent of men have experienced severe physical violence by an intimate partner at some point in their lives. These grants play a critical role in helping to create a coordinated community response to this problem.

Prioritizes Evidence-Based Practices that Work. The Budget increases the set-aside for research, evaluation, and statistics at the Office of Justice Programs. In addition, the Budget supports the National Crime Statistics Exchange Initiative to develop nationally representative crime statistics. The Budget also continues to invest in *CrimeSolutions.gov*, a "what works" clearinghouse for best practices in criminal justice, juvenile justice, and crime victim services. These investments bolster the Administration's efforts to ensure that more Federal funding flows to evidence-based activities.

DEPARTMENT OF LABOR

Highlights:

- The Department of Labor (DOL) fosters the well-being of wage earners, job seekers, and retirees.
- Given the budget constraints the Nation faces after decades of reckless spending, and the current need to rebuild the Nation's military without increasing the deficit, the Budget focuses DOL on its highest priority functions and disinvests in activities that are duplicative, unnecessary, unproven, or ineffective. The Budget also takes steps to reorganize and modernize the Agency's operations so scarce taxpayer dollars are spent well.
- The Budget requests $9.4 billion for DOL, a $2.6 billion or 21-percent decrease from the 2017 enacted level.

The President's 2019 Budget:

DOL promotes the well-being of American workers, job seekers, and retirees by helping them improve their skills, find work, and get back on their feet after job loss, injury, or illness, as well as safeguarding their working conditions, health and retirement benefits, and wages. Workers are the backbone of the American economy, and the Nation needs a skilled and productive workforce to keep its economy growing. The Budget improves the quality of life for all workers by making targeted, evidence-based investments to help workers get ahead and by eliminating duplicative, wasteful, and non-essential activities.

"Not only will our apprentices transform their lives, but they will also transform our lives in the truest sense. Today's apprentices will construct the roads and bridges that move our citizens, they will bend the metal and steel that shape our cities, and they will pioneer the new technology that drives our commerce."

President Donald J. Trump
June 15, 2017

Building a Highly Skilled and Competitive Workforce

Expands Access to Apprenticeship. The Budget invests $200 million in apprenticeships, a proven earn-while-you-learn strategy that equips workers with the skills they need to fill open, high-paying jobs. Apprenticeship is a great solution for employers looking for a skilled workforce and workers looking for an affordable path to a secure future, yet currently only

550,000 individuals—less than half of one percent of the workforce—participate in apprenticeships each year. As part of implementing the President's Executive Order "Expanding Apprenticeships in America," the Department is establishing a new industry-recognized apprenticeship system to modernize and expand the U.S. approach to apprenticeships. DOL is working to empower employers, educational institutions, labor-management organizations, trade associations, States, and other third parties to collaborate to create new, industry-driven apprenticeship solutions. The Department is also pursuing ways to expand apprenticeship opportunities in high-growth sectors where apprenticeships are underutilized, including healthcare, information technology, and advanced manufacturing.

Develops a Plan to Reorganize and Consolidate the Nation's Workforce Development Programs. The Federal Government has more than 40 workforce development programs spread across 14 agencies with a total annual cost of approximately $17 billion. Despite changes in the recent reauthorization of the Workforce Innovation and Opportunity Act, the system remains fragmented at the Federal level, perpetuating unnecessary bureaucracy and complicating State and local efforts to meet the comprehensive needs of Americans seeking workforce-related services. The Secretaries of Labor and Education, who administer most of the programs, are working on a comprehensive plan to consolidate and reorganize Federal workforce development programs to ensure that American workers receive the highest quality services possible and are prepared to fill the high-growth jobs of today and tomorrow. The plan will be released as part of a spring 2018 Government reorganization package.

Reforms Job Corps. Job Corps trains and educates approximately 50,000 disadvantaged youth at 125 primarily residential centers across the United States. The Budget takes aggressive steps to improve Job Corps for the youth it serves by: closing centers that do a poor job educating and preparing students for jobs; focusing the program on the older youth for whom the program is more effective; improving center safety; and making other changes to sharpen program quality and efficiency. As part of this reform effort, the Budget ends the Department of Agriculture's (USDA) role in the program, unifying responsibility in DOL. Workforce development is not a core USDA role, and the 26 centers it operates are overrepresented in the lowest performing cohort of centers. The Budget also announces other reforms to the program, including shifting the outreach and admissions function to States and piloting the use of cooperative agreements with non-profits that have expertise in serving youth to operate centers. These reforms would save money and improve results by eliminating ineffective centers and finding better ways to educate and train youth.

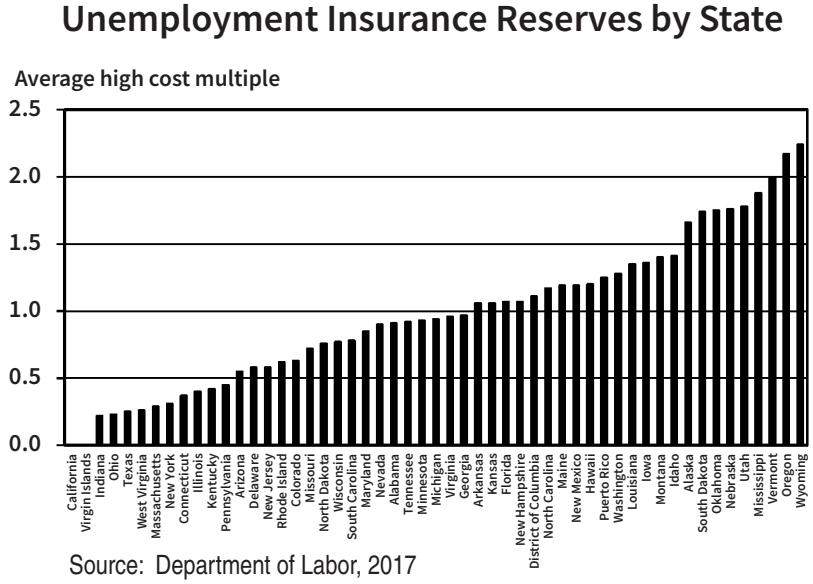
Modernizing the Unemployment Safety Net to Emphasize Work

Reduces Waste, Fraud, and Abuse While Getting Claimants Back to Work More Quickly. The Budget expands Reemployment Services and Eligibility Assessments, an evidence-based activity that saves an average of $536 per claimant in unemployment insurance (UI) benefit costs by reducing improper payments and getting claimants back to work more quickly and at higher wages. The Budget proposes to create a permanent program that would allow each State to provide these services to one-half of its UI claimants as well as all of its transitioning servicemembers. The Budget also reduces waste, fraud, and abuse in the UI program with a package of program integrity proposals. These proposals would require States to use the tools already at their disposal for combatting improper payments while expanding their authority to spend certain UI program funds on activities that reduce waste, fraud, and abuse in the system.

Focuses Trade Adjustment Assistance on Apprenticeship and Other Work-Based Training. The Trade Adjustment Assistance (TAA) program, which provides cash benefits and training to workers who have been displaced by international trade, is in need of reform. A rigorous 2012 evaluation of the program demonstrated that workers who participated in the program had lower earnings than

the comparison group at the end of a four-year follow-up period,[1] in part because they were more likely to participate in long-term job training programs rather than immediately reentering the workforce. However, this training was not targeted to in-demand industries and occupations—only 37 percent of participants became employed in the occupations for which they trained. The Budget proposes to refocus the TAA program on apprenticeship and on-the-job training, earn-as-you-learn strategies that ensure that participants are training for relevant occupations. States would also be encouraged to place a greater emphasis on intensive reemployment services for workers who are not participating in work-based training, getting those workers back into the workforce more quickly.

Strengthens the Unemployment Safety Net. States are responsible for funding the benefits they provide under the State-administered UI program. In order to avoid raising taxes on employers in the middle of a recession, States should build balances that would allow them to cover benefits when unemployment spikes. Despite years of recovery since the Great Recession, many States' UI accounts are still not adequately financed—as of September 30, 2017, only 24 States had sufficient reserves to weather another recession. The Budget proposes to strengthen the incentive for States to prepare for the next recession and adequately fund their UI systems by reducing Federal tax credits in States with particularly low reserve balances.



Source: Department of Labor, 2017

Protecting American Workers

Secures Safe and Healthy Workplaces. The Budget maintains targeted investments in the Occupational Safety and Health Administration (OSHA) and Mine Safety and Health Administration aimed at preventing worker fatalities, injuries, and illnesses through enforcement, outreach, and compliance assistance. The Budget increases OSHA Federal Compliance Assistance to assist employers who want help protecting their workers through cooperative programs.

Makes Health Insurance More Affordable for Small Businesses. The President's Executive Order "Promoting Healthcare Choice and Competition Across the United States" directed the Secretary of Labor to expand access to health coverage by allowing more employers to form Association Health Plans (AHPs), arrangements under which small businesses may band together to offer competitive and affordable health insurance to their employees. The Budget supports this initiative by increasing funding for the Employee Benefits Security Administration to develop policy and enforcement capacity to expand access to AHPs.

[1] *https://www.mathematica-mpr.com/our-publications-and-findings/publications/the-evaluation-of-the-trade-adjustment-assistance-program-a-synthesis-of-major-findings*

Rebuilds DOL's Role in Overseeing Union Integrity. To help safeguard labor union democracy and financial integrity, the Budget takes steps to restore the Office of Labor-Management Standards' investigative workforce, which has fallen by more than 40 percent during the past 10 years. The Budget would strengthen protections for union members by supporting more audits and investigations to uncover flawed officer elections, fraud, and embezzlement.

Protects Americans' Pensions. The Pension Benefit Guaranty Corporation's multiemployer program, which insures the pension benefits of 10 million workers, is at risk of insolvency by 2025. As an important step to protect the pensions of these hardworking Americans, the Budget proposes to add new premiums to the multiemployer program, raising approximately $16 billion in premiums over the 10-year window. At this level of premium receipts, the program is more likely than not to remain solvent over the next 20 years, helping to ensure that there is a safety net available to workers whose multiemployer plans fail.

Reforms the Federal Employees' Compensation Act. The Budget proposes to reform the Federal Employees' Compensation Act program, which provides workers' compensation benefits to Federal employees injured or killed on the job and their survivors. The proposed reform would save taxpayer dollars by modernizing program administration, simplifying benefit rates, and introducing controls to prevent waste, fraud, and abuse.

Puts American Workers First. DOL handles the labor certification component of foreign temporary work visa programs, which ensure that American workers are not unfairly displaced or disadvantaged by foreign workers. The certification programs lack a reliable workload-based source of funding, which has created recurring seasonal backlogs for employers and hindered DOL's ability to enforce protections for workers. The Budget proposes to establish fees to create a workload-based funding source and place responsibility for funding this work on the program's users rather than taxpayers.

Supporting Working Families

Provides for Paid Family Leave for New Parents. The Budget invests in a better future for Americans with a fully paid-for proposal to provide six weeks of paid family leave to new mothers and fathers, including adoptive parents, so all families can afford to take time to recover from childbirth and bond with a new child. Using the UI system as a base, the proposal would allow States to establish paid parental leave programs in a way that is most appropriate for their workforce and economy. The Administration looks forward to working with the Congress to advance policies that would make paid parental leave a reality for families across the Nation.

Making Government More Efficient

Tackles Duplication and Inefficiency at the Department of Labor. DOL is acting to implement in-house reforms consistent with the President's directive to reorganize and improve the Federal Government. Many of DOL's administrative activities, including procurement, human resources, financial management, and physical security, are separated across its subcomponents, creating duplication and wasting resources that would be better spent on core mission-related work. As part of its plan, DOL is centralizing these activities to improve oversight, eliminate duplication, save money, and achieve economies of scale. In addition, the Budget gives more tools to DOL's Chief Information Officer to modernize the Department's antiquated information technology systems by reallocating base resources.

DEPARTMENT OF STATE AND OTHER INTERNATIONAL PROGRAMS

Highlights:

- The Department of State, the U.S. Agency for International Development (USAID), and other international programs help to advance the national security interests of the United States by building a more democratic, secure, and prosperous world.
- The Budget for the Department of State and USAID's diplomatic and development activities supports the strategic objectives of the United States, including those outlined in the 2018 Budget and the newly released National Security Strategy of the United States. In addition, the Budget supports Agency reform and critical investments that improve accountability, effectiveness, and efficiency in using taxpayer dollars to advance U.S. foreign affairs and national security goals. By pursuing a more balanced share of international spending and holding Departments and international organizations accountable for results, the Budget supports U.S. interests abroad, which would lead to a more prosperous and secure America.
- The Budget requests $25.8 billion in base funding for the Department of State and USAID, a $9 billion or 26-percent decrease from the 2017 enacted level. The Budget also requests $12 billion as Overseas Contingency Operations funding for extraordinary costs, primarily in war areas such as Syria, Iraq, and Afghanistan, for an Agency total of $37.8 billion, which is a $191 million increase from the 2018 Budget. The Budget also requests $1.4 billion for Department of the Treasury international programs, a $354 million or 20-percent reduction from the 2017 enacted level.

The President's 2019 Budget:

The Budget supports the missions of the Department of State, USAID, and other international programs to advance the national security interests of the United States. The Budget promotes the development of more resilient and democratic societies, leading to a more secure and prosperous world. The Budget requests sufficient resources for the Department of State and other international programs to carry out their responsibilities under the National Security Strategy to protect the American people, preserve peace and security, promote American prosperity, and advance American influence. The Budget would enable the United States to compete for influence against those who do not share America's values or interests, catalyze conditions to help aspiring partners achieve mutually beneficial economic and security goals, and respond to the emerging era of great power competition across political, economic, and information domains. In addition, the Budget prioritizes diplomatic and development activities that provide maximum policy benefits, while making efficient, effective, and accountable use of taxpayer resources. Furthermore, the Budget upholds

"America is a sovereign Nation and our first priority is always the safety and security of our citizens. We are not here to lecture—we are not here to tell other people how to live, what to do, who to be, or how to worship. Instead, we are here to offer partnership—based on shared interests and values—to pursue a better future for us all."

President Donald J. Trump
May 21, 2017

U.S. commitments to partners and allies, while emphasizing the critical role of other donors to advance shared priorities.

Provides a Platform of over 275 Embassies, Consulates, and Diplomatic Missions Around the World for the Development and Implementation of U.S. Foreign Policy, and to Carry out Visa and Passport Programs to Protect the American People. The Budget requests $8.2 billion for Diplomatic Programs and the Information Technology (IT) Central Fund, which would support the critical day-to-day operations of the Department's overseas staff. In addition, the Budget is investing in more efficient and effective business processes for the Department of State. Specifically, the Budget requests $96 million for human capital investments in order to integrate a comprehensive approach to attracting, developing, and enabling personnel to have the resources and capabilities required for improved performance, leadership, and accountability. The Budget requests an additional $150 million to address key IT investments that would modernize legacy systems and software, allow the workforce to be more agile and resourceful—regardless of their location—and accelerate cloud-based solutions. The Budget also requests $1.3 billion for USAID Operations to support USAID personnel in 87 missions.

Prioritizes the Safety and Security of American Diplomats and Staff Overseas. The Budget requests $4.6 billion to protect overseas personnel and facilities. This funding level includes the Department's share of the $2.2 billion requested Government-wide in the Budget for new, secure embassy construction, as recommended by the Benghazi Accountability Review Board report. This would continue the upward trend of housing overseas personnel in safer diplomatic facilities. With the proposed level of funding, the Department of State would continue to protect American personnel representing more than 30 agencies, as well as provide services to Americans overseas, in a safe and secure environment.

Promotes a Free and Open Indo-Pacific. The United States' future security and prosperity depends on maintenance of free-and-open access to the Indo-Pacific. The Budget supports the Administration's commitment to U.S. leadership in this dynamic region through advancing democracy and good economic governance, supporting U.S. private sector competitiveness, promoting exports of U.S. goods and services, and sustaining the role of the United States as the region's preferred security and economic partner.

Advances American Interests in the Middle East. The Budget fully supports the new, 10-year Memorandum of Understanding between the United States and Israel, including $3.3 billion in Foreign Military Financing grant assistance to bolster Israel's capacity to defend itself and maintain its qualitative military edge. The Budget also requests $1.3 billion in economic and security assistance to support a long-term commitment to Jordan in recognition of the critical U.S.-Jordan strategic partnership. This extraordinary level of commitment contributes to Jordan's stability and security, and to shared goals of peace and prosperity in the Middle East and beyond. The Budget also dedicates significant security and economic assistance to other key partners in the region, including Egypt. In addition, the Budget supports the President's strategy to counter the destabilizing influence of the Iranian regime in the Middle East and beyond.

Keeps the Islamic State of Iraq and Syria (ISIS) and Other Violent Extremist Organizations on the Path to Lasting Defeat. The Budget for the Department of State and USAID supports the global strategy to defeat ISIS and other terrorist organizations, in coordination with the Global Coalition working to defeat ISIS as well as other partner countries. The Budget provides targeted assistance to address sources of regional instability and support partner country efforts to re-establish security and stability within their borders. These efforts constitute conditions for the long-term defeat of violent extremists, and protect U.S. interests in the region.

Supports the President's Strategy in Afghanistan and South Asia. The Budget's more than $630 million for civilian assistance supports the President's new strategy to empower the people of Afghanistan to take ownership of their future. In addition, the Budget strengthens and sustains improvements in education, health, governance, and other sectors that are essential for securing a stable and prosperous Afghanistan. The Budget also allows the United States to honor the pledge made at the Brussels conference on Afghanistan, which anticipated gradually declining assistance levels. The Budget requests $256 million for Pakistan in economic and other assistance to help increase stability, promote economic growth, and create opportunities for U.S. businesses. In addition, the Budget requests $80 million in Foreign Military Financing assistance to enhance Pakistan's counterterrorism and counterinsurgency capabilities, contingent on Pakistan taking appropriate action to expand cooperation in areas where U.S.-Pakistan interests converge and to address areas of divergence, in line with the Administration's South Asia strategy.

Counters the Proliferation of Weapons of Mass Destruction. The Budget prioritizes efforts to secure, eliminate, and prevent the proliferation of weapons of mass destruction and their delivery systems. Through diplomatic engagement, and bilateral and multilateral programs, the United States continues to promote strategic stability. These efforts build the international coalitions necessary to stop the spread of materials and expertise that aid state and non-state proliferators, and ensure that those who seek to build and use these weapons are held accountable.

Proposes a Reformed, Consolidated U.S. Development Finance Institution to Expand U.S. Influence Abroad. During his November 2017 trip to Asia, the President committed to reforming U.S. development finance institutions to better incentivize private sector investment in developing nations, counter America's competitors, and provide better alternatives to State-directed initiatives. The Budget builds on this commitment and acts on the President's call for a streamlined, more effective Government. Specifically, the Budget consolidates several private sector mobilization and development finance functions at various agencies, such as the Overseas Private Investment Corporation (OPIC) and USAID's Development Credit Authority, into a new, enhanced U.S. Development Finance Institution (DFI). The DFI would not only reduce fragmentation, achieve operational efficiencies, and provide cost savings to the taxpayer, but it would also improve coordination and policy alignment. The DFI also includes reformed and modernized tools to ensure that U.S. development finance effectively catalyzes, but does not displace, private sector resources, and does not create undue risk for the U.S. taxpayer. A reformed, consolidated DFI more effectively supports economic growth and development outcomes in emerging markets. It would also advance U.S. national security interests, and support U.S. companies, jobs, and exports.

Ensures that Trade is Fair and Reciprocal. The Budget requests $63 million for the Office of the U.S. Trade Representative (USTR) in support of the President's ambitious trade agenda. By renegotiating outdated agreements and pursuing opportunities for new trade deals, the Administration is working to ensure that trade grows the economy and brings jobs back to America's shores. The Administration further protects American workers and businesses by identifying trade violations, and pursuing all enforcement options at its disposal to end these abuses, many of which went unaddressed for years.

Levels the Playing Field for America's Exporters. The Budget supports a fully functioning Export-Import Bank (ExIm) to help level the playing field for America's exporters and help America compete, while ensuring that ExIm does not displace the private sector. The Budget would allow ExIm to play an important role in supporting the Administration's job creation agenda by facilitating exports where market gaps would otherwise exist, while ensuring that ExIm does not unnecessarily distort the market. ExIm would focus its efforts on market segments where U.S. support is critical to compete, including in areas of national security importance, and on supporting small and medium-sized American exporters that are the engines of economic growth and U.S. job creation.

Targets Foreign Assistance to Promote Developing Countries' Self-Reliance and Ultimately End their Need for Aid. The Budget reflects the Administration's goal to encourage and advance partner countries' self-reliance in order to become tomorrow's trading and security partners. Working with partners to help them reach their development goals advances common interests and values, strengthens stability in key regions, boosts U.S. economic opportunities, and establishes the conditions for a more secure and prosperous world. The Budget supports new efforts to track countries' development progress from fragility through self-reliance to lasting prosperity. Going forward, agencies would use this information to guide resource requests, program approaches, incentivize critical reforms, and measure program performance to support partner countries' progress along the development pathway and toward a transition away from the need for aid. The Budget also emphasizes aid approaches that bring in private capital and innovation, foster fair and reciprocal trading relationships, and empower reform-minded governments and people who share the same goals to develop their own capabilities and resources.

Concentrates Efforts Against HIV/AIDS. In September, Secretary Tillerson launched the President's Emergency Plan for AIDS Relief's (PEPFAR) new Strategy for Accelerating HIV/AIDS Epidemic Control (2017-2020). The Budget supports the new impact strategy by continuing support in more than 50 countries and strengthening U.S. investment in a subset of countries, which represent the most vulnerable communities to HIV/AIDS and have the potential to achieve control by 2020. In addition, the Budget requests $925 million to complete a three-year commitment to the Global Fund to Fight AIDS, Tuberculosis and Malaria, fully funding the U.S. Government's Fifth Replenishment pledge to match $1 for every $2 provided by other donors. At the funding level requested in the Budget, the United States would provide sufficient resources to maintain all current patient levels on HIV/AIDS treatment. U.S. efforts to control the HIV/AIDS epidemic are a direct reflection of U.S. leadership abroad and the goodwill, compassion, and generosity of the American people.

Helps Prevent Public Health Emergencies through the Global Health Security Agenda (GHSA) and Advances Maternal and Child Health. Containing the spread of deadly diseases overseas is a vital U.S. national security interest. To prevent, detect, and respond to infectious disease threats abroad, the Budget request supports an array of global health security activities through the GHSA. The Budget also requests nearly $2 billion for lifesaving health interventions through USAID, including the President's Malaria Initiative, programs that address tuberculosis, polio eradication, and Neglected Tropical Diseases, and the U.S. contribution to Gavi, the Vaccine Alliance. With the Protecting Life in Global Health Assistance policy now in place, the Budget request includes U.S. investments in family planning and reproductive health, with an emphasis on evidence-based methods, including fertility awareness. These services would save thousands of lives and support women's empowerment.

Improves Food Security and Resilience. To help address global hunger and poverty, the Budget includes bilateral funding for agriculture-led food security programs. Increased emphasis on resilience and evidence-based programs that aim to address root causes of vulnerability would help prevent future famines in regions that face recurrent crises, particularly in Sub-Saharan Africa.

Resilience and targeted programs have been shown to be effective in helping vulnerable populations withstand severe weather and other shocks, which limits the need for emergency food and other humanitarian assistance. Beyond resilience, this funding is focused on strengthening the capacity of developing countries with extreme poverty that have strong potential to address their severe food insecurity, through activities such as improvements in smallholders' agricultural productivity, markets, and nutrition, and which commit to undertake policy reforms as part of robust country-led strategies.

"To honor the people of our nations, we must ensure that no one and no member state shoulders a disproportionate share of the burden, and that's militarily or financially. We also ask that every peacekeeping mission have clearly defined goals and metrics for evaluating success. They deserve to see the value in the United Nations, and it is our job to show it to them."

President Donald J. Trump
September 18, 2017

Maintains U.S. Global Humanitarian Leadership While Expecting Others to do More. The Budget requests significant humanitarian assistance resources enabling the United States to remain the largest single humanitarian donor. The Budget request also enables the United States to address major humanitarian crises, including those driven by conflict, such as in Syria, Yemen, and Iraq. The Budget relies on a new approach to relief that includes new efforts to influence other donors to give a greater share. The Budget also demands improved performance by United Nations (UN) organizations and other implementers to maximize the benefit for recipients of assistance. This approach supports the priority to impose greater accountability on international partners along with donor burden sharing that is more balanced, while reducing suffering and meeting the needs of refugees and displaced persons close to their homes until they can safely return.

Mobilizes Partner Countries' Domestic Resources, a Critical Step on the Path to Self-Reliance and Transitioning Away from Aid Assistance. Domestic resource mobilization (DRM) presents a long-term path to sustainable development finance by encouraging countries to adopt effective, transparent, and accountable systems for mobilizing their own resources to invest in their own development. The U.S. Government's DRM activities are funded by USAID, Treasury's Office of Technical Assistance, the Millennium Challenge Corporation (MCC), and PEPFAR. USAID's new centrally-managed DRM initiative would equip and challenge partner countries to more effectively mobilize and manage domestic public and private resources, leverage other available financing sources, and sustainably lead their own development. USAID is building on the experiences and successes of DRM efforts in countries such as El Salvador, where improvements in tax collection over the last decade have increased government revenues by $350 million per year. Assistance would be provided to local governments to mobilize and manage public revenues, as well as private capital via local capital markets, to finance their own development and decrease aid dependency. This initiative would strive to ensure partner country commitment, a robust graduation strategy, rigorous monitoring and evaluation, and enhanced public-private dialogue.

