NYSE - Nasdaq Real Time Price • USD

Atmos Energy Corporation (ATO)

Follow Compare

129.38 +0.29 (+0.23%)

As of 10:36 AM EDT. Market Open.

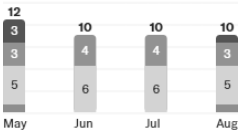
Estimate Trends Fair Value

Research Analysis

Earnings Per Share

+0.8 Estimate

Analyst Recommendations



Strong Buy
Buy
Hold
Underperform
Sell

Analyst Price Targets

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Earnings Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	6	2	9	9
Avg. Estimate	0.8	2.2	6.78	7.09
Low Estimate	0.76	2.15	6.75	7.05
High Estimate	0.85	2.25	6.8	7.16
Year Ago EPS	0.8	2.08	6.1	6.78

Revenue Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	2	--	6	6
Avg. Estimate	783.5M	--	4.58B	5.04B
Low Estimate	740M	--	4.33B	4.83B
High Estimate	827M	--	4.95B	5.25B
Year Ago Sales	587.64M	--	4.28B	4.58B
Sales Growth (year/est)	33.30%	--	7.10%	10.10%

Earnings History

CURRENCY IN USD	9/30/2023	12/31/2023	3/31/2024	6/30/2024
EPS Est.	0.72	2.05	2.61	1.05
EPS Actual	0.8	2.08	2.85	1.08
Difference	0.08	0.03	0.24	0.03
Surprise %	11.10%	1.50%	9.20%	2.90%

EPS Trend

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Current Estimate	0.8	2.2	6.78	7.09
7 Days Ago	0.79	2.2	6.78	7.09
30 Days Ago	0.81	2.2	6.77	7.06
60 Days Ago	0.83	2.24	6.77	7.07
90 Days Ago	0.83	2.23	6.76	7.06

EPS Revisions

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Up Last 7 Days	1	--	--	--
Up Last 30 Days	1	--	3	3
Down Last 7 Days	--	--	--	--
Down Last 30 Days	--	--	--	--

Growth Estimates

CURRENCY IN USD	ATO	Industry	Sector	S&P 500
Current Qtr.	0.00%	--	--	7.00%
Next Qtr.	5.80%	--	--	11.40%
Current Year	11.10%	--	--	4.10%
Next Year	4.60%	--	--	13.00%
Next 5 Years (per annum)	7.40%	--	--	11.67%
Past 5 Years (per annum)	13.21%	--	--	--

Upgrades & Downgrades

Maintains	JP Morgan: Overweight to Overweight	8/15/2024
Maintains	Wells Fargo: Overweight to Overweight	8/9/2024
Maintains	Morgan Stanley: Overweight to Overweight	6/24/2024
Maintains	Morgan Stanley: Overweight to Overweight	5/28/2024
Maintains	Barclays: Equal-Weight to Equal-Weight	5/14/2024
Upgrade	Wells Fargo: Equal-Weight to Overweight	5/14/2024

More Upgrades & Downgrades

Related Tickers

NJR	CPK	NI	NWN	SR	BKH	UGI	SWX	OGS	SR-PA
New Jersey Resources ...	Chesapeake Utilities C...	NiSource Inc.	Northwest Natural Hol...	Spire Inc.	Black Hills Corporation	UGI Corporation	Southwest Gas Holdin...	ONE Gas, Inc.	Spire Inc.
45.71 +0.31%	**116.54** +0.14%	**32.82** -0.12%	**40.26** +0.07%	**65.73** +0.66%	**58.71** +0.09%	**24.64** -0.08%	**72.25** +0.80%	**68.70** +0.51%	**24.34** +0.33%

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NYSE - Nasdaq Real Time Price • USD

Chesapeake Utilities Corporation (CPK)

Follow Compare

116.54 +0.16 (+0.14%)

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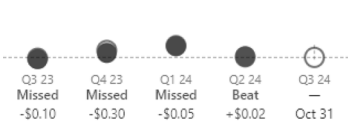
Estimate Trends Fair Value

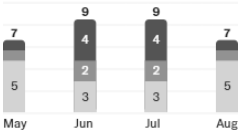
Research Analysis

Earnings Per Share



+0.73 Estimate

Analyst Recommendations



Strong Buy
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Analyst Price Targets