Ensures U.S. Leadership at Multilateral Development Banks (MDBs). The Budget requests $1.4 billion in funding for MDBs, including the World Bank's International Development Association, the African Development Fund, and the Asian Development Fund. As a leading donor in these institutions, the United States demands high performance, reforms in line with U.S. values, and strategic investments in projects that serve U.S. development, foreign policy, and national security goals.

Advances U.S. Interests and Values in Multilateral Organizations. The United States will compete and be a leader in multilateral organizations so that American interests and principles are protected. The Administration remains committed to the need for greater transparency and reform

in international bodies and for other donors to invest more. The Budget requests more than $2 billion for contributions to the UN Secretariat and technical agencies, UN peacekeeping, and other international organizations while signaling intent to pursue greater accountability and emphasize shared responsibility among members throughout the international system. In support of these goals, the Department of State and USAID will review multilateral aid and contributions to evaluate how each multilateral organization to which the United States belongs advances American interests.

Reforms International Affairs Agencies to Strengthen Implementation of their Strategic Missions. The Administration is committed to making the Federal Government more effective, more efficient, and more accountable. In 2019, the Department of State and USAID will continue to implement an in-depth redesign process to adapt U.S. diplomacy and development to the 21st Century, and better position each Agency for the future. More than 35,000 State and USAID professionals provided comments about which strengths to build on and which inefficiencies to remedy, including information technology and human capital management. The Budget also supports USAID's efforts to realign its strategies, programs, and processes to improve project design and procurement, diversify its portfolio of partners, and build local capacity to prepare countries to progress beyond the need for traditional assistance. The Budget further proposes consolidating small grants assistance currently managed by the U.S. African Development Foundation and the Inter-American Foundation into USAID, in order to improve alignment while also elevating locally driven development in poor and remote communities.

DEPARTMENT OF TRANSPORTATION

Highlights:

- The mission of the Department of Transportation (DOT) is to ensure that: the Nation has the safest, most efficient, and modern transportation system in the world; the system improves the quality of life for all American people and communities, from rural to urban; and the system increases the productivity and competitiveness of American workers and businesses.
- The Budget request for DOT streamlines the Department to focus on its vital Federal safety mission, and provides critical investments necessary for regionally and nationally significant projects. The Budget also ensures taxpayer dollars are spent prudently, by reducing, eliminating, and reforming programs that are ineffective, inefficient, and unaccountable, or lack a clear Federal nexus and fail to encourage innovation.
- The Budget requests $15.6 billion in discretionary budget authority for 2019, a $3.7 billion or 19-percent decrease from the 2017 enacted base discretionary level of $19.3 billion (which excludes supplemental emergency relief funding). The Budget also provides $60.9 billion in mandatory funds and obligation limitations. For programs funded from the Highway Trust Fund, the Budget is consistent with the fourth year of the Fixing America's Surface Transportation Act (FAST Act) of 2015.

The President's 2019 Budget:

DOT oversees the safety, security, mobility, efficiency, and interconnectedness of the Nation's vast transportation networks. DOT's highest priority is the safety of the American people. The Budget reflects this priority by providing DOT the resources necessary for ensuring that the Nation's air, surface, and maritime transportation systems are safe. Another top priority is improving the condition and performance of the Nation's transportation infrastructure. The Budget ensures that DOT would continue to advance nationally and regionally significant projects, via Federal financial assistance and timely, prudent regulatory and permitting decision-making. While providing the funds to support these and other important priorities, the Budget also reflects reductions and eliminations of programs that are inefficient, ineffective, or should be carried out by States, local government, or the private sector.

Ensures the Safety of the Nation's Transportation System. The Budget prioritizes the resources necessary for fulfilling the Department's safety missions. The human and economic costs of transportation accidents are severe, and DOT is committed to preventing as many accidents as possible through its educational outreach, investments, and oversight of safety standards. The vast majority of transportation-related fatalities occur on the Nation's highways: 37,461 in 2016. The Budget provides

Promise Made:

"Our infrastructure will again be the best in the world."

President Donald J. Trump
August 15, 2017

Promise Kept:

To dramatically modernize the Nation's infrastructure, and make it the best in the world, the Administration is proposing a comprehensive Infrastructure Initiative. The initiative is designed to: spur additional State, local, and private infrastructure investment by awarding incentives to project sponsors for demonstrating innovative approaches that would generate new revenue streams, modernize procurement practices, and improve project performance; support bold, innovative, and transformative infrastructure projects that can significantly improve existing conditions; support rural economic competitiveness through a Rural Formula Grant program; and accelerate the delivery of nationally and regionally significant projects with increased Federal loan support. The Administration is also advocating for transformational reform to the environmental permitting process, to shorten the timelines it takes to permit a project, while still maintaining good environmental outcomes. These programs would support additional investment in highways, bridges, airports, rail, ports, and other types of infrastructure in urban and rural America.

$2.6 billion to the Federal Highway Administration's (FHWA) Highway Safety Improvement Program, to assist States in the implementation of their safety plans. The Budget also funds other FHWA, National Highway Traffic Safety Administration (NHTSA), and Federal Motor Carriers Safety Administration (FMCSA) safety programs, to prevent highway fatalities. In addition, the Budget provides resources to support the development of autonomous vehicles and infrastructure, which hold promise to dramatically improve highway safety and deliver many other benefits. The Budget also supports the continued emphasis on ensuring that the air, rail, transit, and pipeline systems are the safest in the world.

Continues Investment in Surface Transportation. Americans' quality of life and long-term economic prosperity depend, in part, on the condition and performance of the Nation's transportation infrastructure. To address these challenges, the Budget requests $57.4 billion in mandatory funds and obligation limitation to improve the Nation's highways, bridges, and transit systems. The Budget includes $46 billion for highway infrastructure and safety programs, $9.9 billion for transit infrastructure, and $1.4 billion for NHTSA and FMCSA safety programs. These levels match the authorized amounts in the FAST Act.

Reforms Air Traffic Control. Consistent with the 2018 Budget, the Budget includes a multiyear reauthorization proposal to shift the air traffic control function of the Federal Aviation Administration to a non-governmental, independent air traffic services cooperative, making the system more efficient and innovative while maintaining safety. Similar to successful efforts in many other developed countries, the goal is to create a system that can respond to changing air travel demand by deploying cutting-edge technology and giving airlines, general aviation users, and passengers a system that is a good steward of their financial resources.

Reforms the Essential Air Services (EAS) Program. EAS was designed as a temporary program nearly 40 years ago. However, today many EAS flights are not full and have high per passenger subsidy costs. Several EAS eligible communities are relatively close to major airports. The Budget includes a legislative reform proposal to modify the definition of essential air service, to ensure that Federal funds are efficiently targeted at the communities most in need. These reforms aim to reduce support for service that results in high per passenger subsidies (often hundreds of dollars per passenger) and end subsidies to communities that are relatively close to other airports. The Budget requests $93 million in discretionary resources, a reduction of $57 million from the 2017 enacted level of $150 million.

Reforms Amtrak Long Distance Services. While Amtrak has in recent years improved its ridership and revenue on the Northeast Corridor and State Supported Routes, Amtrak continues to rely exclusively on Federal subsidies to operate long distance train routes, which have large operating losses and serve a small number of passengers. The Budget proposes reforms to Amtrak to improve efficiencies in long distance services and reduce reliance of the Federal Government. In particular, the Budget proposes that States begin to share the operating subsidy costs of Long Distance routes with the Federal Government. This would make States more equal partners with the Federal Government, and would strengthen the responsiveness of Amtrak to the communities they serve. State contributions to long distance routes is only one tool in the menu of options for reform the Administration will be exploring to improve the current system and reduce Federal subsidies in the Long Distance network.

Eliminates Discretionary Grant Programs. Consistent with the 2018 Budget, the Budget eliminates funding for the unauthorized Transportation Investment Generating Economic Recovery discretionary grant program, which awards grants to projects that are generally eligible for funding under existing surface transportation formula grant and loan programs. In addition, DOT's Infrastructure For Rebuilding America grant program, authorized by the FAST Act, supports larger highway and multimodal freight projects with demonstrable national or regional benefits. The Budget also proposes to wind down the Federal Transit Administration's Capital Investment Grant program (known as New Starts), by limiting funding to projects with existing full funding grant agreements only. The President's Infrastructure Initiative is designed to incentivize States and localities to raise new revenue and funding dedicated for infrastructure investment, via competitive Federal grant awards and other incentives. Those new State and local funds would be available for transportation projects prioritized by those communities, which are better equipped to understand their infrastructure needs. The Federal Government would continue to be a partner in advancing large, regionally- or nationally-significant projects via expanded Federal credit support.

Reorganizes the Department of Transportation. The Budget includes proposals in response to Executive Order 13781, which requires each agency to prepare a plan to reorganize the agency, if appropriate, in order to improve its efficiency, effectiveness, and accountability. One such proposal is to modernize Air Traffic Control. Another proposal to increase effectiveness is to explore the transfer of certain surface transportation job training programs to the Department of Labor, the Federal Agency with the most expertise in job training programs. The Department is also undertaking a major shared services effort to consolidate acquisitions, human resources, and information technology functions within the Department.

Large Increase in 2017 Loans for Transportation Infrastructure Renewal

(Dollars in millions)

	2015	2016	2017
Loans Closed	7	6	12
TIFIA Assistance ...	$2,384	$2,180	$3,851
Total Project Costs ..	$8,776	$6,793	$14,602

Source: DOT

DOT's Build America Bureau provides innovative financing support for large, complex transportation infrastructure projects. One of the major financial tools the Bureau executes is the Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program. TIFIA loans leverage substantial non-Federal investment to support nationally or regionally significant transportation projects. In 2017, the Bureau provided $3.9 billion in TIFIA assistance, $1.7 billion or 77 percent more than in 2016. This assistance supported $14.6 billion in infrastructure improvements, $7.8 billion or 115 percent more than in 2016. Examples of recently financed projects include construction of a bridge and roadways connecting Indiana and Kentucky; a public-private partnership toll road project in Harris County, Texas; and a 17.6-mile tunnel connecting the Norfolk/Virginia Beach areas to Virginia's eastern shore.

DEPARTMENT OF THE TREASURY

Highlights:

- The Department of the Treasury (Treasury) manages the U.S. Government's finances, promotes conditions that enable stable economic growth, protects the integrity of the financial system, and combats financial crimes and terrorist financing.
- The Budget requests the resources necessary to responsibly manage the Nation's debt and efficiently collect revenue while reallocating funding from non-mission critical areas to invest in the financial enforcement tools that would safeguard the financial system and bring maximum economic pressure against North Korea and other national security threats.
- The Budget requests $12.3 billion in base discretionary resources for Treasury's domestic programs, a $392 million or 3-percent decrease from the 2017 enacted level. This program level excludes mandatory spending changes involving the Treasury Forfeiture Fund.
- The Budget also proposes a program integrity initiative to narrow the gap between taxes owed and taxes paid that is estimated to reduce the deficit by approximately $29 billion over the next 10 years.

The President's 2019 Budget:

The Budget capitalizes on Treasury's ongoing drive for efficiencies, and would improve stewardship of taxpayers' dollars, by focusing on the Department's core economic and financial responsibilities. The Budget prioritizes resources to combat terrorist financing, proliferation financing, and other forms of illicit finance and supports Treasury's role as chair of the Committee on Foreign Investment in the United States (CFIUS) to address current and future national security risks. In addition, the Budget maintains Treasury's mission-critical functions as the Federal Government's revenue collector, financial manager, and economic policymaker. The foundation of American prosperity rests with the people, not the Federal Government, and the Budget would ensure that taxpayers, investors, and job-creators operate in an economy that is secure, fair, and free from unnecessary bureaucratic impediments.

Prioritizes Safeguarding Markets and Protecting Financial Data. Treasury's Office of Terrorism and Financial Intelligence (TFI) possesses a unique set of authorities and tools to combat terrorists, rogue regimes, proliferators of weapons of mass destruction, and other illicit actors by denying their access to the financial system, disrupting their revenue streams, and degrading their capabilities. Likewise, the Financial Crimes Enforcement Network's (FinCEN) role in linking the

law enforcement and intelligence communities with financial institutions and regulators helps these entities uncover and prosecute illegal activities and money-laundering schemes. In addition, consistent with the National Security Strategy, the Budget supports Treasury's leading role as chair of the CFIUS. The Administration will work with the Congress to modernize and strengthen this essential national security tool.

The Budget requests $159 million for TFI, a $36 million increase from the 2017 enacted level, to continue its critical work safeguarding the financial system from abuse and combatting other national security threats using non-kinetic economic tools. These additional resources would be deployed to economically isolate North Korea, complete the Terrorist Financing Targeting Center in Saudi Arabia, and increase sanctions pressure on Iran, including through the implementation of the Countering America's Adversaries Through Sanctions Act.

The Budget requests $118 million for FinCEN, a $3 million increase from the 2017 enacted level, to administer the Bank Secrecy Act and focus on the prevention of terrorist financing, money laundering, and other financial crimes in new sectors and through new pathways. This increase would also enable FinCEN to further utilize its unique authorities—FinCEN would expand investigations into financial institutions that may be facilitating the illicit activities of national security threats such as North Korea, terrorist organizations, and drug trafficking organizations that are fueling the opioid crisis.

The Budget also requests $25 million to proactively and strategically protect Treasury information technology (IT) systems that carry out these activities as well as those that account for, and process, trillions of dollars in revenue and payments against cybersecurity threats. These funds are requested in addition to bureau-level investments, and would be centrally managed to strengthen the security of Treasury's most critical IT assets and improve Treasury's response and recovery capabilities. The funds would also allow Treasury to leverage enterprise-wide services and capabilities and help the Department nimbly respond to cybersecurity incidents.

Preserves Funding for Essential Revenue Collection Operations. The tax reforms enacted last year were the most significant changes to the Nation's tax code in more than 30 years. They achieved the President's goals of: 1) cutting taxes for middle-income families; 2) simplifying the tax code for individuals; and 3) reducing business taxes so American employers can create jobs, raise wages for their workers, better compete with foreign businesses, and bring back money that is currently held offshore. By investing in the modernization of Internal Revenue Service (IRS) systems, the Budget would help make the implementation of tax reform successful and support the President's vision of making tax filing simpler for hardworking Americans.

The IRS collects approximately $3.4 trillion in tax revenue annually and processes more than 246 million tax returns and forms resulting in more than $437 billion in tax refunds. The Budget proposes $11.1 billion in base funding for the IRS including $2.3 billion for running key tax filing and compliance IT applications and $110 million for IT modernization efforts. The Budget also requests additional funds for new and continuing investments to expand and strengthen the enforcement of tax law to ensure that all Americans are paying the taxes they owe. These additional investments proposed over the next 10 years are estimated to generate approximately $44 billion in additional revenue at a cost of $15 billion, yielding a net savings of $29 billion over 10 years.

Approximately 90 percent of individual taxpayers file their tax returns electronically and more than 278 million taxpayers use the Where's My Refund application to check the status of their refunds rather than calling the IRS. However, for many interactions, the IRS relies on antiquated tax processing systems (many of which date back to the 1960s) and handles most of its interactions with

taxpayers, other than tax filing, through the mail. Modernizing IRS systems would allow IRS staff to have up-to-date, accurate information about taxpayer accounts when they work with taxpayers.

The Budget also includes several proposals to ensure that taxpayers comply with their obligations, that tax refunds are only paid to those taxpayers who are eligible for them, and that taxpayer dollars are protected from criminals seeking to commit fraud:

- Increasing oversight of paid tax preparers—taxpayers are increasingly turning to paid tax return preparers to assist them in meeting their tax filing obligations. Ensuring that these preparers understand the tax code would help taxpayers get higher quality service and prevent unscrupulous tax preparers from exploiting the system and vulnerable taxpayers.

- Giving the IRS the authority to correct more errors on tax returns before refunds are issued—this would keep refunds from being issued to taxpayers who are not eligible. The Budget would also allow the IRS to resolve simple issues quickly without having to direct enforcement resources away from more difficult cases.

- Requiring a valid Social Security Number for work in order to claim the Child Tax Credit and Earned Income Tax Credit—this proposal would ensure that only individuals authorized to work in the United States could claim these credits.

Manages the Nation's Finances More Effectively. The Bureau of the Fiscal Service (Fiscal Service) conducts all Treasury debt financing operations, provides central payment services for Federal agencies, runs Government-wide accounting and reporting services, and manages the collection of delinquent debt. In 2017, the Fiscal Service issued approximately $8.6 trillion in marketable Treasury securities, processed the collection of more than $4 trillion in Federal receipts, and distributed more than $3.4 trillion in payments, including Social Security payments, IRS tax refunds, and veterans' benefits.

The Fiscal Service performs the vast majority of payment and collection transactions electronically, but in 2017, it still issued almost 60 million paper checks and collected more than $500 billion in payments by mail or in person. The Budget supports Treasury's ongoing digitization of payments that would reduce burden and bureaucracy while increasing options and accessibility for citizens and customers to conduct transactions with the Federal Government in a secure, electronic environment.

As the Federal Government's central payment provider, the Fiscal Service is also responsible for helping agencies identify, prevent, and reduce improper payments. To improve Treasury's efforts to help agencies prevent and detect improper payments, the Budget includes administrative actions and legislative proposals that would:

- remove costly barriers to data sharing across the Government;

- allow for more cost-effective and efficient use of data sources;

Doing More with Less

The Budget proposes $331 million for Fiscal Service operations, approximately $100 million less than the 2010 level. This reduction is the result of the successful consolidation of two bureaus and significant administrative actions including the closing or re-purposing of two payments centers, consolidating five data centers into two, and decreasing the Bureau's footprint. During the same period, the Fiscal Service has maintained, and in many cases improved, its performance of core services and taken on a number of new Government-wide initiatives.

- provide centralized access and use of the National Directory of New Hires and the Social Security Administration's full death file;
- create a central repository for death records from Federal agencies; and
- facilitate partnerships with non-Federal partners.

The Budget also includes two legislative proposals that would help to improve these efforts by authorizing an additional mechanism to recover delinquent Federal non-tax debt and streamlining recovery of unclaimed assets owed to the United States.

Rationalizes the Financial Regulatory Framework. The Administration is committed to reforming the Nation's financial system and rolling back the regulatory excesses mandated by the Dodd-Frank Act, as demonstrated by Executive Order 13772, "Core Principles for Regulating the United States Financial System" (Core Principles EO).

Since issuance of the Core Principles EO in February 2017, Treasury has published several reports making numerous recommendations for administrative and statutory reforms. These reviews included evaluation of the Financial Stability Oversight Council (FSOC) and the Office of Financial Research (OFR), both established by the Dodd-Frank Act. The Budget proposes to impose appropriate congressional oversight of these functions by subjecting all Treasury FSOC and OFR activities to the normal appropriations process. The Budget reflects continued reductions in OFR spending commensurate with the renewed fiscal discipline being applied across the Federal Government. Treasury is also working to increase the transparency of FSOC decision-making procedures and to implement more rigorous cost-benefit analysis standards.

Increases Treasury's Efficiency and Effectiveness by Streamlining Operations. The Budget eliminates funding for the Community Development Financial Institutions (CDFI) Fund's discretionary grant and direct loan programs, a savings of $234 million from the 2017 enacted level. The CDFI Fund was created more than 20 years ago to jump-start a now mature industry. In addition, private institutions should have ready access to the capital needed to extend credit and provide financial services to underserved communities. However, the Budget maintains funding for administrative expenses to support ongoing CDFI Fund program activities, including the New Markets Tax Credit program. The Budget also proposes to extend the CDFI Bond Guarantee Program, which offers CDFIs low-cost, long-term financing at no cost to taxpayers, as the program requires no credit subsidy.

In addition, the Budget proposes to transfer all alcohol and tobacco responsibilities from the Department of Justice's Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) to Treasury's Alcohol and Tobacco Tax and Trade Bureau (TTB). This transfer would leverage TTB's resources and expertise relating to the alcohol and tobacco industries and allow ATF to continue to focus on its firearms and explosives mandates, enabling both agencies to more efficiently and effectively carry out their core mission of protecting the public.

The U.S. Mint and the Bureau of Engraving and Printing (BEP) are responsible for assuring that the Nation retains its status as producing the world's most accepted currency, that U.S. currency is secure against counterfeiting efforts, and that U.S. currency is produced efficiently and at the lowest cost. The Budget includes two legislative proposals that would enable BEP to lower costs and improve the security of official documents issued by States:

- providing BEP with the authority to vacate its aging production facility, purchase land, and construct a new facility in the National Capital Region which would result in estimated 10-year savings of $579 million in lower project costs, ultimately lowering operating costs; and
- authorizing BEP to offer its specialized printing services to States for a fee which would allow States to leverage the U.S. Government's secure document production capabilities to print birth, marriage, and death certificates. Many States want to use this technology but cannot find an American printing firm to produce the documents and are instead turning to foreign companies or lowering their security standards.

In addition, the U.S. Mint and BEP are consolidating their acquisition and sales activities to share a common sales platform and gain efficiencies from similar procurement needs and expertise.

DEPARTMENT OF VETERANS AFFAIRS

Highlights:

- The Department of Veterans Affairs (VA) provides veterans of the Armed Forces and their survivors with a wide variety of benefits including but not limited to healthcare, mental health services, homelessness programs, service-connected disability compensation, readjustment counseling, vocational rehabilitation, education, and home loan guaranties.
- The Budget provides resources to implement a multi-faceted strategy to modernize and transform VA to meet a growing demand for access to healthcare, improve the timeliness and effectiveness of non-medical benefit delivery, and promote internal accountability to reduce waste, fraud, and abuse.
- The Budget requests $83.1 billion for VA, an $8.7 billion, or 11.7-percent increase from the 2017 enacted level. In addition, $75.6 billion is requested for advance medical care appropriations for 2020 to ensure the Department has the resources to continue providing high-quality medical services to veterans. In addition, the Budget also requests new legislative authorities and $122.7 billion in mandatory budget authority, including $121 billion in 2020 advance appropriations, for other veteran and survivor benefits.

The President's 2019 Budget:

VA fulfills President Lincoln's promise to care for America's veterans, their families, and survivors—men and women who have responded when their Nation needed help. The Budget would provide the resources for the Nation to meet its obligations to those who have served in the Armed Forces. With this funding, VA would: deliver premier care through one of the largest integrated healthcare systems in the United States to approximately 9.3 million enrollees; deliver compensation benefits to approximately 4.9 million veterans and 432,000 survivors; administer pension benefits for approximately 469,000 veterans and their survivors; provide servicemember and veteran group life insurance plans to approximately six million enrollees; provide educational assistance to slightly more than 950,000 beneficiaries; manage a home mortgage program with slightly more than 3.1 million active loans,

"As Commander-in-Chief, I will not accept substandard service for our great veterans."

President Donald J. Trump
March 17, 2017

guaranteed by VA; and provide memorial and burial benefits to approximately 141,000 veterans and their family members in 2019.

Agency Reforms

Improves Veteran Experience. The Budget focuses on four priorities to enhance veterans' quality of life and demonstrate the Administration's commitment to a better future. These priorities include: a greater focus on identifying at-risk veterans and providing them targeted interventions to prevent suicide; enhancing healthcare in the community; simplifying access to and knowledge of non-medical benefits; and implementing a new appeals framework. These objectives are essential to VA's efforts to enrich veterans' experiences and become the service provider of choice.

In addition, the Budget supports initiatives to modernize and reform VA:

- $4.2 billion to leverage emerging technology, modernize and maintain infrastructure, and provide greater choices and benefits to veterans;
- $172 million for the Office of the Inspector General to strengthen accountability, promote transparency, and reduce waste, fraud, and abuse; and
- in 2019 VA will continue implementing a long-term strategic plan that would further streamline service delivery, improve the efficiency of the Federal Government, and ensure that veterans are receiving the benefits they need.

Veterans Health Administration

Improves Veterans' Access to Medical Care. The Budget provides $70.7 billion, a 9.6-percent increase above the 2017 enacted level, to provide high-quality healthcare services to veterans and eligible beneficiaries. The Budget also proposes $75.6 billion in advance appropriations for VA medical care programs in 2020, a 6.9-percent increase above the 2019 request. In addition, $11.9 billion would be used to enhance and expand veterans' access to high-quality community care, by consolidating multiple community care programs, including the Veterans Choice Program, into one unified program. This new program, the Veteran Coordinated Access & Rewarding Experiences program, would place the veteran and his or her physician at the center of the decision-making process and offer options for veterans to use a network of walk-in clinics for minor illnesses and injuries. Overall, the Budget is designed to improve veterans' experiences with and access to healthcare, building on the best features of VA's existing community care programs and strengthening VA's ability to furnish care in its own facilities.

> *"I intend to build a system that puts veterans first and allows them to get the best possible health care and services wherever they may be—in VA or in the community."*
>
> David Shulkin
> Secretary
> February 1, 2017

Combats the Opioid Epidemic. Fighting the opioid epidemic is a top priority of this Administration, and VA is at the forefront of combatting this public health emergency. The Budget provides $381 million in critical investments to reduce over-reliance on opioids for pain management and to promote the safe and effective use of opioid therapy. Funding supports multidisciplinary approaches in opioid prevention and treatment, including investments in: provider training to assess risk and manage treatment; mental health outpatient and residential treatment programs; opioid

overdose, recognition, rescue and response training programs; medication assisted therapy for opioid use disorders; patient advocacy; and distribution of naloxone kits.

Provides Critical Funding for Mental Health and Suicide Prevention. The Budget provides slightly more than $8.6 billion to expand and transform VA's focus on mental health services to ensure veterans receive timely and appropriate care that is tailored to the unique needs of each person. As part of its effort, VA is focusing on earlier identification and intervention for at-risk veterans to link them with the health services they need. VA would also continue to provide emergent mental healthcare treatment for veterans with other-than-honorable discharges. Suicide prevention is VA's number one clinical priority, and the Budget supports VA's efforts across five key domains: improve transition; know all veterans; partner across communities; reduce easy access to dangerous substances and objects; and improve access to care.

Continues Efforts to End Veteran Homelessness. The Budget supports VA's commitment to ending veteran homelessness by sustaining funding levels and providing opportunities to improve the targeting of intervention for veterans impacted by homelessness. Specifically, the Budget requests $1.8 billion for veteran homelessness programs including Supportive Services for Veteran Families and VA's component of the Department of Housing and Urban Development—VA Supportive Housing Program. These programs provide critical wrap-around care to help address and prevent veteran homelessness.

Veterans Benefits Administration and Board of Veterans Appeals

Streamlines Delivery of Veteran Benefits. VA provides veterans and eligible dependents with benefits including disability compensation, pension, GI Bill, educational assistance, vocational rehabilitation, and home loan guaranties among others. The Budget invests $2.9 billion, a 1-percent increase from the 2017 enacted level for these programs. These benefits directly support the economic security of veterans and their families, and reflect a greater commitment to a better future.

Modernizes the Claims Appeals Process. Of the amount requested, $183.5 million is for the Board of Veterans Appeals and related information technology (IT) initiatives to enhance ongoing efforts to reduce the pending appeals inventory and modernize VA's appeal process by establishing a new framework that is designed to provide quicker decisions on appeals for the veteran. The new framework would provide veterans with choices to obtain resolution of their appeals based on the option that best serves the individual veteran's circumstances. The new options are designed to improve the timeliness of appeals decisions.

"This is about making benefits work better for veterans and transforming the Department of Veterans Affairs to do better for years, and for generations [of] future veterans."

David Shulkin
Secretary
November 6, 2017

Enhances and Expands Access to Post-9/11 GI Bill Education Benefits. The Budget complements and supports continued implementation of the Harry W. Colmery Veterans Educational Assistance Act of 2017 (the "Forever GI Bill") which represents one of the most sweeping changes to the Post-9/11 GI Bill since its inception, expanding access to veterans and eligible dependents. In addition to the benefit payments, requested funding would also fund IT investments to effectively implement all provisions of the new law.

National Cemetery Administration

Increases Access to Burial and Memorial Benefits. The Budget includes $315.8 million, a 10.4-percent increase from the 2017 enacted level, to expand veteran access to memorial benefits, deliver premier service to veterans' families, and provide perpetual care for slightly more than 3.8 million gravesites. The National Cemetery Administration consistently receives high satisfaction ratings from veterans and their families for the care of VA cemeteries as National Shrines. In addition to sustaining 139 cemeteries and 33 other sites, the Budget supports the initial activation of nine new cemeteries in California, Idaho, Indiana, Maine, New York (two), North Dakota, Wisconsin, and Wyoming. In 2019, VA anticipates providing slightly more than 141,000 interments for veterans and family members.

Infrastructure Revitalization

Provides Critical Funding for Construction and Modernization of VA Facilities. The Budget provides $1.8 billion for 91 major and minor construction projects including new medical care facilities, national cemeteries, and projects at regional offices. The Budget also provides $1.4 billion for non-recurring maintenance projects to maintain and modernize medical facilities. These investments enhance the safety and security of VA facilities and help VA programs and services keep pace with modern technologies.

- Approximately $1.1 billion funds major construction projects, including construction of a community living center and domiciliary at Canandaigua, New York; construction of a facility that would specialize in spinal cord injuries at Dallas, Texas; and expansion of four national cemeteries that would provide slightly more than 80,000 new gravesites. This funding also includes $400 million to address critical seismic issues at VA facilities.

- In addition, $707 million funds minor construction projects, including corrections and additions to Veterans Health Administration facilities, gravesite expansions at national cemeteries, and renovations at regional offices.

- VA would use the $1.4 billion in funding for non-recurring maintenance to address infrastructure needs in its medical facilities.

Invests in IT Infrastructure to Improve Services. The Budget provides $4.2 billion for the Office of Information Technology. Of this amount, $204 million would support recapitalizing VA's legacy IT systems with new enterprise and business-line specific IT solutions to better support veteran focused initiatives. These investments are essential to better integrate processes, adopt modern technology solutions, improve security, and reduce long-term sustainment costs. In support of VA's goal to provide a comprehensive source to simplify veterans' access to and understanding of their benefits and services available to them, the Budget includes funding for a Navigator interface to navigate veterans to those entities best equipped to meet their needs. In addition to the amount requested for enterprise-wide IT infrastructure enhancements, $1.2 billion is included in a separate budget account for the acquisition of a replacement Electronic Health Records system. This is a substantive investment for this critical initiative, which would help facilitate a seamless transition for servicemembers as they leave the Armed Forces.

CORPS OF ENGINEERS—CIVIL WORKS

Highlights:

- The Army Corps of Engineers civil works program (Corps) develops, manages, restores, and protects water resources primarily through the construction, operation and maintenance, and study of water-related infrastructure projects. The Corps is also responsible for regulating development on navigable waters of the United States and works with other Federal agencies to help communities respond to and recover from floods and other natural disasters.
- The Budget focuses Federal investment where it is most warranted. The Budget also proposes reforms to how the Nation invests in water resources projects, reducing the reliance on Federal funding and control and providing States and local government, as well as the private sector, more flexibility to make investments they deem a priority.
- The Budget requests $4.8 billion for the Corps, a more than 20-percent decrease from the 2017 enacted level.

The President's 2019 Budget:

The Corps has three main missions: flood and storm damage reduction; commercial navigation; and aquatic ecosystem restoration. The Corps also regulates development in navigable waters and wetlands. While the Agency has had a significant impact on water resources development throughout its history, current approaches to funding, constructing, and maintaining projects are not delivering benefits in either a timely or cost effective manner. The current paradigm for investing in water resources development is not sustainable; it can deter rather than enable local communities, States, and the private sector from making important investments on their own, even when they are the primary beneficiaries. The Budget supports the Administration's infrastructure proposal and lays the groundwork for: modernizing the Nation's approach to water resources; broadening the pool of capital for infrastructure investments; reducing bureaucratic red tape; and empowering State, local, and private decision-making. The Budget does this by focusing Federal investment where it is most warranted and proposing reforms to provide States and communities greater flexibility to make the investments that they deem priorities.

Provides Accountability to the American Taxpayer

Emphasizes Investments in Ongoing Construction of Projects with High Economic or Environmental Returns while Addressing Public Safety. The Budget keeps the Federal Government's promise to complete ongoing construction projects, which provide a high return to the Nation or address a significant risk to public safety, more quickly and cost effectively. By proposing to not start any new construction projects, the Budget enables the Corps to focus on completing these ongoing priority projects faster for less cost, allowing the affected communities to see their benefits sooner. The Budget also recognizes the need for a change in the way future construction investments are funded, with less reliance on Federal appropriations. For example, the Budget proposes to accelerate repairs of the Herbert Hoover Dike through an innovative partnership between the Federal Government and the State of Florida using a combination of appropriations from the Federal Government and the State of Florida.

Prioritizes Operating and Maintaining Existing Infrastructure. The Budget gives priority to operating and maintaining existing infrastructure, improving its reliability, and improving its resilience to cyber-related attacks. Maintenance of key infrastructure is funded; this includes navigation channels that serve the Nation's largest coastal ports and the inland waterways with the most commercial use, such as the Mississippi and Ohio Rivers, and the Illinois Waterway.

Increases Transparency for the American Taxpayer. The Budget establishes clear priorities based on objective criteria for investment decisions. This approach ensures the best overall use of available funds and allows the American taxpayer to understand how Federal resources are allocated. For example, the Budget begins to fund dam safety studies and dredged materials disposal plans within the investigations account where they appropriately belong. The Budget also classifies the Poplar Island project, which serves as the primary dredged material disposal site for the Port of Baltimore, as a navigation project. The Administration believes new Federal investment decisions should be clearly identified by both the Administration and the Congress before funds are spent. Consistent with this approach, the Budget does not propose any new starts. In addition, the Budget proposes revisions to the appropriations language for the Construction, Operations and Maintenance, and Mississippi River and Tributaries accounts and the Harbor Maintenance and Inland Waterways Trust Funds to enable greater transparency in how these funds are spent.

Promotes American Economic Prosperity

Reforms Inland Waterways Funding. The Budget proposes to reform the laws governing the Inland Waterways Trust Fund, including an annual per vessel fee for commercial users, to help finance future capital investments on these waterways and a portion of the cost of operating and maintaining them. The current diesel fuel tax is insufficient to support the users' share of these costs.

Increases Flexibility for State and Local Communities to Make Investment Decisions

Reduces the Harbor Maintenance Tax. The Budget proposes to reduce the Harbor Maintenance Tax as a step toward providing ports greater flexibility to finance their capital and operating costs on their own. By reducing the tax burden on users of ports, ports would have greater flexibility to determine appropriate fees for services they provide, in order to help finance their operations.

Divests the Washington Aqueduct. The Budget proposes to sell the Washington Aqueduct, the wholesale water supply system for Washington, District of Columbia; Arlington County, Virginia; the City of Falls Church, Virginia; and parts of Fairfax County, Virginia. The Corps owns and operates the Aqueduct, which is the only local water supply system in the Nation owned and operated by the Corps. Ownership of local water supply is best carried out by State or local government or the private

sector, where there are appropriate market and regulatory incentives. Selling the Aqueduct to a public or private utility would contribute to American economic prosperity through a more efficient allocation of economic resources.

ENVIRONMENTAL PROTECTION AGENCY

Highlights:

- The Environmental Protection Agency (EPA) is responsible for implementing and enforcing statutes designed to protect human health and the environment.
- The Budget continues the Agency's work to protect the air, land, and water from pollution, while reducing and eliminating lower priority activities and voluntary programs. Focusing on the core mission supports overall efforts to restrain Federal spending and promote operational efficiencies that enhance the Agency's performance.
- The Budget requests $5.4 billion for EPA, a $2.8 billion or 34-percent decrease from the 2017 enacted level.

The President's 2019 Budget:

Environmental protection and public health are key to U.S. prosperity and essential to America's quality of life. EPA was created in 1970 to consolidate into one agency the Federal Government's activities to protect human health and the environment. Through cooperative federalism, EPA works with States and Tribes, as well as local governments, businesses, and the public to protect clean air, water, and land.

Since its creation, the work of EPA and its partners has led to significant reductions in the risks from pollution and has helped to meaningfully improve the lives of all Americans:

- emissions of the major air pollutants identified in the Clean Air Act of 1970 have decreased by 70 percent;
- approximately 90 percent of the U.S. population served by community water systems receives drinking water that meets all applicable water quality standards; and
- more than 2,700 of the most contaminated Superfund and other hazardous waste sites have a remedy in place to reduce human exposure to hazardous substances.

In recognition of the significant environmental and public health gains that have already been made, the Budget would maintain key environmental achievements while furthering work in core mission areas. EPA would continue to invest in protecting the air, land, and water as well as address exposure to toxic chemicals.

EPA Answers the Call to Action

In 2017, faced simultaneously with three major hurricanes, a tropical storm, and major wildfires spanning over eight States and two Territories, EPA provided crucial front line support to its Federal, State, territorial, and tribal partners by:

- evaluating slightly more than 6,300 drinking water systems and close to 500 wastewater systems;
- assessing approximately 250 Superfund sites and 1,700 oil and chemical facilities;
- providing technical assistance as needed to damaged facilities;
- responding to approximately 275 spills and recovering more than 2,000 vessels and 48,600 orphaned containers;
- advising on waste management and debris disposal mechanisms; and
- utilizing its laboratory network, along with specialized equipment such as the Airborne Spectral Photometric Environmental Collection Technology airplane and Trace Atmospheric Gas Analyzer mobile laboratories to monitor the air and water quality in the affected communities.

EPA's support delivered vital data on the potential risks and hazards to first responders and the public.

To achieve these goals, the Budget continues to propose a number of strategic reforms. The Budget eliminates many voluntary and lower priority activities and programs, and invests in process improvements and other operational enhancements to bring greater efficiency and cost-effectiveness to the work of the Agency. EPA is also in the midst of implementing sweeping regulatory reforms. The President's Executive Orders 13771, "Reducing Regulation and Controlling Regulatory Costs," and 13783, "Promoting Energy Independence and Economic Growth," are guiding the Agency to find new approaches to protecting the environment and human health while also ensuring consideration of economic security, as consistent with law. As EPA continues to focus on its fundamental responsibilities, and strengthens its relationships with States and Tribes on the implementation of Federal environmental laws, there is an opportunity to reshape the Agency's workforce, ensuring that EPA operates efficiently while maintaining critical skills and expertise.

Empowers State Environmental Priority-Setting. States are the primary implementers of many Federal environmental statutes and critical partners in protecting the Nation's environment and human health. States have long sought flexibility to direct grant resources to their individual priorities, rather than receiving funding only through grants dedicated to specific programs. The Budget recognizes and responds to this need by providing $27 million for "Multipurpose Grants" within EPA's Categorical Grant portfolio totaling $597 million. States would be able to spend this funding on any statutorily mandated delegated duty. This proposal would enable each State to set its own environmental priorities and quickly respond to new threats as they arise.

Invests in Water Infrastructure Construction, Repair, and Replacement. The Budget funds water infrastructure through the State Revolving Funds and the Water Infrastructure Finance and Innovation Act (WIFIA) credit program. The 2019 capitalization of the State Revolving Funds would supplement the approximately $80 billion currently revolving at the State level; in addition, the WIFIA credit subsidy would support more than $1 billion in direct loans, resulting in more than $2 billion in total investment. These resources would complement State and local drinking water and wastewater infrastructure investments as well as funding provided through other Federal channels, including the President's Infrastructure Initiative.

Accelerates the Clean Up of the Nation's Most Complex Hazardous Waste Sites. The Budget provides $762 million for the Hazardous Substance Superfund Account to address the release of hazardous substances and the clean up of hazardous waste sites. The Budget also supports the recommendations made in EPA's Superfund Task Force Report to identify impediments to expeditious

clean up at sites with significant exposure risks and to bring more private funding to the table for redevelopment. Revitalizing contaminated land improves the quality of life for communities around the United States and is part of EPA's core mission.

Enhances Monitoring of America's Significant Watersheds. The Budget funds programs to measure and assess the health of the Great Lakes and Chesapeake Bay. These watersheds require coordination and collaboration among numerous States, Tribes, and local governments. In the case of the Great Lakes, international coordination with Canada is also necessary. Effective coordination and collaboration among these stakeholders relies on accurate and continuous data. The Budget provides funds to support basin-wide monitoring in these watersheds, which would assist decision-making on health and economic issues including harmful algal blooms and invasive species management. The Budget also supports cooperative federalism by building State and local capacity to conduct monitoring, while recognizing that the primary responsibility for local ecosystem restoration rests with States and local groups.

Restoring the Land to Productive Use

The Budget prioritizes funding for Brownfields site assessment grants in order to accelerate investment in local communities. The EPA Brownfields program provides competitive grants to local communities to address sites where redevelopment is challenged by the presence or potential presence of contamination. EPA's Brownfields program site assessment grants provide useful information to communities about the extent of contamination at a property. Real estate developers use this information to estimate future clean-up costs and to plan for redevelopment of the property. EPA Brownfields grantees report that approximately 30 percent of brownfield properties that are assessed using EPA Brownfields funding do not require remediation for the intended reuse of the property; although, in some cases, institutional controls may be required. Finding that remediation is not necessary for the intended reuse of the site means faster redevelopment and the return of the property to productive use.

Ensures Consistent Enforcement and Enhanced Compliance Assistance. The Budget continues to concentrate EPA's enforcement objectives on programs that are not delegated to State, local, and tribal partners. EPA will work with partners to maintain a consistent and effective enforcement program to avoid duplication and give the regulated community an even playing field for conducting business. To specifically assist the oil and chemical industries in their compliance with EPA regulations, the Budget proposes to institute a voluntary fee that can be paid by a facility to have EPA provide on-site compliance assistance.

Strengthens Protections from Toxic Chemicals. In 2016, the Congress passed the Frank R. Lautenberg Chemical Safety for the 21st Century Act to modernize the Toxic Substances Control Act (TSCA). TSCA, as amended, requires EPA to make an affirmative finding of safety on all new chemicals introduced into commerce. EPA must also prioritize and evaluate existing chemicals in commerce and manage chemicals when EPA finds they do not to meet safety standards that are in place to protect people and the environment from unreasonable risks. In 2019, EPA will continue to set up new protocols to implement the modernized TSCA and evaluate the risks of new and existing chemicals in commerce as part of the Agency's commitment to provide for the safety and security of all Americans.

Fee-Funds the Popular ENERGY STAR Program. ENERGY STAR is a trusted resource for consumers and businesses that want to purchase products that save them money and help protect the environment. The Budget includes a proposal to authorize EPA to administer the ENERGY STAR program through the collection of user fees. Product manufacturers that seek to label their products

under the program would pay a modest fee to support EPA's work to set voluntary energy efficiency standards and to process applications. Fee collections would begin after EPA undertakes a rulemaking process to determine which products would be covered by fees and the level of fees, and to ensure that a fee system would not discourage manufacturers from participating in the program or result in a loss of environmental benefits.

Reinforces Emergency Preparedness and Response Capabilities. The 2017 hurricane season reminded the Administration of how important it is for all levels of government to be ready to assist residents in the face of natural disasters. EPA plays a critical role in this capacity, providing technical assistance to drinking water and waste water utilities, responding to the release of hazardous substances, and advising on disease vector control and waste disposal. The Budget further supports EPA's efforts by providing $6 million to the Critical Infrastructure Protection program and $45 million for key emergency response equipment and training under the Homeland Security Preparedness Response & Recovery program. Protecting the safety and security of the American people is a Federal priority that ensures a prosperous Nation.

Invests in Cutting-Edge Research and Development for American Prosperity and a Better Future. The Budget provides $246 million for EPA to continue to perform research and development activities in support of core mission areas, focusing on air quality, water resources, sustainable communities, chemical safety, and human health risk assessment. These interdisciplinary research programs would apply the best available science to address current and future environmental hazards, develop new approaches, and improve the scientific foundation for making environmental protection decisions. The Agency will strengthen the alignment of its research resources to support EPA programs, regions, States, and Tribes with the goal of improving America's collective quality of life and preserving the health of the environment for future generations.

Refocuses the Agency on Core Activities. As part of the Administration's initiative to refocus EPA on its core mission, the President's Budget continues to eliminate funding for lower priority programs, programs that have duplicative functions with other agencies, activities that can be absorbed into other functions, and responsibilities that should be primarily for State and local governments. Examples of program eliminations include: the Climate Change Research and Partnership Programs; the Indoor Air and Radon Programs; the Marine Pollution and National Estuary Programs; the Environmental Education Program; and the Beaches Program. Total savings from eliminated EPA programs and activities would save taxpayers approximately $600 million compared to 2017 enacted levels.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Highlights:

- The National Aeronautics and Space Administration (NASA) is responsible for leading an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and bring new knowledge and opportunities back to Earth. As it pioneers the space frontier, NASA supports growth of the Nation's economy in space, increases understanding of the universe and our place in it, works with industry to improve America's aerospace technologies, and advances American leadership.
- The Budget supports the Administration's new space exploration policy by refocusing existing NASA activities toward exploration, by redirecting funding to innovative new programs that support the new policy, and by providing additional funding to support new public-private initiatives.
- The Budget requests a total of $19.6 billion for NASA, a $500 million (2.6-percent) increase from the 2018 Budget ($61 million below NASA's 2017 funding level).
- The Budget proposes to end direct U.S. Government funding for the space station by 2025 and provides $150 million to begin a program that would encourage commercial development of capabilities that NASA can use in its place.
- The Budget refocuses and consolidates NASA's space technology development programs to support space exploration activities.
- The Budget continues strong programs in science and aeronautics, including a supersonic "X-plane," planetary defense from hazardous asteroids, and potentially a bold mission to retrieve pieces of Mars for scientific study on Earth.

The President's 2019 Budget:

The Budget supports an innovative and sustainable program of exploration with commercial and international partners to enable the return of humans to the Moon for long-term exploration and utilization, followed by human missions to Mars and other destinations. As it pioneers the space frontier, NASA supports growth of the Nation's space economy, increases understanding of the universe and America's place in it, and advances America's aerospace technology.

"The directive I'm signing today will refocus America's space program on human exploration and discovery. It marks an important step in returning American astronauts to the Moon for the first time since 1972 for long-term exploration and use. This time, we will not only plant our flag and leave our footprints, we will establish a foundation for an eventual mission to Mars. And perhaps, someday, to many worlds beyond."

President Donald J. Trump
November 11, 2017

The Budget takes concrete actions to once again launch Americans into space from American soil. The Budget partners with industry to land robotic missions on the surface of the Moon in the next few years, paving the way for a return of U.S. astronauts—this time not just to visit, but to lay the foundation for further journeys of exploration and the expansion of the U.S. economy into space. The Budget supports a sustainable space exploration program to be proud of—one that reflects American ingenuity, ambition, and leadership. Specifically, the Budget:

Renews Focus on Human Exploration and Discovery and Expands Commercial Partnerships to Strengthen U.S. Leadership in Space. The Budget provides $10 billion to support human space exploration and to pursue a campaign that would establish U.S. preeminence to, around, and on the Moon. This would be achieved through a renewed focus on new approaches and industrial partners, and by pursuing near-term milestones for lunar exploration, such as the commercial launch of a key power and propulsion space tug in 2022. A new lunar robotic exploration program would support innovative approaches to achieve human and science exploration goals. This new program would fund contracts for transportation services and the development of small rovers and instruments to meet lunar science and exploration needs. The Budget also supports the creation of a new Exploration Research and Technology program to enable lower-cost technology and systems needed to sustainably return humans to the Moon and beyond. In addition, the Budget fully funds the Space Launch System (SLS) rocket and Orion crew capsule as key elements of the human space exploration program. The Budget provides $3.7 billion for SLS and Orion, which would keep the programs on track for a test launch by 2020 and a first crewed launch around the Moon by 2023.

Provides Cost Savings by Phasing out Government Programs and Replacing them with Commercial or Public-Private Operations. The Budget proposes to end direct U.S. financial support for the International Space Station in 2025, after which NASA would rely on commercial partners for its low Earth orbit research and technology demonstration requirements. A new $150 million program would begin support for commercial partners to encourage development of capabilities that the private sector and NASA can use. The Budget also proposes a transition away from NASA's current Government-owned and operated fleet of communications satellites and associated ground stations. Instead, the Budget proposes a greater reliance on commercial communications satellite capabilities. The Budget also proposes canceling, pending an independent review, an over-budget project to upgrade the current NASA-owned system in order to make resources available for these new partnerships.

Continues Robotic Exploration of the Solar System. The Budget provides $2.2 billion to Planetary Science and maintains support for competed science missions and the next Mars rover, which would launch in 2020. The Budget also provides $50 million to explore possibilities for retrieving geologic samples from Mars, which has long been a high priority science goal and a keystone of future Mars exploration. A $150 million planetary defense program would help protect the Earth from potentially hazardous asteroids.

Fully Funds an Experimental Supersonic Airplane and Increases Hypersonics Research Funding. The Budget fully funds the Low-Boom Flight Demonstrator, an experimental supersonic

(faster than the speed of sound) airplane that would make its first flight in 2021. This "X-plane" would open a new market for U.S. companies to build faster commercial airliners, creating jobs and cutting cross-country flight times in half. The Budget also increases funding for research on flight at speeds more than five times the speed of sound, commonly referred to as hypersonics. Hypersonics research is critical to understanding how crewed and robotic spacecraft can safely enter and exit the atmospheres of planets. Hypersonics also has applications for national defense.

"American companies are on the cutting edge of space technology, and they're developing new rockets, spaceships, and satellites that will take us further into space, faster than ever before. Like the railroads that brought American explorers, entrepreneurs, and settlers to tame the Wild West, these groundbreaking new technologies will open untold opportunities to extend the range of American action and values into the new worlds of outer space. And by fostering much stronger partnerships between the Federal Government and the realm of industry, and bringing the full force of our national interest to bear, American leadership in space will be assured."

Vice President Michael R. Pence
October 5, 2017

Supports a Focused Earth Science Program. The Budget provides $1.8 billion for a focused, balanced Earth Science portfolio that supports the priorities of the science and applications communities. The Budget maintains the Nation's 45-year record of space-based land imagery by funding Landsat 9 and a Sustainable Land Imaging program. The Budget maintains the Administration's previous termination of five Earth Science missions—PACE, OCO-3, RBI, DSCOVR Earth-viewing instruments, and CLARREO Pathfinder—to achieve savings.

Terminates a New Space Telescope while Increasing Support for other Astrophysics Priorities. The Budget terminates development of the WFIRST space telescope, which was not executable within its previous budget and would have required a significant funding increase in 2019 and future years. The Budget redirects funding from this mission to competed research including smaller, principal-investigator-led astrophysics missions. These missions have a history of providing high scientific impact while training the next generation of scientists and engineers. The Budget continues to fund the $8.8 billion James Webb Space Telescope, which is expected to launch in 2019 and operate for many years to come.

Redirects Education Funding to Higher Priorities. The Budget continues to support the termination of the $100 million Office of Education, redirecting those funds to NASA's core mission of exploration. The Science Activation program within the Science Mission Directorate—a focused, science-driven program with clear objectives, evaluation strategies, and strong partnerships—is retained.

Supports the Technology Demonstration of In-Space Robotic Manufacturing and Assembly. The Budget provides $54.2 million for public-private partnerships to demonstrate new technologies used to build large structures in a space environment. Such structures could be key to supporting future exploration and commercial space activities.