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Earnings Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	5	5	5	6
Avg. Estimate	0.73	1.71	5.39	6.24
Low Estimate	0.69	1.65	5.3	6.15
High Estimate	0.81	1.77	5.43	6.33
Year Ago EPS	0.53	1.26	4.73	5.39

Revenue Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	2	2	5	5
Avg. Estimate	171.85M	231.35M	818.33M	876.53M
Low Estimate	164.8M	222M	777M	835M
High Estimate	178.9M	240.7M	871M	946M
Year Ago Sales	131.55M	185.34M	670.6M	818.33M
Sales Growth (year/est)	30.60%	24.80%	22.00%	7.10%

Earnings History

CURRENCY IN USD	9/30/2023	12/31/2023	3/31/2024	6/30/2024
EPS Est.	0.63	1.56	2.12	0.8
EPS Actual	0.53	1.26	2.07	0.82
Difference	-0.1	-0.3	-0.05	0.02
Surprise %	-15.90%	-19.20%	-2.40%	2.50%

EPS Trend

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Current Estimate	0.73	1.71	5.39	6.24
7 Days Ago	0.73	1.71	5.39	6.24
30 Days Ago	0.79	1.81	5.39	6.24
60 Days Ago	0.79	1.81	5.39	6.26
90 Days Ago	0.79	1.81	5.39	6.26

EPS Revisions

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Up Last 7 Days	--	--	--	--
Up Last 30 Days	2	1	1	1
Down Last 7 Days	--	--	--	--
Down Last 30 Days	--	--	--	--

Growth Estimates

CURRENCY IN USD	CPK	Industry	Sector	S&P 500
Current Qtr.	37.70%	--	--	7.00%
Next Qtr.	35.70%	--	--	11.40%
Current Year	14.00%	--	--	4.10%
Next Year	15.80%	--	--	13.00%
Next 5 Years (per annum)	7.60%	--	--	11.67%
Past 5 Years (per annum)	10.24%	--	--	--

Upgrades & Downgrades

Maintains	Barclays: Equal-Weight to Equal-Weight	8/13/2024
Initiated	Barclays: Equal-Weight	5/30/2024
Maintains	Wells Fargo: Equal-Weight to Equal-Weight	5/10/2024
Maintains	RBC Capital: Outperform to Outperform	3/1/2024
Maintains	Wells Fargo: Equal-Weight to Equal-Weight	2/23/2024
Upgrade	RBC Capital: Sector Perform to Outperform	1/10/2024

More Upgrades & Downgrades

Related Tickers

NJR	SWX	SR	SR-PA	ATO	OGS	CTRI	RGCO	NWN	SPH
New Jersey Resources ...	Southwest Gas Holdin...	Spire Inc.	Spire Inc.	Atmos Energy Corpora...	ONE Gas, Inc.	Centuri Holdings, Inc.	RGC Resources, Inc.	Northwest Natural Hol...	Suburban Propar
45.72 +0.33%	72.25 +0.80%	65.73 +0.66%	24.34 +0.33%	129.44 +0.27%	68.70 +0.51%	16.72 +0.48%	20.53 0.00%	40.26 +0.07%	17.72 +0.09%

NYSE - Nasdaq Real Time Price • USD

New Jersey Resources Corporation (NJR)

Follow Compare

45.74 +0.17 (+0.37%)

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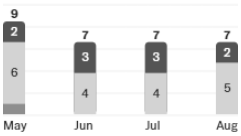
Estimate Trends Fair Value

Research Analysis

Earnings Per Share

Analyst Recommendations



Analyst Price Targets

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Earnings Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	5	1	6	6
Avg. Estimate	0.88	0.87	2.94	2.87
Low Estimate	0.84	0.87	2.93	2.83
High Estimate	0.89	0.87	2.95	2.91
Year Ago EPS	0.3	0.74	2.7	2.94

Revenue Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	1	--	3	3
Avg. Estimate	407M	--	2.03B	2.07B
Low Estimate	407M	--	1.81B	1.84B
High Estimate	407M	--	2.17B	2.22B
Year Ago Sales	331.32M	--	1.96B	2.03B
Sales Growth (year/est)	22.80%	--	3.50%	1.90%