SMALL BUSINESS ADMINISTRATION

Highlights:

- The Small Business Administration (SBA) ensures that America's small business owners have the tools and resources needed to start and develop their operations, drive U.S. competitiveness, and help grow the economy. The President is committed to seeing that small businesses succeed by promoting responsible policies that produce economic growth while simultaneously reducing the regulatory and tax burdens that can impede their development.
- The Budget leverages today's strong market conditions to enable SBA to fulfill its core mission while ensuring that its operations represent the most prudent use of taxpayer dollars. The Budget introduces counter-cyclical policies in SBA's business loan guarantee programs and updates fee structures to ensure that during positive economic times, SBA is not supplanting private sector lending or creating excess risk for the Government.
- The Budget requests $834 million in new budget authority for 2019, a $53 million or 5.9-percent decrease from the 2017 enacted level. This request is offset by changes to existing fee structures across SBA's business loan guarantee programs and the elimination of unspent funds from prior years, resulting in a net request of $629 million.

The President's 2019 Budget:

America's 30 million small businesses play a critical role in job creation and retention. SBA's assistance to those firms and entrepreneurs help drive a robust U.S. economy and promote economic security. SBA achieves this through a variety of programs, from promoting access to capital and Federal contracting, to business counseling and disaster assistance. Small businesses account for more than 57 million jobs, and create two out of three net new jobs each year in the United States. As more than half of all Americans are either employed by or own a small business, SBA works to ensure that each day more Americans have the opportunity to start, scale, and succeed in businesses of their own. With this as its mission, SBA is uniquely positioned to deliver on two of the President's top priorities—job creation and economic growth. The Budget supports these priorities by assisting small business owners and entrepreneurs with securing access to capital and by providing counseling and training services, while ensuring that it does not supplant activities better provided by the private sector.

Promotes Access to Affordable Capital for American Entrepreneurs. The Budget supports $43 billion in business loans that would help America's small business owners access affordable

capital to start or expand their businesses. Through its variety of business loan programs, SBA helps expand private lending to small business owners that cannot attain it elsewhere. These programs support financing for an array of purposes, from general business operations to fixed assets and venture capital investments in small businesses.

U.S. Small Businesses at a Glance:

Economic engines. The United States is home to 29.6 million small businesses, 99.9 percent of all U.S. businesses.

Job creators. Small businesses employ 57.9 million (47.8 percent of the labor force) and each year create 1.4 million net new jobs.

Major exporters. Small businesses represent 97.7 percent of U.S. exporters.

Opening opportunity. Lending to women-owned businesses by SBA totaled more than $8.5 billion in 2017, an increase of approximately $575 million from the prior year.

Levels the Playing Field with Private Sector Small Business Lending. SBA fills a critical void in the market when economic shocks reduce traditional lending to small businesses and when the private market is unwilling to provide capital to credit-worthy borrowers. However, during prosperous economic times such as these, the Budget proposes that SBA introduce counter-cyclical policies to its business loan guarantee programs that enables it to maintain its operations while ensuring that it is not displacing direct private lending. Through an adjustment of fees across its business loan guarantee programs, SBA would cover both its anticipated lending and operational costs, leveling the playing field among its lender community while operating at zero cost to the taxpayer.

Targets Support for the Smallest of Small Businesses and Startups. Through its 7(m) Direct Microloan program, SBA supports low-interest financing for non-profit intermediaries that in turn provide loans of up to $50,000 to rising entrepreneurs. In addition to the $25 million in technical assistance grant funds requested for the Microloan program, the Budget requests $4 million in subsidy resources to support $42 million in direct lending.

Assists Businesses and Homeowners in the Direct Aftermath of Disaster. SBA provides affordable, accessible, and immediate disaster assistance to those hardest hit when disaster strikes. The Budget supports more than $1 billion in disaster relief lending to businesses, homeowners, renters, and property owners to help American communities recover quickly in the wake of declared disasters.

"Small business owners embody the American pioneering spirit and remind us that determination can turn aspiration into achievement…America's small business owners transform ideas into reality. They are a strong testament to the opportunities a market economy affords."

President Donald J. Trump
April 28, 2017

Optimizes How Support is Delivered to Business Owners and Entrepreneurs. The Budget requests $110 million for the Small Business Development Center program, which delivers a variety of services to small businesses and prospective business owners across U.S. cities and counties. The Budget also proposes the creation of a competitive set-aside within the program that would reward those centers that most efficiently utilize their resources and provide innovative methods to help entrepreneurs.

Opens Opportunities for Businesses in the Underserved Market. In 2019, SBA will continue to focus on socially and economically disadvantaged communities in emerging markets. For example, SBA's 7(j) Management and Technical Assistance Program would revitalize its mission through the

development and integration of new, innovative consulting solutions tailored to individual community needs and local business goals.

> *"The mission of the SBA is to help small businesses grow, create jobs and help our economy thrive…I want to get to know small business owners and entrepreneurs across America and learn about the obstacles they face while growing a business. I also want to encourage entrepreneurs to tap into SBA resources for start-up and growth solutions."*
>
> Linda McMahon
> Administrator
> June 21, 2017

Emphasizes Equal Opportunity and Representation in the Marketplace. Through its diverse set of entrepreneurial training programs, SBA will continue reaching women, veterans, minority communities, rural business owners, and entrepreneurs in historically underutilized business zones in order to ensure that all Americans have an equal opportunity to succeed when it comes to starting, scaling, and operating a small business. These include supported investments in advising and mentoring programs such as SCORE, Women's Business Centers, and Veterans Outreach. These programs complement SBA's ongoing efforts to remove barriers that underserved populations, including women, face in accessing the capital necessary to start, grow, and expand their businesses.

Helps Small Businesses Gain Access to Federal Contracts and Research Opportunities. Small business contracts represent the largest form of direct monetary support for small businesses in the Federal Government. Through its 8(a) business development and set-aside contracting programs, SBA leads Federal efforts to deliver 23 percent of contracts to small businesses. This includes set-asides of five percent for women-owned and small, disadvantaged 8(a) businesses and three percent set-asides for historically underutilized business zones and service-disabled veteran-owned small businesses. In 2019, SBA would also continue fostering high-tech innovation among small businesses by awarding highly competitive funding agreements through its Small Business Innovation Research program.

Enables SBA to Advocate on Behalf of American Small Business Owners. The Budget requests $9.1 million for SBA's Office of Advocacy. Through this Office, SBA is positioned to encourage and educate stakeholders and the public on policies that support the development and growth of American small businesses. The Budget accomplishes this by intervening early in Federal agencies' regulatory development processes, and serving as a liaison between them and the small business community to explain and expand on issues of concern.

Underscores Responsibility and Transparency of SBA's Practices. The Budget requests $21.9 million for SBA's Office of the Inspector General (OIG) to provide auditing and investigative services to support and assist SBA in achieving its mission. As with all Federal lending and contracting programs, SBA faces challenges such as improper payments and losses from defaulted loans. The OIG plays a critical role in addressing these and identifying actions to deter and detect waste, fraud, and abuse.

Summary Tables

Table S–1. Budget Totals [1]

(In billions of dollars and as a percent of GDP)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Budget Totals in Billions of Dollars:														
Receipts	3,316	3,340	3,422	3,609	3,838	4,089	4,386	4,675	4,946	5,231	5,506	5,818	19,344	45,520
Outlays	3,982	4,214	4,407	4,596	4,754	4,941	5,160	5,348	5,526	5,748	5,955	6,181	23,858	52,615
Deficit	665	873	984	987	916	852	774	672	579	517	450	363	4,513	7,095
Debt held by the public	14,665	15,790	16,872	17,947	18,950	19,946	20,809	21,495	22,137	22,703	23,194	23,684		
Gross domestic product (GDP)	19,177	20,029	21,003	22,069	23,194	24,369	25,605	26,900	28,253	29,647	31,089	32,602		
Budget Totals as a Percent of GDP:														
Receipts	17.3%	16.7%	16.3%	16.4%	16.5%	16.8%	17.1%	17.4%	17.5%	17.6%	17.7%	17.8%	16.6%	17.1%
Outlays	20.8%	21.0%	21.0%	20.8%	20.5%	20.3%	20.2%	19.9%	19.6%	19.4%	19.2%	19.0%	20.5%	20.0%
Deficit	3.5%	4.4%	4.7%	4.5%	3.9%	3.5%	3.0%	2.5%	2.1%	1.7%	1.4%	1.1%	3.9%	2.8%
Debt held by the public	76.5%	78.8%	80.3%	81.3%	81.7%	81.9%	81.3%	79.9%	78.4%	76.6%	74.6%	72.6%		

[1] Outlays and deficits are standardized to 12 monthly benefit payments, as shown on Table S–4.

Table S–2. Effect of Budget Proposals on Projected Deficits

(Deficit increases (+) or decreases (-) in billions of dollars)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Projected deficits in the pre-policy baseline [1]	**665**	**870**	**969**	**1,049**	**1,103**	**1,115**	**1,109**	**1,123**	**1,136**	**1,242**	**1,316**	**1,378**	**5,345**	**11,540**
Percent of GDP	3.5%	4.3%	4.6%	4.8%	4.8%	4.6%	4.4%	4.2%	4.1%	4.3%	4.3%	4.3%		
Proposals in the 2019 Budget:														
Changes to mandatory spending and receipts:														
Repeal and replace Obamacare	.....	.....	3	23	–27	–41	–56	–73	–92	–113	–137	–161	–98	–675
Support at least $1 trillion in private/public infrastructure investment	.....	.....	45	11	18	25	31	29	20	12	5	2	130	199
Provide paid parental leave	.....	.....	1	1	2	2	2	2	2	2	2	3	7	19
Reform the welfare system	.....	.....	–21	–23	–25	–25	–27	–27	–27	–29	–29	–28	–123	–263
Reform Federal student loans	.....	.....	–6	–12	–16	–19	–22	–24	–25	–26	–27	–27	–75	–203
Reduce improper payments Government-wide	.....	.....	–*	–1	–2	–3	–6	–6	–12	–22	–40	–59	–11	–151
Reform disability programs	.....	.....	–1	–2	–2	–2	–2	–5	–8	–12	–17	–22	–9	–72
Reform retirement and health benefits for Federal employees	.....	.....	–3	–1	–4	–5	–6	–8	–9	–10	–11	–12	–18	–68
Limit Farm Bill subsidies and make other agricultural reforms	.....	.....	–1	–4	–5	–6	–6	–7	–7	–7	–7	–7	–23	–58
Eliminate wasteful spending in Medicare and improve drug pricing and payment policies [2]	.....	.....	–2	–11	–16	–22	–26	–26	–29	–32	–34	–38	–77	–236
Other spending reductions and program reforms [3]	.....	5	–4	–13	–15	–11	–18	–22	–11	–56	–61	–68	–60	–278
Total, changes to mandatory spending and receipts	.....	5	10	–30	–92	–108	–135	–166	–197	–292	–355	–419	–356	–1,786
Reprioritize discretionary spending:														
Eliminate the defense sequester and raise the cap on defense discretionary spending	.....	32	43	66	76	82	84	85	86	86	86	85	350	777
Reorganize Government and apply two-penny plan to non-defense discretionary spending	.....	–32	–27	–57	–92	–122	–140	–163	–187	–211	–235	–260	–438	–1,495
Phase down the use of Overseas Contingency Operations funding	.....	–13	–5	–20	–33	–40	–43	–75	–94	–102	–109	–113	–141	–634
Provide 2018 emergency funding and align emergency and disaster funding with the ten-year average [4]	.....	11	1	–5	–12	–20	–21	–22	–23	–23	–24	–25	–57	–174
Total, reprioritize discretionary spending	.....	–2	11	–16	–62	–100	–120	–176	–218	–251	–283	–313	–287	–1,527
Debt service and indirect interest effects	.....	*	*	*	–3	–9	–16	–26	–38	–54	–74	–98	–28	–319
Total changes to spending and receipts in the 2019 Budget	.....	**4**	**21**	**–46**	**–157**	**–217**	**–272**	**–368**	**–453**	**–597**	**–713**	**–830**	**–671**	**–3,631**
Effect of post-policy boost to economic growth	.....	.....	–5	–16	–30	–46	–63	–82	–104	–128	–153	–185	–160	–813
Total deficit reduction in the 2019 Budget [5]	.....	**4**	**16**	**–62**	**–187**	**–263**	**–335**	**–451**	**–557**	**–725**	**–866**	**–1,015**	**–832**	**–4,445**
Resulting deficits in the 2019 Budget	**665**	**873**	**984**	**987**	**916**	**852**	**774**	**672**	**579**	**517**	**450**	**363**	**4,513**	**7,095**
Percent of GDP	3.5%	4.4%	4.7%	4.5%	3.9%	3.5%	3.0%	2.5%	2.1%	1.7%	1.4%	1.1%		

* $500 million or less.

[1] Includes adjustments to standardize the number of benefit payments in each year. See Table S-3 for more information on the baseline.

[2] Includes the following categories of proposals on Table S–6: Address fraud and abuse in Medicare, Eliminate wasteful spending on Government-imposed provider burdens in Medicare, Eliminate wasteful spending, Medicare drug pricing and payment improvements, Improve the Medicare appeals system, and Medicare interactions.

[3] Includes interaction between 2019 Budget proposals and the adjustment to standardize the number of benefit payments in each year.

[4] The Balanced Budget and Emergency Deficit Control Act of 1985 (BBEDCA) requires the baseline for discretionary appropriations, including disaster and emergency spending, to reflect the most recent enacted levels, extended through the budget window with adjustments for inflation. This line represents the effect of providing needed emergency funding for 2018 and then aligning emergency and disaster funding with the average of funding provided over the previous ten years, relative to the inflated spending levels in the BBEDCA baseline.

[5] Includes differences between baseline and policy estimates of the outlay effects of 2019 mandatory sequestration.

Table S–3. Baseline by Category [1]

(In billions of dollars)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Outlays:														
Discretionary programs:														
Defense	590	611	637	668	678	690	705	719	737	755	774	793	3,378	7,156
Non-defense	610	661	656	659	670	669	676	689	705	721	738	756	3,330	6,940
Subtotal, discretionary programs	1,200	1,271	1,293	1,327	1,349	1,359	1,381	1,408	1,442	1,476	1,512	1,549	6,708	14,096
Mandatory programs:														
Social Security	939	987	1,047	1,109	1,174	1,245	1,319	1,398	1,480	1,566	1,656	1,752	5,894	13,745
Medicare	591	582	640	688	743	845	876	902	1,005	1,103	1,196	1,353	3,792	9,350
Medicaid	375	402	420	439	464	490	519	549	583	624	661	701	2,332	5,450
Exchange subsidies (including Basic Health Care Program)	39	48	48	48	49	52	54	57	60	63	66	69	251	565
Other mandatory programs	574	570	576	589	612	654	655	658	684	745	764	815	3,086	6,751
Subtotal, mandatory programs	2,519	2,588	2,731	2,873	3,042	3,286	3,423	3,564	3,811	4,100	4,343	4,689	15,355	35,861
Net interest	263	310	364	447	515	577	636	684	727	772	815	859	2,538	6,396
Total outlays	3,982	4,170	4,388	4,647	4,906	5,222	5,439	5,656	5,980	6,348	6,670	7,098	24,601	56,353
Receipts:														
Individual income taxes	1,587	1,660	1,687	1,790	1,917	2,050	2,198	2,348	2,504	2,700	2,883	3,062	9,642	23,140
Corporation income taxes	297	218	225	265	273	314	374	417	435	417	406	414	1,451	3,539
Social insurance and retirement receipts:														
Social Security payroll taxes	851	852	905	941	995	1,049	1,103	1,164	1,226	1,296	1,361	1,442	4,994	11,483
Medicare payroll taxes	256	259	275	287	304	322	339	359	379	401	422	448	1,528	3,535
Unemployment insurance	46	48	47	47	47	46	47	48	49	50	52	55	233	488
Other retirement	10	10	11	11	12	12	13	14	14	15	16	17	59	135
Excise taxes	84	108	108	112	118	121	124	128	132	136	140	146	584	1,265
Estate and gift taxes	23	25	17	18	19	21	23	24	26	28	29	31	98	236
Customs duties	35	40	44	47	48	50	51	52	53	55	56	58	240	515
Deposits of earnings, Federal Reserve System	81	72	55	49	52	59	67	73	77	82	86	91	282	691
Other miscellaneous receipts	48	48	50	47	47	49	50	52	52	54	56	57	243	515
Total receipts	3,316	3,340	3,424	3,613	3,833	4,095	4,389	4,678	4,948	5,233	5,508	5,820	19,354	45,541
Deficit	**665**	**829**	**964**	**1,033**	**1,073**	**1,127**	**1,051**	**978**	**1,032**	**1,115**	**1,162**	**1,277**	**5,247**	**10,812**
Net interest	263	310	364	447	515	577	636	684	727	772	815	859	2,538	6,396
Primary deficit	403	519	600	586	558	550	415	294	305	343	347	418	2,709	4,416
On-budget deficit	715	824	955	1,000	1,029	1,070	975	887	925	1,003	1,035	1,142	5,028	10,021
Off-budget deficit/surplus (–)	–49	5	9	33	44	57	76	91	107	112	127	135	219	791

Table S–3. Baseline by Category [1]—Continued

(In billions of dollars)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Memorandum, totals with pre-policy economic assumptions and standardized to 12 monthly benefit payments:[2]														
Receipts	3,316	3,340	3,419	3,597	3,804	4,051	4,329	4,600	4,850	5,115	5,366	5,650	19,200	44,781
Outlays	3,982	4,210	4,388	4,647	4,906	5,166	5,438	5,723	5,986	6,357	6,682	7,029	24,545	56,322
Deficit	665	870	969	1,049	1,103	1,115	1,109	1,123	1,136	1,242	1,316	1,378	5,345	11,540
Memorandum, budget authority for discretionary programs:														
Defense	634	637	652	668	684	701	718	736	754	773	792	811	3,422	7,287
Non-defense	586	565	580	594	608	623	639	655	672	689	706	724	3,044	6,489
Total, discretionary budget authority	1,220	1,202	1,232	1,262	1,292	1,324	1,357	1,391	1,425	1,461	1,498	1,535	6,466	13,776

* $500 million or less.

[1] Baseline estimates are on the basis of the economic assumptions shown in Table S–9, which incorporate the effects of the Administration's fiscal policies. Baseline totals reflecting current-law economic assumptions are shown in a memorandum bank.

[2] When October 1 falls on a weekend, certain mandatory benefit payments are accelerated to the previous business day, and as a result certain fiscal years can have 11 or 13 benefit payments rather than the normal 12 payments.

Table S–4. Proposed Budget by Category

(In billions of dollars)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Outlays:														
Discretionary programs:														
Defense	590	634	678	721	730	744	759	743	744	755	768	783	3,633	7,426
Non-defense	610	636	626	584	549	498	483	470	461	452	443	436	2,740	5,002
Subtotal, discretionary programs	1,200	1,270	1,304	1,305	1,280	1,242	1,243	1,214	1,205	1,207	1,211	1,219	6,373	12,428
Mandatory programs:														
Social Security	939	987	1,046	1,108	1,173	1,243	1,317	1,395	1,476	1,562	1,652	1,748	5,887	13,720
Medicare	591	582	625	656	703	798	824	848	955	1,024	1,107	1,257	3,605	8,796
Medicaid and Market-Based Health Care Grant	375	400	412	483	480	495	512	528	546	564	579	597	2,382	5,196
Exchange subsidies (including Basic Health Program)	39	48	45	11	.....	.....	.....	.....	.....	.....	.....	.....	56	56
Other mandatory programs	574	577	567	575	590	626	621	617	636	664	662	680	2,979	6,238
Allowance for infrastructure initiative	.....	.....	45	11	18	25	31	29	19	11	4	1	129	193
Subtotal, mandatory programs	2,519	2,593	2,739	2,845	2,964	3,187	3,303	3,416	3,632	3,825	4,004	4,283	15,038	34,199
Net interest	263	310	363	447	510	568	619	658	688	717	740	761	2,507	6,070
Total outlays	3,982	4,173	4,407	4,596	4,754	4,996	5,165	5,288	5,526	5,748	5,955	6,263	23,918	52,697
Receipts:														
Individual income taxes	1,587	1,660	1,688	1,791	1,919	2,053	2,202	2,353	2,511	2,707	2,890	3,070	9,652	23,182
Corporation income taxes	297	218	225	265	273	314	374	417	435	417	406	413	1,451	3,539
Social insurance and retirement receipts:														
Social Security payroll taxes	851	852	905	941	994	1,049	1,103	1,164	1,226	1,296	1,361	1,442	4,992	11,481
Medicare payroll taxes	256	259	275	287	304	322	339	359	379	401	422	448	1,528	3,536
Unemployment insurance	46	48	47	47	48	49	51	50	52	53	55	59	241	510
Other retirement	10	10	11	13	16	19	21	23	24	25	26	26	80	204
Excise taxes	84	108	108	112	119	106	109	111	114	117	121	125	555	1,144
Estate and gift taxes	23	25	17	18	19	21	23	24	26	28	29	31	98	236
Customs duties	35	40	44	47	48	50	51	52	53	54	56	58	239	511
Deposits of earnings, Federal Reserve System	81	72	55	49	53	60	68	73	78	83	87	92	285	698
Other miscellaneous receipts	48	48	51	47	47	49	50	52	53	54	56	58	244	516
Allowance for Obamacare repeal and replacement	.....	.....	–3	–9	–3	–3	–3	–3	–3	–3	–4	–4	–20	–38
Total receipts	3,316	3,340	3,422	3,609	3,838	4,089	4,386	4,675	4,946	5,231	5,506	5,818	19,344	45,520
Deficit	**665**	**833**	**984**	**987**	**916**	**908**	**778**	**612**	**579**	**517**	**450**	**445**	**4,574**	**7,177**
Net interest	263	310	363	447	510	568	619	658	688	717	740	761	2,507	6,070
Primary deficit/surplus (–)	403	522	621	540	406	340	160	–46	–109	–199	–291	–316	2,067	1,107
On-budget deficit	715	828	977	956	875	853	706	525	477	410	328	315	4,367	6,423
Off-budget deficit/surplus (–)	–49	5	7	31	41	54	72	87	102	107	122	130	206	754

Table S–4. Proposed Budget by Category—Continued

(In billions of dollars)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Memorandum, totals standardized to 12 monthly benefit payments: [1]														
Receipts	3,316	3,340	3,422	3,609	3,838	4,089	4,386	4,675	4,946	5,231	5,506	5,818	19,344	45,520
Outlays	3,982	4,214	4,407	4,596	4,754	4,941	5,160	5,348	5,526	5,748	5,955	6,181	23,858	52,615
Deficit	665	873	984	987	916	852	774	672	579	517	450	363	4,513	7,095
Memorandum, budget authority for discretionary programs:														
Defense	634	675	716	733	743	760	778	737	752	768	784	800	3,729	7,570
Non-defense	586	545	483	469	455	434	425	415	408	400	392	385	2,267	4,266
Total, discretionary budget authority	1,220	1,220	1,199	1,202	1,198	1,194	1,203	1,152	1,160	1,168	1,176	1,185	5,996	11,836
Memorandum, repeal & replace Obamacare—Medicaid and other outlays for health care coverage:														
Medicaid	375	400	412	363	357	370	383	397	411	426	438	453	1,885	4,011
Exchange Subsidies (including Basic Health Program)	39	48	45	11	.....	.....	.....	.....	.....	.....	.....	.....	56	56
Market-Based Health Care Grant	.....	.....	.....	120	123	126	128	131	134	138	141	144	497	1,185
Total, outlays	414	448	457	494	480	495	512	528	546	564	579	597	2,438	5,251

[1] When October 1 falls on a weekend, certain mandatory benefit payments are accelerated to the previous business day, and as a result certain fiscal years can have 11 or 13 benefit payments rather than the normal 12 payments.