Earnings History

CURRENCY IN USD	9/30/2023	12/31/2023	3/31/2024	6/30/2024
EPS Est.	0.3	0.75	1.33	-0.02
EPS Actual	0.3	0.74	1.41	-0.09
Difference	0	-0.01	0.08	-0.07
Surprise %	0.00%	-1.30%	6.00%	-350.00%

EPS Trend

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Current Estimate	0.88	0.87	2.94	2.87
7 Days Ago	0.88	0.87	2.94	2.87
30 Days Ago	0.82	0.87	2.94	2.88
60 Days Ago	0.8	0.87	2.94	2.88
90 Days Ago	0.85	0.87	2.94	2.86

EPS Revisions

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Up Last 7 Days	--	--	--	--
Up Last 30 Days	3	--	--	--
Down Last 7 Days	--	--	--	--
Down Last 30 Days	--	--	--	--

Growth Estimates

CURRENCY IN USD	NJR	Industry	Sector	S&P 500
Current Qtr.	193.30%	--	--	7.00%
Next Qtr.	17.60%	--	--	11.40%
Current Year	8.90%	--	--	4.10%
Next Year	-2.40%	--	--	13.00%
Next 5 Years (per annum)	6.00%	--	--	11.67%
Past 5 Years (per annum)	4.06%	--	--	--

Upgrades & Downgrades

Maintains	JP Morgan: Neutral to Neutral	8/15/2024
Maintains	Mizuho: Neutral to Neutral	2/5/2024
Maintains	Mizuho: Neutral to Neutral	11/20/2023
Upgrade	JP Morgan: Underweight to Neutral	9/21/2023
Maintains	Wells Fargo: Equal-Weight to Equal-Weight	8/4/2023
Maintains	Guggenheim: Neutral	4/24/2023

More Upgrades & Downgrades

Related Tickers

CPK	NWN	SR	ATO	OGS	SWX	NI	CTRI	UGI	BKH
Chesapeake Utilities C...	Northwest Natural Hol...	Spire Inc.	Atmos Energy Corpora...	ONE Gas, Inc.	Southwest Gas Holdin...	NiSource Inc.	Centuri Holdings, Inc.	UGI Corporation	Black Hills Corporatior
116.54 +0.14%	40.26 +0.07%	65.76 +0.70%	129.32 +0.18%	68.70 +0.51%	72.25 +0.80%	32.81 -0.15%	16.72 +0.48%	24.64 -0.10%	58.76 +0.17%

NYSE - Nasdaq Real Time Price • USD

NiSource Inc. (NI)

Follow Compare

32.80 -0.06 (-0.18%)

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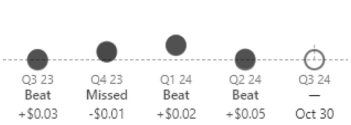
Estimate Trends Fair Value

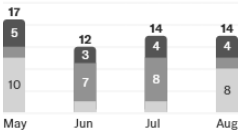
Research Analysis

Earnings Per Share



+0.17 Estimate

Analyst Recommendations



Strong Buy
Buy
Hold
Underperform
Sell

Analyst Price Targets

33.54 Average

30.00 Low

32.80 Current

37.00 High

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Earnings Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	7	8	13	12
Avg. Estimate	0.17	0.55	1.73	1.85
Low Estimate	0.14	0.47	1.69	1.82
High Estimate	0.22	0.68	1.74	1.88
Year Ago EPS	0.19	0.53	1.6	1.73

Revenue Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	2	2	7	8
Avg. Estimate	1.18B	1.53B	6.11B	6.49B
Low Estimate	1.09B	1.47B	5.63B	5.7B
High Estimate	1.26B	1.58B	6.72B	7.82B
Year Ago Sales	--	1.42B	5.51B	6.11B
Sales Growth (year/est)	--	7.30%	11.00%	6.20%

Earnings History

CURRENCY IN USD	9/30/2023	12/31/2023	3/31/2024	6/30/2024
EPS Est.	0.16	0.54	0.83	0.16
EPS Actual	0.19	0.53	0.85	0.21
Difference	0.03	-0.01	0.02	0.05
Surprise %	18.80%	-1.90%	2.40%	31.20%

EPS Trend

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Current Estimate	0.17	0.55	1.73	1.85
7 Days Ago	0.17	0.55	1.72	1.84
30 Days Ago	0.18	0.59	1.72	1.84
60 Days Ago	0.2	0.59	1.72	1.85
90 Days Ago	0.21	0.6	1.72	1.85