Table S–5. Proposed Budget by Category as a Percent of GDP

(As a percent of GDP)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Averages 2019–2023	Averages 2019–2028
Outlays:														
Discretionary programs:														
Defense	3.1	3.2	3.2	3.3	3.1	3.1	3.0	2.8	2.6	2.5	2.5	2.4	3.1	2.8
Non-defense	3.2	3.2	3.0	2.6	2.4	2.0	1.9	1.7	1.6	1.5	1.4	1.3	2.4	2.0
Subtotal, discretionary programs	6.3	6.3	6.2	5.9	5.5	5.1	4.9	4.5	4.3	4.1	3.9	3.7	5.5	4.8
Mandatory programs:														
Social Security	4.9	4.9	5.0	5.0	5.1	5.1	5.1	5.2	5.2	5.3	5.3	5.4	5.1	5.2
Medicare	3.1	2.9	3.0	3.0	3.0	3.3	3.2	3.2	3.4	3.5	3.6	3.9	3.1	3.3
Medicaid and Market-Based Health Care Grant	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	2.1	2.0
Exchange subsidies (including Basic Health Program)	0.2	0.2	0.2	0.1	.....	.....	.....	.....	.....	.....	.....	.....	0.1	*
Other mandatory programs	3.0	2.9	2.7	2.6	2.5	2.6	2.4	2.3	2.2	2.2	2.1	2.1	2.6	2.4
Allowance for infrastructure initiative	.....	.....	0.2	0.1	0.1	0.1	0.1	0.1	0.1	*	*	*	0.1	0.1
Subtotal, mandatory programs	13.1	12.9	13.0	12.9	12.8	13.1	12.9	12.7	12.9	12.9	12.9	13.1	12.9	12.9
Net interest	1.4	1.5	1.7	2.0	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.1	2.3
Total outlays	20.8	20.8	21.0	20.8	20.5	20.5	20.2	19.7	19.6	19.4	19.2	19.2	20.6	20.0
Receipts:														
Individual income taxes	8.3	8.3	8.0	8.1	8.3	8.4	8.6	8.7	8.9	9.1	9.3	9.4	8.3	8.7
Corporation income taxes	1.5	1.1	1.1	1.2	1.2	1.3	1.5	1.5	1.5	1.4	1.3	1.3	1.2	1.3
Social insurance and retirement receipts:														
Social Security payroll taxes	4.4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.4	4.4	4.4	4.3	4.3
Medicare payroll taxes	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.3	1.3
Unemployment insurance	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Other retirement	*	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Excise taxes	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4
Estate and gift taxes	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Customs duties	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Deposits of earnings, Federal Reserve System	0.4	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3
Other miscellaneous receipts	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Allowance for Obamacare repeal and replacement	.....	.....	–*	–*	–*	–*	–*	–*	–*	–*	–*	–*	–*	–*
Total receipts	17.3	16.7	16.3	16.4	16.5	16.8	17.1	17.4	17.5	17.6	17.7	17.8	16.6	17.1
Deficit	**3.5**	**4.2**	**4.7**	**4.5**	**3.9**	**3.7**	**3.0**	**2.3**	**2.1**	**1.7**	**1.4**	**1.4**	**4.0**	**2.9**
Net interest	1.4	1.5	1.7	2.0	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.1	2.3
Primary deficit/surplus (–)	2.1	2.6	3.0	2.4	1.7	1.4	0.6	–0.2	–0.4	–0.7	–0.9	–1.0	1.8	0.6
On-budget deficit	3.7	4.1	4.7	4.3	3.8	3.5	2.8	2.0	1.7	1.4	1.1	1.0	3.8	2.6
Off-budget deficit/surplus (–)	–0.3	*	*	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.2	0.3

Table S–5. Proposed Budget by Category as a Percent of GDP—Continued

(As a percent of GDP)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Averages 2019–2023	Averages 2019–2028
Memorandum, totals standardized to 12 monthly benefit payments:														
Receipts	17.3	16.7	16.3	16.4	16.5	16.8	17.1	17.4	17.5	17.6	17.7	17.8	16.6	17.1
Outlays	20.8	21.0	21.0	20.8	20.5	20.3	20.2	19.9	19.6	19.4	19.2	19.0	20.5	20.0
Deficit	3.5	4.4	4.7	4.5	3.9	3.5	3.0	2.5	2.1	1.7	1.4	1.1	3.9	2.8
Memorandum, budget authority for discretionary programs:														
Defense	3.3	3.4	3.4	3.3	3.2	3.1	3.0	2.7	2.7	2.6	2.5	2.5	3.2	2.9
Non-defense	3.1	2.7	2.3	2.1	2.0	1.8	1.7	1.5	1.4	1.3	1.3	1.2	2.0	1.7
Total, discretionary budget authority	6.4	6.1	5.7	5.4	5.2	4.9	4.7	4.3	4.1	3.9	3.8	3.6	5.2	4.6
Memorandum, repeal & replace Obamacare—Medicaid and other outlays for health care coverage:														
Medicaid	2.0	2.0	2.0	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.6	1.5
Exchange Subsidies (including Basic Health Program)	0.2	0.2	0.2	0.1	.....	.....	.....	.....	.....	.....	.....	.....	0.1	*
Market-Based Health Care Grant	.....	.....	.....	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
Total, outlays	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	2.1	2.0

*0.05 percent of GDP or less.

Table S–6. Mandatory and Receipt Proposals

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Agriculture:													
Farm Bill savings:													
Limit eligibility for agricultural commodity payments to $500,000 Adjusted Gross Income (AGI)	.....	–114	–89	–142	–135	–124	–120	–111	–102	–98	–90	–604	–1,125
Limit Crop Insurance eligibility to $500,000 AGI	.....	.....	–56	–58	–67	–71	–77	–84	–92	–102	–117	–252	–724
Limit Crop Insurance premium subsidies	.....	.....	–2,231	–2,258	–2,482	–2,502	–2,540	–2,556	–2,587	–2,606	–2,609	–9,473	–22,371
Streamline conservation programs	.....	–136	–189	–483	–876	–1,291	–1,689	–2,017	–2,121	–2,120	–2,120	–2,975	–13,042
Eliminate lower priority Farm Bill programs	.....	–54	–112	–94	–98	–100	–100	–100	–100	–100	–100	–458	–958
Cap Crop Insurance companies' underwriting gains	.....	.....	.....	.....	–413	–420	–423	–426	–430	–437	–439	–833	–2,988
Eliminate Food for Progress food aid program	.....	–166	–166	–166	–166	–166	–166	–166	–166	–166	–166	–830	–1,660
Eliminate farm payment limit loopholes	.....	–149	–143	–141	–137	–135	–132	–130	–128	–127	–126	–705	–1,348
Eliminate Livestock Forage Program	.....	–416	–421	–434	–444	–451	–456	–460	–462	–468	–471	–2,166	–4,483
Total, Farm Bill savings	.....	–1,035	–3,407	–3,776	–4,818	–5,260	–5,703	–6,050	–6,188	–6,224	–6,238	–18,296	–48,699
Establish Food Safety and Inspection Service (FSIS) user fee	.....	.....	–660	–660	–660	–660	–660	–660	–660	–660	–660	–2,640	–5,940
Establish Animal and Plant Health Inspection Service (APHIS) user fee	.....	–23	–23	–23	–23	–23	–23	–23	–23	–23	–23	–115	–230
Establish Packers and Stockyards Program user fee	.....	–23	–23	–23	–23	–23	–23	–23	–23	–23	–23	–115	–230
Establish Agricultural Marketing Service (AMS) user fee	.....	–20	–20	–20	–20	–20	–20	–20	–20	–20	–20	–100	–200
Eliminate interest payments to electric and telecommunications utilities	.....	–129	–127	–130	–130	–128	–129	–129	–129	–129	–129	–644	–1,289
Eliminate the Rural Economic Development Program	.....	.....	–158	–160	.....	.....	.....	.....	.....	.....	.....	–318	–318
Outyear mandatory effects of discretionary changes to the Conservation Stewardship Program	.....	.....	–27	–135	–180	–180	–180	–180	–180	–180	–180	–522	–1,422
Total, Agriculture	.....	–1,230	–4,445	–4,927	–5,854	–6,294	–6,738	–7,085	–7,223	–7,259	–7,273	–22,750	–58,328
Education:													
Create single income-driven student loan repayment plan [1]	.....	–2,429	–6,006	–9,365	–11,883	–13,885	–15,458	–16,317	–17,228	–17,695	–18,099	–43,568	–128,365
Eliminate subsidized student loans	.....	–1,500	–2,580	–2,886	–2,973	–2,992	–3,008	–3,050	–3,096	–3,216	–3,254	–12,931	–28,555
Eliminate Public Service Loan Forgiveness	.....	–1,720	–2,979	–3,873	–4,411	–4,851	–5,303	–5,511	–5,597	–5,758	–5,859	–17,834	–45,862
Eliminate account maintenance fee payments to guaranty agencies	.....	–656	.....	.....	.....	.....	.....	.....	.....	.....	.....	–656	–656
Move Iraq-Afghanistan Service Grants into the Pell Grant program	.....	.....	.....	.....	.....	–1	–1	–1	–1	–1	–1	–1	–6
Expand Pell Grants to short-term programs	.....	7	27	34	40	46	48	49	49	50	51	154	401

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Reallocate mandatory Pell funding to support short-term programs	.....	–7	–27	–34	–40	–46	–48	–49	–49	–50	–51	–154	–401
Total, Education	.....	–6,305	–11,565	–16,124	–19,267	–21,729	–23,770	–24,879	–25,922	–26,670	–27,213	–74,990	–203,444
Energy:													
Repeal borrowing authority for Western Area Power Administration (WAPA)	.....	–450	–875	–75	575	275	110	–50	–50	–50	–50	–550	–640
Divest WAPA transmission assets	.....	.....	–580	.....	.....	.....	.....	.....	.....	.....	.....	–580	–580
Divest Southwestern Power Administration transmission assets	.....	.....	–15	.....	.....	.....	.....	.....	.....	.....	.....	–15	–15
Divest Bonneville Power Administration transmission assets	.....	.....	–1,733	–488	–483	–493	–452	–386	–386	–386	–386	–3,197	–5,193
Reform the laws governing how Power Marketing Administrations establish power rates	.....	–162	–169	–173	–182	–188	–192	–199	–206	–211	–217	–874	–1,899
Restart Nuclear Waste Fund Fee in 2021	.....	.....	.....	–359	–359	–364	–367	–364	–360	–360	–360	–1,082	–2,893
Total, Energy	.....	–612	–3,372	–1,095	–449	–770	–901	–999	–1,002	–1,007	–1,013	–6,298	–11,220
Health and Human Services (HHS):													
Create child welfare flexible funding option	.....	.....	.....	7	8	8	8	21	22	18	18	23	110
Reform the title IV-E adoption assistance savings provision	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Provide tribal access to the Federal Parent Locator Service	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reauthorize the Promoting Safe and Stable Families program (title IV-B)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Expand the Regional Partnership Grants program	.....	13	35	40	40	40	27	5	.....	.....	.....	168	200
Maintain Federal funding for key child care programs	.....	499	499	499	499	499	499	499	499	499	499	2,495	4,990
Reauthorize and modify Abstinence Education and the Personal Responsibility Education Program	.....	4	52	66	15	2	3	8	.....	.....	.....	139	150
Reauthorize Health Profession Opportunity Grants	.....	3	45	18	13	4	2	.....	.....	.....	.....	83	85
Drug pricing and payment improvements:													
Improve 340B program integrity	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Medicare:													
Authorize the HHS Secretary to leverage Medicare Part D plans' negotiating power for certain drugs covered under Part B[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Permanently authorize a successful pilot on retroactive Medicare Part D coverage for low-income beneficiaries	.....	.....	–20	–30	–30	–30	–30	–40	–40	–40	–40	–110	–300

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Increase Medicare Part D plan formulary flexibility	.....	–280	–404	–444	–487	–530	–576	–618	–669	–725	–784	–2,145	–5,517
Eliminate cost-sharing on generic drugs for low-income beneficiaries	.....	–30	–40	–40	–20	–20	–10	–20	–10	–10	–10	–150	–210
Require Medicare Part D plans to apply a substantial portion of rebates at the point of sale	.....	1,785	2,727	3,139	3,533	3,930	4,351	4,801	5,356	5,983	6,555	15,114	42,160
Exclude manufacturer discounts from the calculation of beneficiary out-of-pocket costs in the Medicare Part D coverage gap	.....	–1,490	–2,370	–3,360	–4,800	–5,300	–4,740	–5,360	–5,840	–6,330	–7,430	–17,320	–47,020
Establish a beneficiary out-of-pocket maximum in the Medicare Part D catastrophic phase	.....	377	541	592	648	706	767	825	892	966	1,045	2,864	7,359
Address abusive drug pricing by manufacturers by establishing an inflation limit for reimbursement of Medicare Part B drugs [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Improve manufacturers' reporting of average sales prices to set accurate payment rates [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Modify payment for drugs hospitals purchase through the 340B discount program and require a minimum level of charity care for hospitals to receive a payment adjustment related to uncompensated care [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reduce Wholesale Acquisition Cost (WAC)-based payments [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reform exclusivity for first generics to spur greater competition and access	.....	–118	–130	–142	–169	–169	–165	–194	–209	–225	–267	–728	–1,788
Total, Medicare	.....	244	304	–285	–1,325	–1,413	–403	–606	–520	–381	–931	–2,475	–5,316
Medicaid:													
Test allowing State Medicaid programs to negotiate prices directly with drug manufacturers and set formulary for coverage	.....	.....	–5	–10	–10	–10	–10	–10	–10	–10	–10	–35	–85
Clarify definitions under the Medicaid Drug Rebate Program to prevent inappropriately low manufacturer rebates	.....	–26	–26	–26	–26	–31	–31	–37	–37	–37	–42	–135	–319
Total, Medicaid	.....	–26	–31	–36	–36	–41	–41	–47	–47	–47	–52	–170	–404
Total, drug pricing and payment improvements	.....	218	273	–321	–1,361	–1,454	–444	–653	–567	–428	–983	–2,645	–5,720

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Address opioids:													
Prevent abusive prescribing by establishing HHS reciprocity with the Drug Enforcement Administration to terminate provider prescribing authority	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Require plan participation in a program to prevent prescription drug abuse in Medicare Part D	.....	–10	–10	–10	–10	–10	–10	–10	–10	–10	–10	–50	–100
Provide comprehensive coverage of substance abuse treatment in Medicare [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Track high prescribers and utilizers of prescription drugs in Medicaid [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Require coverage of all medication assisted treatment options in Medicaid	.....	35	25	–20	–75	–110	–130	–135	–145	–150	–160	–145	–865
Provide $5 billion over five years to address the opioid crisis (non-add) [3]	.....	*500*	*800*	*950*	*1,000*	*1,000*	*500*	*200*	*50*	.....	.....	*4,250*	*5,000*
Total, address opioids	.....	25	15	–30	–85	–120	–140	–145	–155	–160	–170	–195	–965
Eliminate wasteful Federal spending:													
Consolidate graduate medical education payments	.....	–370	–1,200	–2,090	–3,070	–4,120	–5,230	–6,270	–7,360	–8,580	–9,800	–10,850	–48,090
Reduce Medicare coverage of bad debts	.....	–400	–1,330	–2,820	–3,760	–4,090	–4,350	–4,620	–4,910	–5,220	–5,530	–12,400	–37,030
Modify payments to hospitals for uncompensated care	.....	.....	–4,100	–5,180	–6,000	–6,870	–7,690	–8,540	–9,420	–10,370	–11,370	–22,150	–69,540
Address excessive payment for post-acute care providers by establishing a unified payment system based on patients' clinical needs rather than the site of care	.....	–780	–1,960	–3,420	–5,820	–8,640	–9,650	–10,830	–11,800	–12,850	–14,440	–20,620	–80,190
Pay all hospital-owned physician offices located off-campus at the physician office rate	.....	–1,240	–2,260	–2,510	–2,810	–3,140	–3,490	–3,860	–4,280	–4,750	–5,640	–11,960	–33,980
Address excessive hospital payments by reducing payment when a patient is quickly discharged to hospice	.....	–70	–100	–110	–110	–120	–130	–140	–150	–160	–170	–510	–1,260
Expand basis for beneficiary assignment for Accountable Care Organizations (ACOs)	.....	.....	.....	–10	–10	–20	–20	–20	–20	–20	–20	–40	–140
Allow ACOs to cover the cost of primary care visits to encourage use of the ACO's providers	.....	.....	–10	–10	–10	–10	–10	.....	.....	.....	–10	–40	–60
Expand the ability of Medicare Advantage organizations to pay for services delivered via telehealth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Require prior authorization when physicians order certain services excessively relative to their peers [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reform and expand durable medical equipment competitive bidding	.....	.....	–330	–600	–630	–690	–740	–780	–840	–910	–960	–2,250	–6,480
Reform physician self-referral law to better support and align with alternative payment models and to address overutilization [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Allow for Federal/State coordinated review of dual eligible Special Needs Plan marketing materials	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Improve appeals notifications for dually eligible individuals in Integrated Health Plans	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clarify the Part D special enrollment period for dually eligible beneficiaries	.....	–38	–53	–57	–62	–67	–72	–77	–83	–89	–95	–277	–693
Cancel funding from the Medicare Improvement Fund (MIF)	.....	.....	.....	.....	–193	.....	.....	.....	.....	.....	.....	–193	–193
Give Medicare beneficiaries with high deductible health plans the option to make tax deductible contributions to Health Savings Accounts and Medical Savings Accounts [4]	.....	.....	.....	610	1,081	1,305	1,513	1,619	1,704	1,786	1,847	2,996	11,465
Total, eliminate wasteful Federal spending	.....	–2,898	–11,343	–16,197	–21,394	–26,462	–29,869	–33,518	–37,159	–41,163	–46,188	–78,294	–266,191
Eliminate wasteful spending on Government-imposed provider burdens in Medicare:													
Repeal the Independent Payment Advisory Board (IPAB)	.....	.....	.....	.....	.....	1,579	3,449	4,591	5,366	6,288	8,209	1,579	29,482
Improve and tailor the way Medicare educates beneficiaries about the program	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eliminate the reporting burden and arbitrary requirements for use of electronic health records	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eliminate arbitrary thresholds and other burdens to encourage participation in advanced Alternative Payment Models [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Simplify and eliminate reporting burdens for clinicians participating in the Merit-based Incentive Payment System	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tailor the frequency of skilled nursing facility surveys to more efficiently use resources and alleviate burden for top-performing nursing homes	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Eliminate the unnecessary requirement of a face-to-face provider visit for durable medical equipment	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, eliminate wasteful spending on Government-imposed provider burdens in Medicare	.....	.....	.....	.....	.....	1,579	3,449	4,591	5,366	6,288	8,209	1,579	29,482
Address fraud and abuse in Medicare:													
Suspend coverage and payment for questionable Part D prescriptions and incomplete clinical information	.....	–30	–30	–40	–40	–50	–40	–40	–50	–50	–50	–190	–420
Prevent abuse of Medicare coverage when another source has primary responsibility for prescription drug coverage	.....	–10	–30	–30	–30	–40	–40	–50	–50	–60	–70	–140	–410
Expand prior authorization to additional Medicare fee-for-service items at high risk of fraud, waste, and abuse [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Prevent fraud by enforcing reporting of enrollment changes through civil monetary penalties for providers and suppliers who fail to update enrollment records	.....	–2	–2	–3	–3	–3	–3	–4	–4	–4	–4	–13	–32
Allow revocation and denial of provider enrollment based on affiliation with a sanctioned entity	.....	.....	.....	–6	–6	–6	–6	–6	–6	–6	–11	–18	–53
Require clearinghouses and billing agents acting on behalf of Medicare providers and suppliers to enroll in the program	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ensure providers that violate Medicare's safety requirements and have harmed patients cannot quickly re-enter the program	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Assess a penalty on physicians and practitioners who order services or supplies without proper documentation	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clarify authority for the Healthcare Fraud Prevention Partnership	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alter the Open Payments reporting and publication cycle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Publish the National Provider Identifier for covered recipients in the Open Payments Program	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Improve the safety and quality of care by requiring accreditation organizations to publicly report Medicare survey and certification reports	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, address fraud and abuse in Medicare	.....	–42	–62	–79	–79	–99	–89	–100	–110	–120	–135	–361	–915

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Medicare appeals:													
Improve the Medicare appeals system [5]	.....	112	112	112	112	112	112	112	112	112	112	560	1,120
Strengthen Medicaid operations and increase State flexibility:													
Allow States to apply asset test to modified adjusted gross income standard populations	.....	–50	–100	–190	–200	–220	–230	–240	–260	–270	–290	–760	–2,050
Reduce maximum allowable home equity for Medicaid eligibility	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Require documentation of satisfactory immigration status before receipt of Medicaid benefits	.....	–170	–180	–190	–200	–210	–220	–230	–250	–260	–280	–950	–2,190
Increase limit on Medicaid copayments for non-emergency use of emergency department	.....	–60	–110	–110	–120	–130	–140	–140	–150	–160	–170	–530	–1,290
Define lottery winnings and other lump-sum payments as income for purpose of Medicaid eligibility	.....	–3	–3	–4	–5	–5	–5	–6	–6	–6	–7	–20	–50
Increase flexibility in the duration of section 1915(b) managed care waivers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Provide a pathway to make permanent established Medicaid managed care waivers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, strengthen Medicaid operations and increase State flexibility	.....	–283	–393	–494	–525	–565	–595	–616	–666	–696	–747	–2,260	–5,580
Address wasteful spending, fraud and abuse in Medicaid:													
Continue Medicaid Disproportionate Share Hospital (DSH) allotment reductions	.....	.....	.....	.....	.....	.....	.....	.....	–6,510	–6,490	–6,470	.....	–19,470
Consolidate provider enrollment screening for Medicare, Medicaid, and Children's Health Insurance Program (CHIP)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Implement pre-payment controls to prevent inappropriate personal care services payments [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Streamline the Medicaid terminations process	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Expand Medicaid Fraud Control Unit review to additional care settings [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Prohibit Medicaid payments to public providers in excess of costs [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, address wasteful spending, fraud and abuse in Medicaid	.....	.....	.....	.....	.....	.....	.....	.....	–6,510	–6,490	–6,470	.....	–19,470

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Children's Health Insurance Program (CHIP):													
Extend CHIP through 2019 with reforms [4]	2,620	–560	2,565	510	.....	.....	.....	.....	.....	.....	.....	2,515	2,515
Other health: [6]													
Reform medical liability [4,7]	.....	–178	–712	–1,862	–3,253	–4,552	–6,098	–7,783	–8,614	–9,122	–9,945	–10,557	–52,119
Reduce the grace period for Exchange premiums [4]	.....	–975	–325	.....	.....	.....	.....	.....	.....	.....	.....	–1,300	–1,300
Permit federally-facilitated Exchange States to conduct Qualified Health Plan certification	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Prohibit governmental discrimination against health care providers that refuse to cover abortion	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fully fund the Risk Corridors program	812	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Provide CMS Program Management implementation funding	.....	12	150	38	.....	.....	.....	.....	.....	.....	.....	200	200
Extend Medicare Enrollment Assistance Programs through 2019	38	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	38	38
Total, other health	850	–1,103	–887	–1,824	–3,253	–4,552	–6,098	–7,783	–8,614	–9,122	–9,945	–11,619	–53,181
Public health:													
Extend Health Centers through 2019	1,372	3,235	1,939	68	36	.....	.....	.....	.....	.....	.....	5,278	5,278
Extend the National Health Service Corps through 2019	54	210	217	54	14	6	.....	.....	.....	.....	.....	501	501
Extend Teaching Health Centers Graduate Medical Education through 2019	30	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	60	60
Extend Family to Family Health Information Centers through 2019	1	4	4	1	.....	.....	.....	.....	.....	.....	.....	9	9
Extend the Maternal, Infant, and Early Childhood Home Visiting Program through 2019	16	120	320	264	64	16	.....	.....	.....	.....	.....	784	784
Extend the Special Diabetes Program for the National Institutes of Health and Indian Health Service (IHS) through 2019	84	203	103	69	19	5	3	1	.....	.....	.....	399	403
Provide tax exemption for IHS Health Professions scholarship and loan repayment programs in return for obligatory service requirement [4]	.....	5	12	13	14	14	14	14	15	17	19	58	137
Total, public health	1,557	3,837	2,595	469	147	41	17	15	15	17	19	7,089	7,172
Interactions:													
Medicare Interactions	.....	190	381	471	538	613	665	708	760	807	863	2,193	5,996
Medicaid Interactions	.....	.....	146	237	352	462	552	633	723	818	933	1,197	4,856
Total, Interactions	.....	190	527	708	890	1,075	1,217	1,341	1,483	1,625	1,796	3,390	10,852
Total, Health and Human Services	5,027	15	–5,967	–16,516	–24,973	–29,892	–31,901	–36,223	–46,284	–49,620	–53,985	–77,333	–295,346

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Homeland Security:													
Extend expiring Customs and Border Protection (CBP) fees	.....	.....	.....	.....	.....	.....	.....	.....	–3,406	–4,556	–4,796	.....	–12,758
Increase customs user fees	.....	–113	–126	–137	–148	–162	–176	–191	–206	–223	–214	–686	–1,696
Increase immigration user fees	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Establish Electronic Visa Update System user fee [4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Authorize mandatory outlays for U.S. Coast Guard Continuation Pay	.....	5	6	7	9	9	10	10	10	10	10	36	86
Eliminate BrandUSA; make revenue available to CBP	.....	60	66	.....	.....	.....	.....	.....	.....	.....	.....	126	126
Make full Electronic System for Travel Authorization (ESTA) receipts available to CBP [4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Expand authority of the Aviation Security Capital Fund	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Establish an immigration services surcharge [4]	.....	–453	–465	–479	–493	–507	–522	–538	–553	–569	–587	–2,397	–5,166
Increase worksite enforcement penalties [4]	.....	–13	–14	–15	–15	–15	–15	–15	–15	–15	–15	–72	–147
Establish National Flood Insurance Program affordability assistance [8]	.....	2	–2	–11	26	39	50	64	80	91	95	54	434
Reauthorize the Oil Spill Liability Trust Fund excise tax [4,9]	.....	–354	–466	–473	–480	–489	–494	–500	–507	–511	–511	–2,262	–4,785
Total, Homeland Security	.....	–866	–1,001	–1,108	–1,101	–1,125	–1,147	–1,170	–4,597	–5,773	–6,018	–5,201	–23,906
Interior:													
Cancel Southern Nevada Public Land Management Act (SNPLMA) balances	.....	–83	–69	–78	.....	.....	.....	.....	.....	.....	.....	–230	–230
Repeal enhanced geothermal payments to counties	.....	–4	–4	–4	–4	–4	–4	–4	–4	–4	–4	–20	–40
Reauthorize the Federal Land Transaction Facilitation Act (FLTFA)	.....	–5	–6	–9	–12	–3	.....	.....	.....	.....	.....	–35	–35
Permanently reauthorize the Federal Lands Recreation Enhancement Act (FLREA)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Establish a Public Lands Infrastructure Fund	.....	152	420	614	766	764	766	781	810	842	878	2,716	6,793
Total, Interior	.....	60	341	523	750	757	762	777	806	838	874	2,431	6,488
Labor:													
Establish a paid parental leave program:													
Provide paid parental leave benefits [4,9,10]	.....	700	1,000	1,767	1,678	1,942	2,174	2,228	2,351	2,464	2,568	7,087	18,872
Establish an Unemployment Insurance (UI) solvency standard [4,9]	.....	.....	.....	–633	–1,615	–2,230	–919	–1,613	–927	–1,267	–1,907	–4,478	–11,111
Improve UI program integrity [4,9]	.....	–83	–188	–211	–211	–174	–195	–181	–229	–194	–216	–867	–1,882
Provide for Reemployment Services and Eligibility Assessments [4,9]	.....	.....	–73	–465	–440	–417	–445	–413	–346	–413	–277	–1,395	–3,289
Total, establish a paid parental leave program	.....	617	739	458	–588	–879	615	21	849	590	168	347	2,590

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Improve Pension Benefit Guaranty Corporation (PBGC) solvency	32	74	–1,470	–1,564	–1,663	–1,760	–1,810	1,428	–5,128	–1,901	–1,936	–6,383	–15,730
Expand Foreign Labor Certification fees	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reform the Federal Employees' Compensation Act (FECA)	.....	–62	–7	–5	–5	–5	–6	–6	–8	–8	–5	–84	–117
Reform the Trade Adjustment Assistance program	.....	–98	–211	–318	–281	–260	–158	–77	–81	–112	–148	–1,168	–1,744
Adjust the HIRE Vets Medallion Program	.....	1	3	4	4	4	4	4	4	4	4	16	36
Total, Labor	32	532	–946	–1,425	–2,533	–2,900	–1,355	1,370	–4,364	–1,427	–1,917	–7,272	–14,965
Transportation:													
Air Traffic Control:													
Reform Air Traffic Control [4]	.....	.....	.....	.....	15,495	16,241	17,027	17,870	18,674	19,497	20,536	31,736	125,340
Outlay savings from discretionary cap adjustment	.....	.....	.....	.....	–8,681	–9,453	–9,829	–10,060	–10,173	–10,173	–10,173	–18,134	–68,542
Reform Essential Air Service [4]	.....	.....	.....	.....	61	1	2	2	1	2	2	62	71
Total, Transportation	.....	.....	.....	.....	6,875	6,789	7,200	7,812	8,502	9,326	10,365	13,664	56,869
Treasury:													
Provide authority for Bureau of Engraving and Printing to construct new facility [4]	.....	–12	–32	–3	89	–360	–53	20	–3	–222	–3	–318	–579
Increase and extend guarantee fee charged by Government-sponsored enterprises	.....	–212	–967	–1,699	–2,350	–3,475	–4,258	–4,034	–3,398	–2,858	–2,401	–8,703	–25,652
Subject Financial Research Fund to appropriations with reforms to the Financial Stability Oversight Council and Office of Financial Research [4, 9]	.....		33	–13	–18	–18	–18	–18	–18	–18	–18	–17	–107
Increase deliquent Federal non-tax debt collections	.....	–32	–32	–32	–32	–32	–32	–32	–32	–32	–32	–160	–320
Increase and streamline recovery of unclaimed assets	.....	–8	–8	–8	–8	–8	–8	–8	–8	–8	–8	–40	–80
Implement tax enforcement program integrity cap adjustment [4]	.....	–152	–787	–1,825	–3,033	–4,330	–5,554	–6,416	–6,931	–7,270	–7,505	–10,127	–43,803
Discretionary outlays from tax enforcement program integrity cap adjustment (non-add)	.....	*320*	*693*	*1,040*	*1,386*	*1,737*	*1,850*	*1,865*	*1,875*	*1,885*	*1,893*	*5,176*	*14,544*
Increase oversight of paid tax return preparers [4]	.....	–22	–31	–36	–39	–43	–47	–52	–57	–63	–67	–171	–457
Provide more flexible authority for the Internal Revenue Service to address correctable errors [4]	.....	–42	–63	–65	–66	–69	–70	–73	–75	–76	–79	–305	–678
Total, Treasury	.....	–481	–1,887	–3,681	–5,457	–8,335	–10,040	–10,613	–10,522	–10,547	–10,113	–19,841	–71,676
Veterans Affairs (VA):													
Provide for a smooth transition to the new Veterans Community Care program	.....	236	479	479	361	215	95	.....	.....	.....	.....	1,770	1,865

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Cap Post–9/11 GI Bill flight training programs at public schools	.....	–43	–45	–46	–47	–49	–51	–53	–55	–57	–59	–230	–505
Extension of home loan fees	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	–356	.....	–356
Enhance burial benefits for veterans	.....	2	2	2	2	2	2	2	3	3	3	10	23
Reinstate COLA round-down	.....	–34	–92	–148	–207	–268	–281	–296	–311	–323	–336	–749	–2,296
Standardize and enhance VA Compensation and Pension benefit programs	.....	–78	–80	–83	–85	–88	–90	–93	–95	–98	–397	–414	–1,187
Standardize, extend, and improve veteran Specially Adapted Housing programs	.....	4	4	5	4	5	.....	.....	.....	1	1	22	24
Standardize and improve veteran vocational rehabilitation and education benefit programs	.....	72	–20	–22	–25	–26	–33	–35	–37	–39	–41	–21	–206
Extend authority for securization of vendee loans	.....	89	19	52	3	50	3	55	4	58	.....	213	333
Extend housing assistance for homeless veterans and include permanent housing options	.....	29	.....	.....	.....	.....	.....	.....	.....	.....	.....	29	29
Total, Veterans Affairs	.....	277	267	239	6	–159	–355	–420	–491	–455	–1,185	630	–2,276
Corps of Engineers:													
Divest the Washington Aqueduct	.....	.....	.....	–120	.....	.....	.....	.....	.....	.....	.....	–120	–120
Reform inland waterways financing [4]	.....	–178	–178	–178	–178	–178	–178	–178	–178	–178	–178	–890	–1,780
Reduce the Harbor Maintenance Tax [4,9]	.....	265	281	292	299	307	314	323	333	345	359	1,444	3,118
Total, Corps of Engineers	.....	87	103	–6	121	129	136	145	155	167	181	434	1,218
Environmental Protection Agency:													
Expand use of pesticide licensing fees	.....	5	4	4	4	4	3	2	1	1	1	21	29
International Assistance Programs:													
Transfer funds from Overseas Private Investment Corporation to Development Finance Institution	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Office of Personnel Management (OPM):													
Federal Employees Health Benefits (FEHB) Program:													
Provide OPM authority to incorporate provisions of the Anti-Kickback Act to the FEHB Program	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Modify the Government contribution to FEHB premiums	.....	.....	.....	–192	–301	–321	–342	–363	–387	–412	–439	–814	–2,757
Modify existing statute on indemnity benefit plans in FEHB	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Provide tax preemption for Federal Employees Dental/Vision Program	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, Federal Employees Health Benefits (FEHB) Program	.....	.....	.....	–192	–301	–321	–342	–363	–387	–412	–439	–814	–2,757

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Reform retirement benefits for Federal employees:													
Increase employee contributions to 50% of cost, phased in at 1% per year [4]	.....	.....	–2,267	–4,602	–6,442	–8,068	–9,441	–9,456	–9,470	–9,480	–9,479	–21,379	–68,705
Eliminate Federal Employee Retirement System COLA; reduce Civil Service Retirement System COLA by 0.5%	.....	–1,119	–1,783	–2,524	–3,350	–4,247	–5,213	–6,250	–7,357	–8,539	–9,798	–13,023	–50,180
Eliminate the Special Retirement Supplement	.....	–497	–867	–1,274	–1,596	–1,818	–2,028	–2,290	–2,540	–2,762	–3,003	–6,052	–18,675
Change retirement calculation from high–3 years to high–5 years	.....	–277	–339	–405	–476	–549	–623	–698	–778	–860	–944	–2,046	–5,949
Reduce the G-fund interest rate	.....	–694	–382	–1,142	–671	–798	–877	–957	–1,052	–1,132	–1,216	–3,687	–8,921
Loss of mandatory offsetting receipts from retirement proposals	.....	.....	11,580	14,047	16,094	17,919	19,486	19,692	19,898	20,098	20,283	59,640	159,097
Discretionary effect of retirement proposals	.....	.....	–6,461	–7,482	–8,026	–8,544	–8,919	–8,619	–8,324	–8,034	–7,743	–30,513	–72,152
Total, reform retirement benefits for Federal employees	.....	–2,587	–519	–3,382	–4,467	–6,105	–7,615	–8,578	–9,623	–10,709	–11,900	–17,060	–65,485
Total, Office of Personnel Management	.....	–2,587	–519	–3,574	–4,768	–6,426	–7,957	–8,941	–10,010	–11,121	–12,339	–17,874	–68,242
Other Independent Agencies:													
Federal Communications Commission:													
Enact Spectrum License User Fee	.....	–50	–150	–300	–450	–500	–500	–500	–500	–500	–500	–1,450	–3,950
Conduct spectrum auctions below 6 gigahertz	.....	.....	–300	–300	.....	.....	.....	.....	.....	.....	–6,000	–600	–6,600
Total, Federal Communications Commission	.....	–50	–450	–600	–450	–500	–500	–500	–500	–500	–6,500	–2,050	–10,550
Restructure the Consumer Financial Protection Bureau	.....	–147	–610	–656	–672	–687	–704	–720	–737	–755	–773	–2,772	–6,461
Eliminate the Securities and Exchange Commission Reserve Fund	.....	.....	–17	–41	–50	–50	–50	–50	–50	–50	–50	–158	–408
Allow District of Columbia Courts to retain bar exam and application fees [11]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reform the Postal Service	.....	–4,592	–4,586	–4,530	–4,501	–4,453	–4,438	–4,436	–4,392	–4,308	–4,254	–22,662	–44,490
Divest Tennessee Valley Authority (TVA) transmission assets	.....	241	–3,760	–19	–19	–19	–19	–19	–19	–19	–19	–3,576	–3,671
Mandatory effects of agency eliminations	.....	.....	.....	.....	–1	.....	.....	.....	.....	.....	.....	–1	–1
Total, Other Independent Agencies	.....	–4,548	–9,423	–5,846	–5,693	–5,709	–5,711	–5,725	–5,698	–5,632	–11,596	–31,219	–65,581
Cross-cutting reforms:													
Repeal and replace Obamacare:													
Proposal modeled after the Graham-Cassidy-Heller-Johnson bill: [4]													
Medicaid reforms	.....	–2,885	–67,165	–92,350	–98,060	–104,475	–112,350	–126,155	–140,800	–159,945	–179,385	–364,935	–1,083,570
Market-Based Health Care Grant program	.....	.....	146,000	146,000	157,000	168,000	179,000	190,000	190,000	210,000	220,000	617,000	1,606,000

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Other [4]	.....	15,142	–4,991	–41,217	–48,946	–50,891	–53,815	–57,221	–60,387	–63,435	–66,091	–130,903	–431,852
Total, proposal modeled after the Graham-Cassidy-Heller-Johnson bill	.....	12,257	73,844	12,433	9,994	12,634	12,835	6,624	–11,187	–13,380	–25,476	121,162	90,578
Additional deficit reduction:													
Medicaid reforms	.....	.....	–4,500	–11,410	–19,920	–28,630	–37,635	–42,640	–48,145	–53,845	–58,940	–64,460	–305,665
Market-Based Health Care Grant program	.....	.....	–26,000	–23,240	–31,417	–39,528	–47,573	–55,550	–52,458	–69,295	–76,058	–120,185	–421,119
State implementation	.....	1,000	750	250	.....	.....	.....	.....	.....	.....	.....	2,000	2,000
Other	.....	–10,000	–21,000	–5,000	.....	–750	–750	–750	–750	–750	–750	–36,750	–40,500
Total, additional deficit reduction	.....	–9,000	–50,750	–39,400	–51,337	–68,908	–85,958	–98,940	–101,353	–123,890	–135,748	–219,395	–765,284
Total, repeal and replace Obamacare	.....	3,257	23,094	–26,967	–41,343	–56,274	–73,123	–92,316	–112,540	–137,270	–161,224	–98,233	–674,706
Reform welfare programs:													
Reform the Supplemental Nutrition Assistance Program	.....	–17,169	–18,521	–20,451	–20,468	–21,615	–22,213	–22,353	–23,686	–23,893	–23,157	–98,224	–213,526
Reduce Temporary Assistance for Needy Families (TANF) block grant	.....	–1,155	–1,435	–1,514	–1,552	–1,584	–1,600	–1,600	–1,600	–1,600	–1,600	–7,240	–15,240
Strengthen TANF	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eliminate the TANF Contingency Fund	.....	–545	–608	–608	–608	–608	–608	–608	–608	–608	–608	–2,977	–6,017
Get noncustodial parents to work	.....	4	5	7	8	10	9	11	13	14	15	34	96
Strengthen Child Support enforcement and establishment	.....	–22	–42	–57	–68	–76	–80	–82	–82	–83	–94	–265	–686
Establish a Child Support technology fund	.....	63	–12	–20	–28	–37	–110	–120	–131	–194	–205	–34	–794
Eliminate Social Services Block Grant (SSBG)	.....	–1,411	–1,649	–1,700	–1,700	–1,700	–1,700	–1,700	–1,700	–1,700	–1,700	–8,160	–16,660
Shift SSBG expenditures to Foster Care and Permanency	.....	18	21	22	22	22	23	23	23	23	23	105	220
Require Social Security Number (SSN) for Child Tax Credit & Earned Income Tax Credit	.....	–1,186	–1,218	–1,164	–1,086	–1,104	–1,009	–921	–903	–790	–702	–5,758	–10,083
Promote Welfare to Work Projects	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, reform welfare programs	.....	–21,403	–23,459	–25,485	–25,480	–26,692	–27,288	–27,350	–28,674	–28,831	–28,028	–122,519	–262,690
Reform disability programs and test new approaches:													
Improve SSI youth transition to work	.....	–5	–28	6	46	21	–6	–35	–59	–80	–108	40	–248
Simplify administration of the SSI program	.....	.....	–347	–86	–68	–50	–29	–18	–6	6	19	–551	–579
Test new approaches to increase labor force participation	.....	100	100	100	100	100	–2,384	–5,070	–9,171	–13,610	–18,632	500	–48,367
Reduce 12 month retroactive Disability Insurance (DI) benefits to six months	.....	–362	–669	–846	–992	–1,057	–1,126	–1,198	–1,268	–1,337	–1,401	–3,926	–10,256

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Create sliding scale for multi-recipient Supplemental Security Income (SSI) families	.....	–588	–618	–636	–693	–661	–631	–702	–720	–738	–814	–3,196	–6,801
Offset overlapping unemployment and disability payments [4, 9]	.....	.....	–81	–209	–255	–281	–296	–311	–325	–343	–356	–826	–2,457
Reinstate the reconsideration review application stage in 10 States	.....	91	–76	–295	–424	–362	–354	–420	–469	–519	–579	–1,066	–3,407
Eliminate Workers Compensation (WC) Reverse Offsets	.....	.....	.....	–22	–22	–23	–25	–26	–28	–30	–31	–67	–207
Change the representative fee and approval process	.....	.....	3	16	29	43	41	45	44	44	45	91	310
Eliminate the requirement for representative payees to provide an annual accounting report	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Administrative Law Judge (ALJ) reforms	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, reform disability programs and test new approaches	.....	–764	–1,716	–1,972	–2,279	–2,270	–4,810	–7,735	–12,002	–16,607	–21,857	–9,001	–72,012
Reduce improper payments:													
Reduce improper payments Government-wide	.....	.....	–719	–1,482	–2,383	–4,288	–4,549	–9,652	–20,480	–38,024	–57,633	–8,872	–139,210
Provide additional debt collection authority for civil monetary penalties (CMPs) and assessments	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Allow Government-wide use of CBP entry/exit data to prevent improper payments	.....	.....	.....	–1	–5	–13	–19	–25	–34	–39	–47	–19	–183
Authorize Social Security Administration (SSA) to use all collection tools to recover funds in certain scenarios	.....	–1	–2	–2	–4	–4	–5	–6	–7	–7	–7	–13	–45
Hold fraud facilitators liable for overpayments	.....	.....	.....	.....	–1	–1	–1	–1	–1	.....	–1	–2	–6
Increase overpayment collection threshold for Old Age, Survivors, and Disability Insurance	.....	–11	–72	–91	–102	–124	–148	–167	–219	–233	–231	–400	–1,398
Exclude SSA debts from discharge in bankruptcy	.....	–7	–15	–21	–25	–30	–32	–34	–35	–37	–39	–98	–275
Allow SSA to use commercial database to verify real property	.....	–26	–40	–50	–61	–62	–62	–70	–73	–77	–83	–239	–604
Improve collection of pension information from States and localities	.....	18	28	24	–441	–1,058	–1,505	–1,618	–1,534	–1,442	–1,332	–1,429	–8,860
Total, reduce improper payments	.....	–27	–820	–1,623	–3,022	–5,580	–6,321	–11,573	–22,383	–39,859	–59,373	–11,072	–150,581
Infrastructure initiative:													
Encourage increased State, local, and private infrastructure by awarding competitive incentive grants	.....	1,000	5,000	11,000	17,500	21,750	19,500	13,250	7,250	3,000	750	56,250	100,000

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Address the need for investment in rural infrastructure	.....	41,350	3,407	2,851	1,058	399	300	245	200	145	45	49,065	50,000
Support bold, innovative, and transformative projects	.....	15	140	770	2,475	4,327	5,135	3,972	2,220	784	202	7,727	20,040
Expand existing Federal infrastructure credit programs	.....	311	933	1,556	2,178	2,800	2,489	1,867	1,244	622	.....	7,778	14,000
Establish a Federal Capital Revolving Fund [12]	.....	1,867	1,733	1,600	1,467	1,333	1,200	–53	–57	–61	–65	8,000	8,964
Expand flexibility and broaden eligibility for Private Activity Bonds [4]	.....	31	138	296	457	616	753	839	893	945	992	1,538	5,960
Total, infrastructure initiative	.....	44,574	11,351	18,073	25,135	31,225	29,377	20,120	11,750	5,435	1,924	130,358	198,964
Authorize additional Afghan Special Immigrant Visas	.....	22	25	26	23	22	23	20	18	18	19	118	216
Eliminate allocations to the Housing Trust Fund and Capital Magnet Fund [4]	.....	–263	–158	–227	–296	–357	–385	–399	–419	–426	–433	–1,301	–3,363
Extend Joint Committee mandatory sequestration	.....	.....	.....	.....	.....	.....	.....	8,342	–21,297	–28,570	–31,298	.....	–72,823
Lease Shared Secondary Licenses	.....	–50	–55	–55	–60	–65	–70	–70	–80	–80	–85	–285	–670
Improve clarity in worker classification and information reporting requirements [4]	100	100	–100	.....	.....	.....	.....	.....	.....	–100	–105	.....	–205
Total, cross-cutting reforms	100	25,446	8,162	–38,230	–47,322	–59,991	–82,597	–110,961	–185,627	–246,290	–300,460	–111,935	–1,037,870
Total, mandatory and receipt proposals	**5,159**	**9,793**	**–30,248**	**–91,766**	**–109,661**	**–135,651**	**–164,371**	**–196,910**	**–292,276**	**–355,469**	**–421,691**	**–357,533**	**–1,788,250**

Note: For receipt effects, positive figures indicate lower receipts. For outlay effects, positive figures indicate higher outlays. For net costs, positive figures indicate higher deficits.

[1] The single income-driven repayment plan proposal has sizable interactive effects with the proposals to eliminate subsidized loans and Public Service Loan Forgiveness. These effects, $19.2 billion over 10 years, are included in the single income-driven repayment plan subtotal.

[2] Estimates were not available at the time of Budget publication.

[3] This funding is included within the estimates of the proposal to repeal and replace Obamacare.

[4] The estimates for this proposal include effects on receipts. The receipt effects included in the totals above are as follows:

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2019–2023	2019–2028
Give Medicare beneficiaries with high deductible health plans the option to make tax deductible contributions to Health Savings Accounts and Medical Savings Accounts	.....	.....	.....	610	1,071	1,285	1,493	1,599	1,674	1,746	1,807	2,966	11,285
Extend Children's Health Insurance Program through 2019 with reforms	.....	–388	–58	.....	.....	.....	.....	.....	.....	.....	.....	–446	–446
Reform medical liability	.....	–24	–222	–548	–987	–1,476	–2,067	–2,687	–3,079	–3,290	–3,475	–3,257	–17,855
Reduce the grace period for Exchange premiums	.....	–164	–55	.....	.....	.....	.....	.....	.....	.....	.....	–219	–219
Provide tax exemption for IHS Health Professions scholarship and loan repayment programs in return for obligatory service requirement	.....	5	12	13	14	14	14	14	15	17	19	58	137

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals 2019–2023	Totals 2019–2028
Establish Electronic Visa Update System user fee	.....	–25	–28	–31	–34	–38	–42	–46	–52	–57	–64	–156	–417
Make full Electronic System for Travel Authorization (ESTA) receipts available to CBP	.....	.....	.....	–171	–177	–183	–189	–196	–202	–209	–216	–531	–1,543
Establish an immigration services surcharge	.....	–453	–465	–479	–493	–507	–522	–538	–553	–569	–587	–2,397	–5,166
Increase worksite enforcement penalties	.....	–13	–14	–15	–15	–15	–15	–15	–15	–15	–15	–72	–147
Reauthorize the Oil Spill Liability Trust Fund excise tax	.....	–354	–466	–473	–480	–489	–494	–500	–507	–511	–511	–2,262	–4,785
Provide paid parental leave benefits	.....	.....	.....	.....	–962	–971	–1,001	–1,194	–1,300	–1,401	–1,495	–1,933	–8,324
Establish an Unemployment Insurance (UI) solvency standard	.....	.....	.....	–633	–1,615	–2,230	–919	–1,613	–927	–1,267	–1,907	–4,478	–11,111
Improve UI program integrity	.....	.....	1	9	21	72	66	98	69	127	105	103	568
Provide for Reemployment Services and Eligibility Assessments	.....	.....	3	14	69	125	128	199	307	287	469	211	1,601
Reform Air Traffic Control	.....	.....	.....	.....	15,495	16,241	17,027	17,870	18,674	19,497	20,536	31,736	125,340
Reform Essential Air Service	.....	.....	.....	.....	152	156	160	164	168	172	177	308	1,149
Provide authority for Bureau of Engraving and Printing to construct new facility	.....	–12	–32	–3	89	–360	–53	20	–3	–222	–3	–318	–579
Subject Financial Research Fund to appropriations with reforms to the Financial Stability Oversight Council and Office of Financial Research	.....	–1	50	50	50	50	50	50	50	50	50	199	449
Implement tax enforcement program integrity cap adjustment	.....	–152	–787	–1,825	–3,033	–4,330	–5,554	–6,416	–6,931	–7,270	–7,505	–10,127	–43,803
Increase oversight of paid tax return preparers	.....	–17	–18	–21	–23	–25	–28	–31	–34	–38	–41	–104	–276
Provide more flexible authority for the Internal Revenue Service to address correctable errors	.....	–7	–11	–12	–12	–13	–13	–14	–15	–15	–16	–55	–128
Reform inland waterways financing	.....	–178	–178	–178	–178	–178	–178	–178	–178	–178	–178	–890	–1,780
Reduce the Harbor Maintenance Tax	.....	265	281	292	299	307	314	323	333	345	359	1,444	3,118
Increase employee contributions to 50% of cost, phased in at 1% per year	.....	.....	–2,267	–4,602	–6,442	–8,068	–9,441	–9,456	–9,470	–9,480	–9,479	–21,379	–68,705
Proposal modeled after the Graham-Cassidy-Heller-Johnson bill	.....	3,452	8,617	2,503	2,829	2,883	2,959	3,192	3,473	3,676	4,092	20,284	37,676
Offset overlapping unemployment and disability payments	.....	.....	.....	3	6	7	14	18	25	29	31	16	133
Expand flexibility and broaden eligibility for Private Activity Bonds	.....	31	138	296	457	616	753	839	893	945	992	1,538	5,960
Eliminate allocations to the Housing Trust Fund and Capital Magnet Fund	.....	–62	–74	–73	–78	–82	–84	–85	–87	–89	–90	–369	–804
Improve clarity in worker classification and information reporting requirements	100	100	–100	.....	.....	.....	.....	.....	.....	–100	–105	.....	–205
Total receipt effects of mandatory proposals	100	2,003	4,327	–5,274	6,023	2,791	2,378	1,417	2,328	2,180	2,950	9,870	21,123

Table S–6. Mandatory and Receipt Proposals—Continued

(Deficit increases (+) or decreases (–) in millions of dollars)

[5] The 2019 Budget requests $127 million in mandatory resources to support Medicare appeals adjudication at the Office of Medicare Hearings and Appeals and the Departmental Appeals Board. While the total mandatory request is $127 million annually, the cost to the Government is $112 million annually, which reflects Medicare Part A and Part B contributions, net of premiums.

[6] In addition to the proposals listed, the Budget requests mandatory appropriations for the Risk Corridors program and for Cost Sharing Reduction payments. These proposals have no deficit effect.

[7] In addition to effects within HHS, the estimates for the proposal include effects within OPM and Treasury.

[8] While this proposal increases Government outlays in the form of means-tested assistance to low-income policyholders, the National Flood Insurance Program is also accelerating premium increases on other policyholders that currently do not pay full-risk premiums.

[9] Net of income offsets.

[10] The paid parental leave proposal consists of $27,196 million in benefit and program administration costs over the 2019–2028 period, offset by $8,324 million in savings associated with increased State revenues.

[11] The proposal would allow the District of Columbia (DC) Courts to retain a portion of the bar examination and application fees it currently deposits into the DC Crime Victim's Compensation Fund. Retained fees are estimated at $360,000 annually beginning in 2019.

[12] The Federal Capital Revolving Fund is capitalized with $10 billion in mandatory funds in 2019. Agency repayments to the fund are reflected as offsetting collections, which reduce the total outlays estimated from the fund over the 10 year window. However, the initial $10 billion in capitalization funding is fully expended by 2023.