EPS Revisions

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Up Last 7 Days	--	1	1	1
Up Last 30 Days	2	3	6	4
Down Last 7 Days	--	--	--	--
Down Last 30 Days	1	--	--	1

Growth Estimates

CURRENCY IN USD	NI	Industry	Sector	S&P 500
Current Qtr.	-10.50%	--	--	7.00%
Next Qtr.	3.80%	--	--	11.40%
Current Year	8.10%	--	--	4.10%
Next Year	6.90%	--	--	13.00%
Next 5 Years (per annum)	7.50%	--	--	11.67%
Past 5 Years (per annum)	14.73%	--	--	--

Upgrades & Downgrades

Maintains	Barclays: Overweight to Overweight	8/13/2024
Maintains	Evercore ISI Group: Outperform to Outperform	8/8/2024
Maintains	BMO Capital: Outperform to Outperform	7/16/2024
Maintains	Barclays: Overweight to Overweight	7/15/2024
Initiated	Mizuho: Outperform	7/11/2024
Reiterates	BMO Capital: Outperform to Outperform	6/18/2024

More Upgrades & Downgrades

Related Tickers

ATO Atmos Energy Corpora... **129.32** +0.18%	**BKH** Black Hills Corporation **58.76** +0.17%	**NJR** New Jersey Resources ... **45.74** +0.37%	**NWN** Northwest Natural Hol... **40.26** +0.07%	**SR** Spire Inc. **65.76** +0.70%	**UGI** UGI Corporation **24.64** -0.10%	**OGS** ONE Gas, Inc. **68.70** +0.51%	**SWX** Southwest Gas Holdin... **72.25** +0.80%	**CPK** Chesapeake Utilities C... **116.54** +0.14%	**CTRI** Centuri Hol **16.72** +0.4

NYSE - Nasdaq Real Time Price • USD

Northwest Natural Holding Company (NWN)

Follow Compare

40.26 +0.03 (+0.07%)

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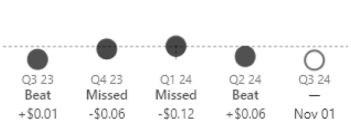
Estimate Trends Fair Value

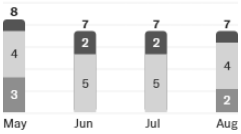
Research Analysis

Earnings Per Share



+1.69 Actual +1.81 Estimate

Analyst Recommendations



Strong Buy
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Analyst Price Targets

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Earnings Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	4	4	5	5
Avg. Estimate	-0.8	1.49	2.31	2.82
Low Estimate	-0.83	1.48	2.3	2.49
High Estimate	-0.78	1.51	2.32	2.97
Year Ago EPS	-0.65	1.21	2.59	2.31

Revenue Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	3	3	5	5
Avg. Estimate	132.47M	386.47M	1.17B	1.22B
Low Estimate	120.3M	341.5M	1.11B	1.04B
High Estimate	147.1M	433M	1.24B	1.32B
Year Ago Sales	141.48M	355.71M	1.2B	1.17B
Sales Growth (year/est)	-6.40%	8.60%	-1.90%	3.60%

Earnings History

CURRENCY IN USD	9/30/2023	12/31/2023	3/31/2024	6/30/2024
EPS Est.	-0.66	1.27	1.81	-0.13
EPS Actual	-0.65	1.21	1.69	-0.07
Difference	0.01	-0.06	-0.12	0.06
Surprise %	1.50%	-4.70%	-6.60%	46.20%

EPS Trend

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Current Estimate	-0.8	1.49	2.31	2.82
7 Days Ago	-0.8	1.49	2.31	2.82
30 Days Ago	-0.78	1.5	2.29	2.82
60 Days Ago	-0.77	1.49	2.28	2.81
90 Days Ago	-0.77	1.49	2.28	2.81

EPS Revisions

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Up Last 7 Days	--	--	--	--
Up Last 30 Days	--	--	4	2
Down Last 7 Days	--	--	--	--
Down Last 30 Days	--	--	--	--

Growth Estimates

CURRENCY IN USD	NWN	Industry	Sector	S&P 500
Current Qtr.	-23.10%	--	--	7.00%
Next Qtr.	23.10%	--	--	11.40%
Current Year	-10.80%	--	--	4.10%
Next Year	22.10%	--	--	13.00%
Next 5 Years (per annum)	2.80%	--	--	11.67%
Past 5 Years (per annum)	8.22%	--	--	--

Upgrades & Downgrades

Upgrade	Janney Montgomery Scott: Neutral to Buy	8/5/2024
Maintains	Stifel: Buy to Buy	5/7/2024
Initiated	Janney Montgomery Scott: Neutral	1/31/2024
Maintains	RBC Capital: Sector Perform to Sector Perform	9/6/2023
Maintains	Wells Fargo: Equal-Weight to Equal-Weight	8/4/2023
Maintains	Guggenheim: Neutral to Neutral	7/7/2023

More Upgrades & Downgrades

Related Tickers

BKH	NJR	UGI	ATO	SWX	SR	OGS	NI	CPK	CTRI
Black Hills Corporation	New Jersey Resources ...	UGI Corporation	Atmos Energy Corpora...	Southwest Gas Holdin...	Spire Inc.	ONE Gas, Inc.	NiSource Inc.	Chesapeake Utilities C...	Centuri Holdings, Inc
58.71 +0.09%	45.74 +0.37%	24.61 -0.22%	129.21 +0.09%	72.25 +0.80%	65.76 +0.70%	68.70 +0.51%	32.78 -0.24%	116.54 +0.14%	16.72 +0.48%

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ONE Gas, Inc. (OGS)

Follow Compare

68.70 +0.35 (+0.51%)

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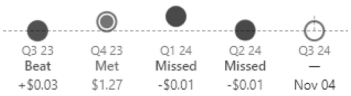
Estimate Trends Fair Value

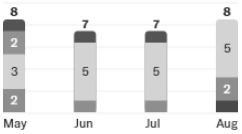
Research Analysis

Earnings Per Share



+0.43 Estimate

Analyst Recommendations



Strong Buy
Buy
Hold
Underperform
Sell

Analyst Price Targets

66.79 Average

62.00 Low

68.70 Current

71.00 High

View More →

Earnings Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	4	4	4	5
Avg. Estimate	0.43	1.22	3.84	4.15
Low Estimate	0.39	1.2	3.83	4.05
High Estimate	0.5	1.27	3.85	4.3
Year Ago EPS	0.45	1.27	4.14	3.84

Revenue Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	1	1	4	4
Avg. Estimate	356.81M	682.3M	2.3B	2.48B
Low Estimate	356.81M	682.3M	2.15B	2.25B
High Estimate	356.81M	682.3M	2.47B	2.65B
Year Ago Sales	391.77M	605.92M	2.37B	2.3B
Sales Growth (year/est)	-8.90%	12.60%	-3.20%	8.00%

Earnings History

CURRENCY IN USD	9/30/2023	12/31/2023	3/31/2024	6/30/2024
EPS Est.	0.42	1.27	1.76	0.49
EPS Actual	0.45	1.27	1.75	0.48
Difference	0.03	0	-0.01	-0.01
Surprise %	7.10%	0.00%	-0.60%	-2.00%

EPS Trend

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Current Estimate	0.43	1.22	3.84	4.15
7 Days Ago	0.41	1.23	3.84	4.17
30 Days Ago	0.41	1.19	3.82	4.11
60 Days Ago	0.39	1.18	3.83	4.11
90 Days Ago	0.39	1.18	3.84	4.12

EPS Revisions

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Up Last 7 Days	--	--	--	--
Up Last 30 Days	2	2	--	1
Down Last 7 Days	--	--	--	--
Down Last 30 Days	--	--	--	1

Growth Estimates

CURRENCY IN USD	OGS	Industry	Sector	S&P 500
Current Qtr.	-4.40%	--	--	7.00%
Next Qtr.	-3.90%	--	--	11.40%
Current Year	-7.20%	--	--	4.10%
Next Year	8.10%	--	--	13.00%
Next 5 Years (per annum)	5.00%	--	--	11.67%
Past 5 Years (per annum)	8.18%	--	--	--