Table S–7. Proposed Discretionary Caps for 2019 Budget

(Net budget authority in billions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals, 2019–2028
Current Law Base Caps:[1]												
Defense	549	562	576	590	605	620	636	652	669	686	703	6,300
Non-Defense	516	530	543	556	570	584	599	614	630	646	662	5,935
Total, Base Current Law Caps	**1,065**	**1,092**	**1,119**	**1,146**	**1,175**	**1,205**	**1,235**	**1,267**	**1,299**	**1,332**	**1,366**	**12,236**
Proposed Base Cap Changes:[2]												
Defense	*+54*	*+65*	*+84*	*+87*	*+89*	*+92*	*+91*	*+90*	*+89*	*+88*	*+87*	*+861*
Non-Defense	*–54*	*–65*	*–87*	*–109*	*–132*	*–155*	*–179*	*–202*	*–226*	*–250*	*–274*	*–1,680*
Total, Base Cap Changes	*+**	*–**	*–3*	*–22*	*–43*	*–64*	*–88*	*–113*	*–137*	*–162*	*–188*	*–820*
Proposed Base Caps:												
Defense	603	627	660	677	694	712	727	742	758	774	790	7,161
Non-Defense	462	465	456	447	438	429	420	412	404	396	388	4,255
Total, Proposed Base Caps	**1,065**	**1,092**	**1,116**	**1,124**	**1,132**	**1,141**	**1,147**	**1,154**	**1,162**	**1,170**	**1,178**	**11,416**
Additional Non-Defense (NDD) Cap Reductions for Budget Proposals:[3]												
Air Traffic Control Reform	.....	.....	.....	.....	*–10*	*–10*	*–10*	*–10*	*–10*	*–10*	*–10*	*–71*
Federal Employee Retirement Cost Share Reduction	.....	.....	*–6*	*–7*	*–8*	*–9*	*–9*	*–9*	*–8*	*–8*	*–8*	*–72*
Total, Proposed NDD Cap Reductions	.....	.....	*–6*	*–7*	*–18*	*–19*	*–19*	*–19*	*–18*	*–18*	*–18*	*–143*
Proposed Base Caps with Additional NDD Adjustments:												
Defense	603	627	660	677	694	712	727	742	758	774	790	7,161
Non-Defense	462	465	450	440	420	410	401	393	386	378	370	4,112
Total, Proposed Base Caps with Adjustments	**1,065**	**1,092**	**1,110**	**1,117**	**1,114**	**1,122**	**1,128**	**1,135**	**1,144**	**1,152**	**1,160**	**11,273**
Cap Adjustments:[4]												
Overseas Contingency Operations	78	101	81	70	68	68	12	12	12	12	12	447
Defense[5]	*66*	*89*	*73*	*66*	*66*	*66*	*10*	*10*	*10*	*10*	*10*	*409*
Non-Defense[6]	*12*	*12*	*8*	*4*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*38*
Emergency Requirements	68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Program Integrity[7]	2	2	3	3	3	4	4	4	4	4	4	35
Disaster Relief[8]	7	7	7	7	7	7	7	7	7	7	7	67
Wildfire Suppression[7]	.....	2	2	2	2	2	2	2	2	2	2	15
Total, Cap Adjustments	**154**	**111**	**92**	**81**	**79**	**80**	**24**	**24**	**24**	**24**	**24**	**564**
Total, Proposed Discretionary Caps:												
Defense	675	716	733	743	760	778	737	752	768	784	800	7,570
Non-Defense	544	487	468	455	433	424	415	407	400	392	385	4,266
Total, Proposed Discretionary Caps	**1,219**	**1,203**	**1,201**	**1,197**	**1,193**	**1,202**	**1,152**	**1,159**	**1,168**	**1,176**	**1,185**	**11,837**

Table S–7. Proposed Discretionary Caps for 2019 Budget—Continued

(Net budget authority in billions of dollars)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Totals, 2019–2028
Memorandum - Appropriations Counted Outside of Discretionary Caps:												
21st Century CURES Appropriations[9]	*1*	*1*	*1*	*	*1*	*1*	*	*	*	.....	.....	*4*
Non-BBEDCA Emergency Funding[10]	.....	*–5*	.....	.....	.....	.....	.....	.....	.....	.....	.....	*–5*

* $500 million or less.

[1] The caps presented here are equal to the levels estimated for 2018 through 2021 in the Balanced Budget and Emergency Deficit Control Act of 1985 (BBEDCA) with separate categories of funding for "defense" (or Function 050) and "non-defense" programs and include OMB estimates of Joint Committee enforcement (also known as "sequestration"). For 2022 through 2028, the caps are assumed to grow at current services growth rates.

[2] The Administration's proposed changes to the caps build off the proposals in the 2018 Budget that was transmitted on May 23, 2017: proposed increases to the existing defense caps for 2018 and 2019 are offset with decreases to the non-defense caps. After 2019, the 2019 Budget proposes defense caps through 2028 that resource the Administration's National Security and National Defense Strategies. Non-defense caps reflect an annual two percent (or "2-penny") decrease each year.

[3] These cap reductions are for reforms in the Budget that would shift the Federal Aviation Administration's air traffic control function to an independent, non-governmental organization beginning in 2022 and reduce Federal agency costs through changes to current civilian employee retirement plans.

[4] The funding amounts below are existing or proposed cap adjustments that are designated pursuant to Section 251(b)(2) of BBEDCA.

[5] The outyear OCO amounts for defense for 2020 through 2023 are consistent with the National Security and National Defense Strategies, while amounts from 2024 through 2028 reflect notional placeholders consistent with a potential transition of certain OCO costs into the base budget while continuing to fund contingency operations. The placeholder amounts for 2024 through 2028 do not reflect specific decisions or assumptions about OCO funding in any particular year.

[6] The outyear OCO amounts for non-defense in the 2019 Budget reflect notional placeholders consistent with a potential transition of certain OCO costs into the base budget. The placeholder amounts do not reflect specific decisions or assumptions about OCO funding in any particular year.

[7] The Budget proposes new cap adjustments related to program integrity in the Internal Revenue Service and wildfire suppression in the Departments of Agriculture and the Interior. For more information on these proposals see the Budget Process chapter of the *Analytical Perspectives* volume of the Budget.

[8] "Disaster Relief" appropriations are amounts designated as such by the Congress provided they are for activities carried out pursuant to a Presidential disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. These amounts are held to a funding ceiling that is determined one year at a time according to a statutory formula. The Administration proposes to change this formula to address the declining ceiling for Disaster Relief appropriations, as discussed in the Budget Process chapter of the *Analytical Perspectives* volume of the Budget. OMB currently estimates the 2019 ceiling to be $7.4 billion under current law. The Administration is requesting $6.7 billion for Disaster Relief in 2019, but does not explicitly request disaster-designated appropriations in any year after the budget year. A placeholder set at the budget year request level is included in each of the outyears.

[9] The 21st Century CURES Act permitted funds to be appropriated each year and not counted towards the discretionary caps so long as the appropriations were specifically provided for the authorized purposes. These amounts are displayed outside of the discretionary cap totals for this reason and the levels included through the budget window reflect authorized levels.

[10] The 2019 Budget includes permanent cancellations of balances of emergency funding in the Departments of Energy and Housing and Urban Development that are not designated pursuant to BBEDCA. These cancellations are not being re-designated as emergency, therefore no savings are being achieved under the caps nor will the caps be adjusted for these cancellations.

Table S–8. 2019 Discretionary Overview by Major Agency

(Net budget authority in billions of dollars)

	2017 Enacted[1]	2018 Estimate[2]	2019 Request	2019 Request less 2017 Enacted: Dollar	2019 Request less 2017 Enacted: Percent
Base Discretionary Funding:					
Cabinet Departments:					
Agriculture[3]	22.7	22.5	19.0	–3.7	–16.4%
Commerce	9.3	9.3	9.9	+0.6	+6.1%
Defense[2]	523.2	574.5	597.1	+73.9	+14.1%
Education	66.9	67.8	59.9	–7.1	–10.5%
Energy	30.2	30.0	29.2	–1.0	–3.4%
National Nuclear Security Administration	*12.8*	*12.8*	*15.1*	*+2.2*	*+17.5%*
Other Energy	*17.3*	*17.2*	*14.1*	*–3.3*	*–18.9%*
Health and Human Services[4]	87.1	86.3	69.5	–17.6	–20.3%
Homeland Security (DHS)[2]	42.4	44.1	46.0	+3.6	+8.6%
Housing and Urban Development (HUD):					
HUD gross total (excluding receipts)	*48.0*	*47.7*	*39.2*	*–8.8*	*–18.3%*
HUD receipts	*–14.0*	*–10.3*	*–10.0*	*+3.9*	*–28.2%*
Interior	13.5	13.4	11.2	–2.3	–16.8%
Justice	28.4	28.1	28.0	–0.4	–1.3%
Labor	12.0	12.0	9.4	–2.6	–21.4%
State and Other International Programs[3]	38.7	38.1	28.3	–10.4	–26.9%
Transportation	19.3	19.2	15.6	–3.7	–19.2%
Treasury	12.7	12.6	12.3	–0.4	–3.0%
Veterans Affairs	74.4	77.3	83.1	+8.7	+11.7%
Major Agencies:					
Corps of Engineers	6.2	6.0	4.8	–1.4	–22.2%
Environmental Protection Agency	8.2	8.0	5.4	–2.8	–33.7%
General Services Administration	–1.2	–0.9	0.6	+1.8	N/A
National Aeronautics & Space Administration	19.7	19.5	19.6	–0.1	–0.3%
National Science Foundation	7.5	7.4	5.3	–2.2	–29.5%
Small Business Administration	0.8	0.8	0.6	–0.2	–24.5%
Social Security Administration[4]	9.3	9.3	8.8	–0.5	–4.9%
Other Agencies	20.8	20.6	18.0	–2.8	–13.5%
Changes in mandatory programs	.....	–20.1	–18.6	–18.6	N/A
Adjustment for 2018 Budget Policy[2]	.....	–58.2	.....	.....	N/A
Subtotal, Base Discretionary Funding	**1,085.9**	**1,065.0**	**1,092.0**	**+6.1**	**+0.6%**
Cap Adjustment Funding:					
Overseas Contingency Operations:					
Defense[2]	82.8	65.8	89.0	+6.2	+7.5%
Homeland Security	0.2	0.2	.....	–0.2	–100.0%

Table S–8. 2019 Discretionary Overview by Major Agency—Continued

(Net budget authority in billions of dollars)

	2017 Enacted[1]	2018 Estimate[2]	2019 Request	2019 Request less 2017 Enacted	
				Dollar	Percent
State and Other International Programs	20.8	20.8	12.0	–8.8	–42.2%
Adjustment for 2018 Budget Policy[2]	.....	–8.9	.....	.....	N/A
Subtotal, Overseas Contingency Operations	103.7	77.8	101.0	–2.7	–2.6%
Emergency Requirements:					
Agriculture and Interior	0.6	0.2	.....	–0.6	–100.0%
Defense	.....	4.7	.....	.....	N/A
Homeland Security	7.4	18.7	.....	–7.4	–100.0%
Housing and Urban Development	8.2	.....	.....	–8.2	–100.0%
Transportation	1.5	.....	.....	–1.5	–100.0%
Corps of Engineers	1.0	.....	.....	–1.0	–100.0%
National Aeronautics & Space Administration	0.2	.....	.....	–0.2	–100.0%
Small Business Administration	0.5	.....	.....	–0.5	–100.0%
Subtotal, Emergency Requirements	19.4	23.6	.....	–19.4	–100.0%
Emergency Hurricane Request:[5]					
Allowance for Defense Hurricane Request	.....	1.2	.....	.....	N/A
Allowance for Non-Defense Hurricane Request	.....	42.8	.....	.....	N/A
Subtotal, Emergency Request	.....	44.0	.....	.....	N/A
Program Integrity:					
Health and Human Services	0.4	0.4	0.5	+0.0	+9.7%
Treasury[6]	.....	.....	0.4	+0.4	N/A
Social Security Administration	1.5	1.5	1.4	–0.1	–8.8%
Subtotal, Program Integrity	2.0	1.9	2.2	+0.3	+13.6%
Disaster Relief:[7]					
Homeland Security	6.7	6.7	6.7	–0.1	–0.9%
Housing and Urban Development	1.4	.....	.....	–1.4	–100.0%
Subtotal, Disaster Relief	8.1	6.7	6.7	–1.5	–18.2%
Wildfire Suppression Operations[6]	.....	.....	1.5	+1.5	N/A
Subtotal, Cap Adjustment Funding	**133.2**	**154.0**	**111.4**	**–21.8**	**–16.4%**
Total, Discretionary Budget Authority Under the Caps	**1,219.1**	**1,219.0**	**1,203.4**	**–15.7**	**–1.3%**
Memorandum - Appropriations Counted Outside of Discretionary Caps:					
21st Century CURES Appropriations:[8]					
Health and Human Services	*0.9*	*0.9*	*0.8*	*–0.1*	*–10.4%*
Non-BBEDCA Emergency Appropriations:[9]					
Energy	.....	.....	*–4.7*	*–4.7*	*N/A*
Housing and Urban Development	.....	.....	*–**	*–**	*N/A*

Table S–8. 2019 Discretionary Overview by Major Agency—Continued

(Net budget authority in billions of dollars)

* $50 million or less.

[1] 2017 Enacted reflects the actual amounts, and include many changes that occur after appropriations are enacted that are part of budget execution such as transfers, reestimates, and the rebasing as mandatory any changes in mandatory programs enacted in appropriations bills.

[2] At the time the 2019 Budget was prepared, 2018 appropriations remained incomplete and the 2018 column reflects at the account level enacted full-year and annualized continuing appropriations provided under the Continuing Appropriations Act, 2018 (Division D of Public Law 115–56, as amended by Division A of Public Laws 115–90 and 115–96). The 2018 levels are further adjusted through policy allowances to illustratively reflect the base and Overseas Contingency Operations totals proposed in the Administration's amended 2018 Budget request. These allowances appear within the Department of Defense, the Department of Homeland Security, and Government-wide.

[3] Funding for Food for Peace Title II Grants is included in the State and Other International Programs total. Although the funds are appropriated to the Department of Agriculture, the funds are administered by the U.S. Agency for International Development.

[4] Funding from the Hospital Insurance and Supplementary Medical Insurance trust funds for administrative expenses incurred by the Social Security Administration that support the Medicare program are included in the Health and Human Services total and not in the Social Security Administration total.

[5] The emergency hurricane request represents the Administration's pending proposal for additional Hurricane relief and recovery funding that was transmitted to the Congress on November 17, 2017.

[6] The Budget proposes new cap adjustments related to program integrity in the Internal Revenue Service and wildfire suppression in the Departments of Agriculture and the Interior. For more information on these proposals see the Budget Process chapter of the *Analytical Perspectives* volume of the Budget.

[7] "Disaster Relief" appropriations are amounts designated as such by the Congress provided they are for activities carried out pursuant to a Presidential disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. These amounts are held to a funding ceiling that is determined one year at a time according to a statutory formula. The Administration proposes to change this formula to address the declining ceiling for Disaster Relief appropriations, as discussed in the Budget Process chapter of the *Analytical Perspectives* volume of the Budget. OMB currently estimates the 2019 ceiling to be $7.4 billion under current law. The Administration is requesting $6.7 billion for Disaster Relief in 2019.

[8] The 21st Century CURES Act permitted funds to be appropriated each year for certain activities and not counted toward the discretionary caps so long as the appropriations were specifically provided for the authorized purposes. These amounts are displayed outside of the discretionary caps totals for this reason.

[9] The 2019 Budget includes permanent cancellations of balances of emergency funding in the Departments of Energy and Housing and Urban Development that are not designated pursuant to BBEDCA. These cancellations are not being re-designated as emergency, therefore no savings are being achieved under the caps nor will the caps be adjusted for these cancellations.

Table S–9. Economic Assumptions[1]

(Calendar years)

	Actual	Projections											
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Gross Domestic Product (GDP):													
Nominal level, billions of dollars	18,624	19,372	20,262	21,263	22,345	23,482	24,672	25,923	27,235	28,598	30,001	31,461	32,991
Percent change, nominal GDP, year/year	2.8	4.0	4.6	4.9	5.1	5.1	5.1	5.1	5.1	5.0	4.9	4.9	4.9
Real GDP, percent change, year/year	1.5	2.2	3.0	3.2	3.1	3.0	3.0	3.0	3.0	2.9	2.8	2.8	2.8
Real GDP, percent change, Q4/Q4	1.8	2.5	3.1	3.2	3.1	3.0	3.0	3.0	3.0	2.9	2.8	2.8	2.8
GDP chained price index, percent change, year/year	1.3	1.7	1.6	1.7	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Consumer Price Index,[2] percent change, year/year	1.3	2.1	2.1	2.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Interest rates, percent:[3]													
91-day Treasury bills[4]	*	0.9	1.5	2.3	2.9	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9
10-year Treasury notes	1.8	2.3	2.6	3.1	3.4	3.6	3.7	3.7	3.7	3.7	3.6	3.6	3.6
Unemployment rate, civilian, percent[3]	4.9	4.4	3.9	3.7	3.8	3.9	4.0	4.2	4.3	4.5	4.7	4.8	4.8

* 0.05 percent or less.

Note: A more detailed table of economic assumptions appears in Chapter 2, "Economic Assumptions and Interactions with the Budget," in the *Analytical Perspectives* volume of the Budget.

[1] Based on information available as of mid-November 2017.

[2] Seasonally adjusted CPI for all urban consumers.

[3] Annual average.

[4] Average rate, secondary market (bank discount basis).

Table S–10. Federal Government Financing and Debt

(Dollar amounts in billions)

	Actual	Estimate										
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Financing:												
Unified budget deficit:												
Primary deficit/surplus (–)	403	522	621	540	406	340	160	–46	–109	–199	–291	–316
Net interest	263	310	363	447	510	568	619	658	688	717	740	761
Unified budget deficit	665	833	984	987	916	908	778	612	579	517	450	445
As a percent of GDP	3.5%	4.2%	4.7%	4.5%	3.9%	3.7%	3.0%	2.3%	2.1%	1.7%	1.4%	1.4%
Other transactions affecting borrowing from the public:												
Changes in financial assets and liabilities:[1]												
Change in Treasury operating cash balance	–194	191	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Net disbursements of credit financing accounts:												
Direct loan and Troubled Asset Relief Program (TARP) equity purchase accounts	54	101	94	87	87	90	87	80	69	59	50	46
Guaranteed loan accounts	–14	1	5	3	2	–*	–2	–4	–5	–9	–8	–1
Net purchases of non-Federal securities by the National Railroad Retirement Investment Trust (NRRIT)	1	–1	–1	–1	–1	–1	–1	–1	–1	–1	–*	–*
Net change in other financial assets and liabilities[2]	–15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Subtotal, changes in financial assets and liabilities	–167	292	98	89	88	88	84	75	63	49	41	45
Seigniorage on coins	–*	–*	–*	–*	–*	–*	–*	–*	–*	–*	–*	–*
Total, other transactions affecting borrowing from the public	–168	292	98	88	88	88	84	75	62	49	41	45
Total, requirement to borrow from the public (equals change in debt held by the public)	498	1,124	1,082	1,075	1,004	996	862	687	642	566	491	490
Changes in Debt Subject to Statutory Limitation:												
Change in debt held by the public	498	1,124	1,082	1,075	1,004	996	862	687	642	566	491	490
Change in debt held by Government accounts	168	148	143	123	116	65	89	119	56	53	–55	–138
Change in other factors	4	1	2	3	2	2	2	2	1	1	2	2
Total, change in debt subject to statutory limitation	670	1,274	1,227	1,201	1,121	1,063	953	808	699	620	438	353
Debt Subject to Statutory Limitation, End of Year:												
Debt issued by Treasury	20,180	21,452	22,678	23,877	24,997	26,059	27,011	27,818	28,517	29,137	29,574	29,926
Adjustment for discount, premium, and coverage[3]	29	30	32	33	35	36	37	38	38	38	39	40
Total, debt subject to statutory limitation[4]	20,209	21,483	22,709	23,910	25,032	26,094	27,048	27,856	28,555	29,175	29,613	29,966
Debt Outstanding, End of Year:												
Gross Federal debt:[5]												
Debt issued by Treasury	20,180	21,452	22,678	23,877	24,997	26,059	27,011	27,818	28,517	29,137	29,574	29,926
Debt issued by other agencies	26	26	25	24	23	22	21	20	19	18	17	16
Total, gross Federal debt	20,206	21,478	22,703	23,901	25,020	26,081	27,032	27,838	28,536	29,155	29,591	29,942
As a percent of GDP	105.4%	107.2%	108.1%	108.3%	107.9%	107.0%	105.6%	103.5%	101.0%	98.3%	95.2%	91.8%

Table S–10. Federal Government Financing and Debt—Continued

(Dollar amounts in billions)

	Actual 2017	Estimate 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Held by:												
Debt held by Government accounts	5,540	5,689	5,831	5,954	6,070	6,135	6,223	6,343	6,399	6,452	6,397	6,258
Debt held by the public[6]	14,665	15,790	16,872	17,947	18,950	19,946	20,809	21,495	22,137	22,703	23,194	23,684
As a percent of GDP	76.5%	78.8%	80.3%	81.3%	81.7%	81.9%	81.3%	79.9%	78.4%	76.6%	74.6%	72.6%
Debt Held by the Public Net of Financial Assets:												
Debt held by the public	14,665	15,790	16,872	17,947	18,950	19,946	20,809	21,495	22,137	22,703	23,194	23,684
Less financial assets net of liabilities:												
Treasury operating cash balance	159	350	350	350	350	350	350	350	350	350	350	350
Credit financing account balances:												
Direct loan and TARP equity purchase accounts	1,281	1,382	1,476	1,563	1,650	1,740	1,827	1,906	1,975	2,034	2,084	2,130
Guaranteed loan accounts	14	15	20	23	25	25	23	19	14	4	–4	–4
Government-sponsored enterprise preferred stock	93	95	95	95	95	95	95	95	95	95	95	95
Non-Federal securities held by NRRIT	25	25	24	23	22	21	20	19	18	18	18	17
Other assets net of liabilities	–58	–58	–58	–58	–58	–58	–58	–58	–58	–58	–58	–58
Total, financial assets net of liabilities	1,515	1,809	1,906	1,995	2,083	2,172	2,256	2,331	2,394	2,443	2,485	2,530
Debt held by the public net of financial assets	13,151	13,981	14,965	15,952	16,867	17,775	18,553	19,164	19,743	20,260	20,709	21,154
As a percent of GDP	68.6%	69.8%	71.3%	72.3%	72.7%	72.9%	72.5%	71.2%	69.9%	68.3%	66.6%	64.9%

* $500 million or less.

[1] A decrease in the Treasury operating cash balance (which is an asset) is a means of financing a deficit and therefore has a negative sign. An increase in checks outstanding (which is a liability) is also a means of financing a deficit and therefore also has a negative sign.

[2] Includes checks outstanding, accrued interest payable on Treasury debt, uninvested deposit fund balances, allocations of special drawing rights, and other liability accounts; and, as an offset, cash and monetary assets (other than the Treasury operating cash balance), other asset accounts, and profit on sale of gold.

[3] Consists mainly of debt issued by the Federal Financing Bank (which is not subject to limit), the unamortized discount (less premium) on public issues of Treasury notes and bonds (other than zero-coupon bonds), and the unrealized discount on Government account series securities.

[4] The statutory debt limit is approximately $20,456 billion, as increased after December 8, 2017.

[5] Treasury securities held by the public and zero-coupon bonds held by Government accounts are almost all measured at sales price plus amortized discount or less amortized premium. Agency debt securities are almost all measured at face value. Treasury securities in the Government account series are otherwise measured at face value less unrealized discount (if any).

[6] At the end of 2017, the Federal Reserve Banks held $2,465.4 billion of Federal securities and the rest of the public held $12,200.0 billion. Debt held by the Federal Reserve Banks is not estimated for future years.

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TO AG-DR-01-112

ATTACHMENT 1

ARE BEING FILED UNDER

THE SEAL OF A PETITION

FOR CONFIDENTIAL

TREATMENT

AG-DR-01-112
CONFIDENTIAL
ATTACHMENT 2
IS BEING FILED
UNDER THE SEAL
OF A PETITION FOR
CONFIDENTIAL
TREATMENT ON CD

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-113

REQUEST:

Rate of Return

Provide any analyses performed by Dr. Morin or other persons at Duke Energy that quantify the credit metrics used by Standard and Poor's and/or Moody's showing that Dr. Morin's recommended ROE is necessary to maintain Duke Energy Kentucky's financial integrity. If no such analyses were performed, please so state.

RESPONSE:

Dr. Morin did not perform such analyses, as this was well outside the scope of his testimony. Also, no other persons at Duke Energy performed such specific analyses. However, any reduction in ROE would weaken the Company's credit metrics due to a corresponding reduction in cash flow.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.
Robert H. "Beau" Pratt

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-114

REQUEST:

Rate of Return

Provide a copy of the Company's guidelines and/or all written criteria that describe when, what (type), how, and how much short-term debt will be issued and outstanding at any time. If the Company has no written guidelines and/or written criteria, so state.

RESPONSE:

The Company has no such written criteria. In practice, the Company utilizes the Duke Energy Money Pool for its short-term borrowing needs until a sufficient amount is accumulated to warrant the issuance of long-term debt to replace some, or all, of these Money Pool borrowings.

PERSON RESPONSIBLE: Robert H. "Beau" Pratt

REQUEST:

Rate of Return

Provide a schedule in electronic spreadsheet format showing the Company's average daily and end of month borrowings from the Duke Energy Money Pool for each month in 2016, 2017, and 2018 to date and projected for each month thereafter through the end of the test year. In addition, provide the interest rates applicable to those borrowings on a daily basis and on average for each month. Provide a copy of all source documents relied on for the projected cost of short-term debt during the test year.

RESPONSE:

CONFIDENTIAL PROPRIETARY TRADE SECRET (As to Attachment 5 Only)

See AG-DR-01-115 Attachment 1 for requested Duke Energy Money Pool information.

- Note that the forecast is developed on a monthly basis, not daily. Therefore, the forecast information is monthly only.

Short-term debt rates used for the test period include rates for:

- Capital Lease – Meters, 3.330%; Capital Lease – Erlanger Facility, 8.634%; and Current Maturities: 4.65% due 10/1/19, 4.650%:
    - See Long-term debt schedule, attached as AG-DR-01-115 Attachment 2 for these three items. The Capital Lease Meters is the twelfth row down. The

Capital Lease – Erlanger Facility is the thirteenth row down. The Current Maturities due 10/1/19 are the fifth row down.

- Amounts Sold for Cash/Classified as Receivable, 3.384%:
  - This rate is the forward 1 month LIBOR plus a 75 basis point credit spread. See below for calculation and AG-DR-01-115 Attachment 3 exported from Bloomberg of the forward LIBOR curve pulled on 5/31/18 with settle date 5/31/18 (use Basis Adj Fwd column). (Note that the forecasted balance outstanding for the Sales of Accounts Receivables debt is consistent through the entire test period. Therefore, any weighted average over the 13 months is the same as the straight average.)
  - The 75-basis-point credit spread used for the Sale of Accounts Receivables includes an estimate of: (a) the credit spread on the Sale of Accounts Receivables financing, and, (b) incremental interest over 1 month LIBOR that the participating banks charge (which is generally 10-12 basis points above 1 month LIBOR). (See AG-DR-01-115 Attachment 4 for support of the 10-12 basis points.)
  - The credit spread on the current Sale of Accounts Receivables agreement is 72.5 basis points. (See page 2 of AG-DR-01-115 Confidential Attachment 5 for support of the 72.5 basis points.) This confidential attachment is being filed under the seal of a Petition for Confidential Treatment and will be provided to all parties upon the execution of a Confidentiality Agreement.

	1M LIBOR forward curve as of 5/31/18
3/29/2019	2.43%
4/30/2019	2.46%

5/31/2019	2.56%
6/28/2019	2.60%
7/31/2019	2.63%
8/30/2019	2.65%
9/30/2019	2.67%
10/31/2019	2.69%
11/29/2019	2.69%
12/31/2019	2.70%
1/31/2020	2.71%
2/28/2020	2.72%
3/31/2020	2.73%
13 Mo Avg	2.6334%
Add: Credit spread	0.7500
Forecasted rate	3.3835%

- Notes Payable – Short-term Money Pool Balance, 2.6335%
    - This rate is based on the forward 1 month LIBOR curve. The weighted average over the 13 month period is 2.6335%. See calculation below. See attachments for screen shots from Bloomberg of LIBOR curve (use Basis Adj Fwd column).

	Forecasted ST MP balance	Forward 1M LIBOR	Forecasted Annualized Interest
	A	B	= A*B
Mar-18	0	2.4344%	0
Apr-18	0	2.4611%	0
May-18	0	2.5572%	0
Jun-18	0	2.5977%	0
Jul-18	4,012,942	2.6260%	105,380
Aug-18	2,371,189	2.6486%	62,803
Sep-18	0	2.6684%	0
Oct-18	0	2.6856%	0
Nov-18	0	2.6914%	0
Dec-18	0	2.7035%	0
Jan-19	0	2.7137%	0
Feb-19	0	2.7212%	0
Mar-19	0	2.7263%	0
	C	= D/C	D
Average	491,087	2.6335%	12,933

PERSON RESPONSIBLE: Robert H. "Beau" Pratt

AG-DR-01-115
ATTACHMENT 1
IS BEING FILED ELECTRONICALLY AND PROVIDED ON CD

Money Pool Borrowings - Including $25 million long-term balance

Historical Information:

	Daily Average		End of Month	
	Borrowings	Rate	Borrowings	Rate
Jan-16	$32,171,226	0.8025%	$25,000,000	0.8871%
Feb-16	25,000,000	0.9287%	25,000,000	0.9309%
Mar-16	25,000,000	0.9494%	25,000,000	0.9306%
Apr-16	25,000,000	0.8870%	25,000,000	0.8849%
May-16	25,000,000	0.8518%	25,000,000	0.8170%
Jun-16	25,000,000	0.8263%	25,000,000	0.8416%
Jul-16	25,024,355	0.7854%	25,000,000	0.7646%
Aug-16	25,060,419	0.8317%	25,000,000	0.8825%
Sep-16	25,000,000	0.8591%	25,000,000	0.8047%
Oct-16	26,470,516	0.7944%	33,991,000	0.6983%
Nov-16	26,135,800	0.8484%	31,838,000	0.8515%
Dec-16	31,035,935	0.9111%	44,656,000	0.8768%
Jan-17	37,653,839	0.8782%	45,398,000	0.8218%
Feb-17	35,389,679	0.9023%	48,981,000	0.8464%
Mar-17	29,971,226	1.0504%	34,227,000	1.1625%
Apr-17	28,438,233	1.2295%	35,801,000	1.2157%
May-17	34,506,581	1.2217%	47,074,000	1.2048%
Jun-17	39,622,900	1.3006%	49,544,000	1.3968%
Jul-17	49,931,710	1.4017%	64,546,000	1.3956%
Aug-17	59,219,581	1.3773%	67,229,000	1.3688%
Sep-17	33,343,367	1.4067%	25,000,000	1.4296%
Oct-17	25,000,000	1.4412%	25,000,000	1.4417%
Nov-17	25,000,000	1.4611%	25,000,000	1.4825%
Dec-17	25,000,000	1.5568%	25,000,000	1.6641%
Jan-18	28,508,323	1.7384%	34,367,000	1.7709%
Feb-18	28,214,964	1.7890%	36,870,000	1.8236%
Mar-18	31,577,433	2.0195%	57,007,000	2.2751%
Apr-18	61,167,000	2.2824%	84,967,000	2.2875%
May-18	87,583,677	2.2075%	121,319,000	2.1923%
Jun-18	110,830,276	2.2304%	99,892,000	2.2310%
Jul-18	106,836,871	2.2278%	120,005,000	2.2180%
Aug-18	111,937,871	2.1481%	113,395,000	2.1173%
Sep-18	108,016,321	2.1412%	127,357,000	2.2900%

Forecasted information:

	Daily Average and End of Month	
	Borrowings	Rate
Oct-18	$25,000,000	2.5165%
Nov-18	25,000,000	2.5646%
Dec-18	25,000,000	2.6233%
Jan-19	25,000,000	2.6663%
Feb-19	25,000,000	2.6667%
Mar-19	25,000,000	2.6844%
Apr-19	25,000,000	2.7111%
May-19	25,000,000	2.8072%
Jun-19	25,000,000	2.8477%
Jul-19	29,012,942	2.8414%
Aug-19	27,371,189	2.8769%
Sep-19	25,000,000	2.9184%
Oct-19	25,000,000	2.9356%
Nov-19	25,000,000	2.9414%
Dec-19	25,000,000	2.9535%
Jan-20	25,000,000	2.9637%
Feb-20	25,000,000	2.9712%
Mar-20	25,000,000	2.9763%

Duke Energy Debt Detail

September 30, 2018

Includes Current Maturities

Entity	Reporting Node Description	USD Balance	Rate	Type	Estimated Settlement Date	Maturity Date	Cusip
Duke Energy Kentucky							
Duke Energy Kentucky	Other Pollution Control Bond - LC - swap	26,720,000	1.570%	Floating	02/01/12	08/01/27	098792AP9
Duke Energy Kentucky	Other Pollution Control Bond - LC (Put Date 11/1/21)	50,000,000	2.747%	Floating	11/04/16	08/01/27	098792AN4
Duke Energy Kentucky	Unsecured	65,000,000	6.200%	Fixed	03/07/06	03/10/36	906888AS1
Duke Energy Kentucky	Unsecured	100,000,000	4.650%	Fixed	09/22/09	10/01/19	26442LAA2
Duke Energy Kentucky	Unsecured	45,000,000	3.420%	Fixed	01/05/16	01/15/26	Private Placement
Duke Energy Kentucky	Unsecured	50,000,000	4.450%	Fixed	01/05/16	01/15/46	Private Placement
Duke Energy Kentucky	Unsecured	30,000,000	3.350%	Fixed	09/07/17	09/15/29	Private Placement
Duke Energy Kentucky	Unsecured	30,000,000	4.110%	Fixed	09/07/17	09/15/47	Private Placement
Duke Energy Kentucky	Unsecured	30,000,000	4.260%	Fixed	09/07/17	09/15/57	Private Placement
Duke Energy Kentucky	Commercial Paper LTD	25,000,000	2.341%	Floating		03/16/23	
Duke Energy Kentucky	Capital Lease	195,078	3.330%	Fixed	06/18/10	06/18/19	
Duke Energy Kentucky	Capital Lease - Erlanger	465,500	8.634%	Fixed	12/30/06	09/30/20	
Duke Energy Kentucky	Unamortized Debt Discount/Premium	(251,201)					
Duke Energy Kentucky	Unamortized Debt Issuance Costs	(1,635,437)					
Total Duke Energy Kentucky		**450,493,939**					

<Menu> to Return

Actions	Modes	Settings			Swap Curve Builder
USD	50 - USD (vs. 1M LIBOR)	Name	USD (vs. 1M LIBOR)		5/31/2018
Curve #	50 - USD (vs. 1M LIBOR)	Shift	0.00 bp		
Interpolation	Smooth Forward (Cont)	OIS DC Stripping	Yes		
Settle Date	5/31/2018	Index Fixing	US0001M 1.98246%		
Curve Side	Mid	Basis Side	Mid		
Interval	1M	Tenor	1M	Up to	5 Yr

Date	Fwd Rate	Basis Adj Fwd	Diff (bp)	Non-DC Fwd	Non-DC Basi
5/31/2018	2.2615	2.0307	-23.07	2.2615	2.0307
6/29/2018	2.2808	2.0501	-23.07	2.2808	2.0501
7/31/2018	2.3444	2.1136	-23.08	2.3444	2.1136
8/31/2018	2.4114	2.2384	-17.3	2.4114	2.2384
9/28/2018	2.4116	2.2482	-16.34	2.4116	2.2483
10/31/2018	2.4299	2.2665	-16.34	2.4299	2.2666
11/30/2018	2.4769	2.3146	-16.23	2.4769	2.3146
12/31/2018	2.5354	2.3733	-16.21	2.5354	2.3733
1/31/2019	2.5785	2.4163	-16.22	2.5785	2.4163
2/28/2019	2.6066	2.4167	-18.99	2.6067	2.4167
3/29/2019	2.6288	2.4344	-19.44	2.6288	2.4345
4/30/2019	2.6555	2.4611	-19.44	2.6555	2.4611
5/31/2019	2.6838	2.5572	-12.66	2.6837	2.5572
6/28/2019	2.713	2.5977	-11.53	2.7129	2.5977
7/31/2019	2.7414	2.626	-11.53	2.7414	2.6262
8/30/2019	2.7639	2.6486	-11.53	2.7643	2.6491
9/30/2019	2.7837	2.6684	-11.54	2.7842	2.669
10/31/2019	2.801	2.6856	-11.54	2.8009	2.6857
11/29/2019	2.8164	2.6914	-12.5	2.8151	2.6902
12/31/2019	2.8303	2.7035	-12.68	2.8275	2.7008
1/31/2020	2.8405	2.7137	-12.68	2.8366	2.7099
2/28/2020	2.848	2.7212	-12.68	2.8436	2.7169
3/31/2020	2.8531	2.7263	-12.68	2.8486	2.7219
4/30/2020	2.8552	2.7284	-12.68	2.851	2.7243
5/29/2020	2.8549	2.76	-9.49	2.8515	2.7568
6/30/2020	2.8538	2.7666	-8.72	2.8513	2.7644
7/31/2020	2.853	2.7658	-8.72	2.8512	2.7642
8/28/2020	2.8522	2.765	-8.72	2.8511	2.7641
9/30/2020	2.8516	2.7644	-8.72	2.851	2.7641
10/30/2020	2.8511	2.7639	-8.72	2.851	2.7641

AG-DR-01-115
ATTACHMENT 4
IS BEING FILED
ELECTRONICALLY
AND PROVIDED ON
CD

	1M LIBOR	Bank A	Bank B	Average Bank CP rate	Difference
2018-1	1.5797%	1.6281%	1.6489%	1.6385%	0.0588%
2018-2	1.6701%	1.7562%	1.6984%	1.7273%	0.0573%
2018-3	1.8831%	1.9041%	1.8840%	1.8940%	0.0109%
2018-4	1.9093%	2.0836%	2.1012%	2.0924%	0.1831%
2018-5	2.0007%	2.2418%	2.2002%	2.2210%	0.2203%
2018-6	2.0903%	2.3377%	2.3309%	2.3343%	0.2440%
2018-7	2.0801%	2.3705%	2.3285%	2.3495%	0.2693%
2018-8	2.1138%	2.3720%	2.3340%	2.3530%	0.2393%
2018-9	2.2606%	2.3757%	2.3042%	2.3400%	0.0794%

AG-DR-01-115

CONFIDENTIAL ATTACHMENT 5

IS BEING FILED UNDER THE SEAL OF A PETITION FOR CONFIDENTIAL TREATMENT

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-116

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, page 13, wherein he states that "[i]nvestors establish the price for equity capital through their buying and selling decisions in capital markets."

a. Would Dr. Morin agree that appreciation of stock price indicates that investors are attracted to the return expected from that equity investment?

RESPONSE:

Appreciation of stock prices, that is, a decrease in expected return, is consistent with a number of economic possibilities, a decrease in interest rates for example, or a positive change is fiscal policy, or a reduction in corporate taxes. It can also be consistent with company-specific events. An increase (decrease) in stock price for an individual stock is not necessarily consistent with a favorable (unfavorable) company-specific factor. Stock price movements are largely influenced by overall market movements, much like the tide that affects all boats.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

AG-DR-01-117

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, generally, and Federal Power Commission v. Hope Natural Gas Co., 64 S. Ct. 281, cited by Dr. Morin on page 9 of his testimony.

a. Cite to the specific instances in Dr. Morin's testimony where he balanced the interests of investors and consumers.

RESPONSE:

Setting the cost of capital equal to investors required return, which is what Dr. Morin accomplishes in his testimony, balances the interests of investors and consumers as there is no transfer of wealth between the two groups.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-118

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, pages 19-20. Dr. Morin states that although "[s]ome analysts multiply the spot dividend yield by one plus one half the expected growth rate" he uses "the conventional one plus the expected growth rate" procedure.

a. What effect on Dr. Morin's calculations would using the (1 + .5g) procedure rather than his preferred (1 + g) have for his four (4) DCF estimates?

RESPONSE:

Dr. Morin's (1 + g) procedure is not his preferred procedure, it is the correct procedure as clearly mandated by the annual DCF model. Dr. Morin is unaware of any college-level finance textbook ever mentioning the (1 + .5g) procedure. The effect of using the wrong (1 + .5g) procedure is to decrease DCF estimates by approximately 5-10 basis points depending on the size of the dividend yield component.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-119

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, page 23, wherein Dr. Morin states "while there is an abundance or earnings growth forecasts, there are very few forecasts of dividend growth. As a result, investors' attention has shifted from dividends to earnings."

a. This statement seems to be applied generally to the equity market. Provide specific documentation that this observation applies to investors looking specifically at stocks of regulated utilities.

RESPONSE:

Dr. Morin's statement is equally applicable to utility stocks. The plain fact of the matter is that there are very few sources of dividend growth forecasts. Dr. Morin is unaware of any source of comprehensive dividend growth forecasts other than Value Line, unlike such sources for earnings forecasts such as Zacks Investment Research, Yahoo Finance, Reuters, Thompson to name a few.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-120

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, page 23, wherein Dr. Morin states, "it is growth in earnings that will support future dividends and share price."

a. Is it Dr. Morin's opinion that when interest rates fell following 2008, it was earnings growth and not dividends or dividend growth that led investors toward utility stocks in seek of yield?

RESPONSE:

Generally, a decrease in interest rates leads investors to utility stocks in search of higher yield.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-121

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, page 23, wherein he states "the sheer volume of earnings forecasts available from the investment community relative to the scarcity of dividend forecasts attests to their importance."

a. Confirm that not all equities pay dividends.

b. How many stocks in the proxy group pay dividends over the last 3 years- or how many did not?

c. What resources are available that provide dividend forecasts?

RESPONSE:

a. It is confirmed.

b. All stocks in Dr. Morin's peer group pay dividends. Otherwise, they would have been excluded from the group.

c. To the best of Dr. Morin's knowledge, Value Line is the only source of comprehensive dividend growth forecasts that is widely available to investors for a large universe of common stocks.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-122

REQUEST:

Rate of Return

Reference the direct testimony of Roger A. Morin, PhD in Case No. 2009-00202, *In Re: Application of Duke Energy Kentucky, Inc. For an Adjustment of Rates.*

a. Confirm that in that matter Dr. Morin used the then-current 30-year U.S. Treasury yield in calculating his CAPM and ECAPM.

b. If confirmed, follow Dr. Morin's previous methodology and perform the CAPM and ECAPM in this matter using the current 30-year U.S. Treasury bond yield. This calculation should use the same beta and market risk premium as Dr. Morin used in his direct testimony in this matter. Provide the outcome of this calculation, both with and without flotation costs. Provide all workpapers used in these calculations in native Excel format. Further, provide the source for the 30-year U.S. Treasury bond yield used.

RESPONSE:

a. In prior testimonies dated some ten years ago or older, Dr. Morin did rely on current 30-year U.S. Treasury yields in calculating CAPM and ECAPM estimates. At that time, current yields did not differ markedly from forecast yields.

b. All else remaining constant, using the current yield of 3.4% instead of the forecast yield of 4.3% in calculating the CAPM and ECAPM estimates reduces these estimates by 90 basis points (4.3% - 3.4% = 0.90%).

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

AG-DR-01-123

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, pages 33 and 37.

a. Provide the sources or copies of the sources for the forecast yields for 30-year U.S. Treasury Bonds used by Dr. Morin (i.e. web address, printed materials).

b. Have any or all of these sources provided forecasted treasury yields for the past 10 years? If so, are these historical forecasts readily accessible for the parties and Commission to review?

RESPONSE:

a. See response to AG-DR-01-112.

b. Most of these forecast sources have been around a long time, Value Line for example. Dr. Morin is not aware of any source where one could access the historical forecasts.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

AG-DR-01-124

REQUEST:

Rate of Return

Reference the testimony of Roger A. Morin, PhD, generally. Dr. Morin's direct testimony discusses at length his opinions on the risks a utility faces should a regulatory commission set the return on equity too low. What risks do utilities, their customers and their stakeholders face if regulatory commissions set the allowed return on equity too high? Please explain in detail any response.

RESPONSE:

If regulatory commissions were to set a return on equity which exceeded the cost of capital there would inevitably a transfer of wealth from customers to investors. Customer rates would be too high as a result. The converse is true as well.

PERSON RESPONSIBLE: Roger A. Morin, Ph.D.

AG-DR-01-125

REQUEST:

Rate of Return

Reference the testimony of Robert H. "Beau" Pratt, page 6, wherein he discusses the regulatory environment in Kentucky.

a. Is DEK aware of any organizations that rate or rank state regulatory commissions?

b. If so, provide a discussion of how Kentucky's regulatory Commission ranks or rates in such reviews.

RESPONSE:

a. Yes.

b. Per an August 2017 report, published by the Regulatory Research Associates, the Kentucky Public Service Commission is ranked "Average/1."

PERSON RESPONSIBLE: William Don Wathen Jr.

REQUEST:

Rate of Return

Reference the testimony of Robert H. "Beau" Pratt, page 7. Are the credit ratings provided on page 7 prescribed specifically to DEK or to Duke Energy as an organization?

RESPONSE:

The credit ratings provided by S&P and Moody's are prescribed specifically for Duke Energy Kentucky. S&P takes a consolidated approach in rating the Duke Energy family as a whole and then notches its ratings up or down based on each Registrant's credit attributes. Moody's rates each Registrant on a standalone basis.

PERSON RESPONSIBLE: Robert H. "Beau" Pratt

REQUEST:

Rate of Return

Reference the testimony of Robert H. "Beau" Pratt, page 13, wherein he discusses that [DEK] has effectively managed its financing costs since the last natural gas base rate case in 2009.

a. Confirm that since DEK's 2009 gas base rate case, interest rates, and thus financing costs, have been at historically low levels.

RESPONSE:

Objection, this question is vague, overbroad, and confusing insofar as it relates to what is meant by the term "historically low levels." As such, this response is further objectionable as it calls for speculation and assumption of facts not in evidence. Without waiving said objection, and to the extent discoverable, US Treasury rates, and thus Duke Energy Kentucky's borrowing costs for new debt issuances, have remained at relatively low levels since 2009. However, with the Fed expected to continue tightening monetary policy and raising short-term (ST) interest rates, the market's expectation is that ST and long-term (LT) interest rates will continue to rise throughout this rate case's forecast period ending March 2020. The recent uptick in ST and LT borrowing rates have started to work its way into Duke Energy Kentucky's overall cost of capital, and we expect this trend of higher borrowing costs to continue. In the past 3 years, Duke Energy Kentucky

has borrowed approximately $100 million annually from the private placement market at blended rates (average across all tenors of each issuance) of approximately 3.82%, 3.90%, and 4.28% for 2016, 2017, and 2018, respectively.

PERSON RESPONSIBLE: Legal- as to objection
Robert H. "Beau" Pratt

AG-DR-01-128

REQUEST:

Rate of Return

Reference the testimony of Robert H. "Beau" Pratt, page 14. Explain what Mr. Pratt means when he says that "[i]t is important to remember that Duke Energy also has dividend obligations to its shareholders."

RESPONSE:

In addition to its capital needs over the next several years, Duke Energy Kentucky, as an operating subsidiary of Duke Energy Corporation, is expected to pay approximately 70 percent of its earnings in support of the Corporation's dividend payout to shareholders. A stable dividend, along with earnings growth, is how the Company seeks to attract and fairly compensate equity investors for their invested capital. The ability to attract both debt and equity capital is vitally important to the Company and its customers by allowing greater financial flexibility and more readily available access to the capital markets on reasonable terms.

PERSON RESPONSIBLE: Robert H. "Beau" Pratt

AG-DR-01-129

REQUEST:

Rate of Return

Reference the testimony of William Don Wathen Jr., page 13, lines 5-9 and page 16, lines 13-21. Explain how Dr. Morin's testimony supports DEK's commitment that it "will not seek a higher rate or return on equity than would have been sought if the merger transaction had not occurred."

RESPONSE:

Inasmuch as Dr. Morin's recommended ROE is based on the use of a proxy group, the ROE being proposed in this case is that return that is comparable to the risks of other companies with comparable risk. In the Company's view, requesting a return comparable to companies with similar risks ensures that there is no influence from its own merger activity.

PERSON RESPONSIBLE: William Don Wathen Jr

AG-DR-01-130

REQUEST:

Rate of Return

Identify any and all change(s) in DEK's equity-to-capital ratio since the final order in the last gas rate case.

RESPONSE:

See AG-DR-01-130 Attachment.

PERSON RESPONSIBLE: Michael Covington

AG-DR-01-130

ATTACHMENT

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DEK CAP STRUCTURE

Source: FERC FORM 1
*Final order on last rate case was January 31st, 2011

Year	YE 2011		YE 2012		YE 2013		YE 2014		YE 2015		YE 2016		YE 2017	
Debt	331,861,232	48%	331,951,659	47%	332,042,086	47%	317,130,831	43%	316,331,907	44%	361,382,052	45%	451,431,622	47%
Equity	354,663,683	52%	372,884,543	53%	377,954,114	53%	413,255,929	57%	404,431,559	56%	437,015,497	55%	511,414,427	53%
	686,524,915		704,836,202		709,996,200		730,386,760		720,763,466		798,397,549		962,846,049	
Dividends	$135,000,000		10,000,000		40,000,000				55,000,000		10,000,000			
Equity Infusion													$15,000,000	

AG-DR-01-131

REQUEST:

Rate Design/ Cost of Service

Explain the basis for the calculation of gas service reconnection costs provided in BLS-5, page 1 of 1.

RESPONSE:

The basis of the calculation is to multiply the average time duration to complete a natural gas service reconnection and the average labor rate, loaded for all applicable items, of personnel performing the reconnection work. This results in the cost of $103.72. Duke Energy Kentucky also has contracts in place for seasonal contractors to perform a gas reconnection at the cost of $90.25 as shown in BLS-5. However, Duke Energy Kentucky only requests an increase in the reconnection charge to $75.00 at this time. The $75.00 value is consistent with the recently approved on-site electric service reconnection charge.

PERSON RESPONSIBLE: Bruce L. Sailers

Duke Energy Kentucky
Case No. 2018-00261
Attorney General's First Set Data Requests
Date Received: October 10, 2018

AG-DR-01-132

REQUEST:

Rate Design/ Cost of Service

Reference the testimony of Bruce L. Sailers, page 19. Explain the phrase "estimated completion times are based on management expertise."

RESPONSE:

The average estimated time to complete a natural gas service reconnection is provided by field operations management involved with performing natural gas service reconnections.

PERSON RESPONSIBLE: Bruce L. Sailers

AG-DR-01-133

REQUEST:

Rate Design/ Cost of Service

Reference the testimony of James E. Ziolkowski, generally.

a. Confirm that Mr. Ziolkowski only performed one cost-of-service study using a single methodology to allocate production plant and other demand related items to the various classes of customers.

RESPONSE:

Mr. Ziolkowski prepared one cost-of-service study.

Three allocators were used in the cost-of-service study to allocate production plant and other demand related items to the various classes of customers.

PERSON RESPONSIBLE: James E. Ziolkowski