Upgrades & Downgrades

Maintains	Wells Fargo: Equal-Weight to Equal-Weight	8/7/2024
Maintains	Morgan Stanley: Equal-Weight to Equal-Weight	6/24/2024
Maintains	Mizuho: Neutral to Neutral	6/5/2024
Maintains	Morgan Stanley: Equal-Weight to Equal-Weight	5/28/2024
Maintains	Mizuho: Neutral to Neutral	4/19/2024
Initiated	UBS: Sell	4/12/2024

More Upgrades & Downgrades

Related Tickers

SR Spire Inc. 65.76 +0.70%	CTRI Centuri Holdings, Inc. 16.72 +0.48%	CPK Chesapeake Utilities C... 116.54 +0.14%	NJR New Jersey Resources ... 45.72 +0.32%	SWX Southwest Gas Holdin... 72.25 +0.80%	NWN Northwest Natural Hol... 40.26 +0.07%	ATO Atmos Energy Corpora... 129.21 +0.09%	SR-PA Spire Inc. 24.34 +0.33%	UGI UGI Corporation 24.60 -0.24%	RGCO RGC Resour 20.53 0.0

NYSE - Delayed Quote • USD

Southwest Gas Holdings, Inc. (SWX)

Follow Compare

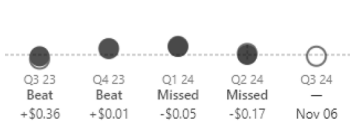
72.00 +0.32 (+0.44%)

As of 10:17 AM EDT. Market Open.

Estimate Trends Fair Value

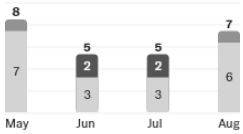
Research Analysis

Earnings Per Share



+0.31 Actual +0.48 Estimate

Analyst Recommendations



Strong Buy
Buy
Hold
Underperform
Sell

Analyst Price Targets

View More →

Earnings Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	3	3	3	3
Avg. Estimate	0.12	1.25	3.06	3.68
Low Estimate	-0.03	1.17	2.83	3.48
High Estimate	0.22	1.3	3.19	3.84
Year Ago EPS	0.1	1.13	3.36	3.06

Revenue Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	2	2	3	3
Avg. Estimate	1.11B	1.28B	5.17B	5.18B
Low Estimate	1.1B	1.17B	5.03B	4.49B
High Estimate	1.13B	1.39B	5.28B	5.56B
Year Ago Sales	--	1.37B	5.43B	5.17B
Sales Growth (year/est)	--	-6.50%	-4.90%	0.30%

Earnings History

CURRENCY IN USD	9/30/2023	12/31/2023	3/31/2024	6/30/2024
EPS Est.	-0.26	1.12	1.42	0.48
EPS Actual	0.1	1.13	1.37	0.31
Difference	0.36	0.01	-0.05	-0.17
Surprise %	138.50%	0.90%	-3.50%	-35.40%

EPS Trend

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Current Estimate	0.12	1.25	3.06	3.68
7 Days Ago	0.12	1.25	3.06	3.68
30 Days Ago	0.21	1.2	3.28	3.78
60 Days Ago	0.26	1.18	3.34	3.73
90 Days Ago	0.23	1.16	3.35	3.82

EPS Revisions

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Up Last 7 Days	--	--	--	--
Up Last 30 Days	--	1	--	1
Down Last 7 Days	--	--	--	--
Down Last 30 Days	--	--	--	--

Growth Estimates

CURRENCY IN USD	SWX	Industry	Sector	S&P 500
Current Qtr.	20.00%	--	--	7.00%
Next Qtr.	10.60%	--	--	11.40%
Current Year	-8.90%	--	--	4.10%
Next Year	20.30%	--	--	13.00%
Next 5 Years (per annum)	4.00%	--	--	11.67%
Past 5 Years (per annum)	1.35%	--	--	--

Upgrades & Downgrades

Maintains	JP Morgan: Neutral to Neutral	8/15/2024
Maintains	Wells Fargo: Equal-Weight to Equal-Weight	8/7/2024
Maintains	Citigroup: Neutral to Neutral	2/29/2024
Maintains	Citigroup: Neutral to Neutral	10/10/2023
Maintains	Citigroup: Neutral to Neutral	6/1/2023
Downgrade	RBC Capital: Sector Perform to Underweight	3/6/2023

More Upgrades & Downgrades

Related Tickers

CPK	CTRI	NJR	SR	NWN	OGS	ATO	BKH	SR-PA	SPH
Chesapeake Utilities C...	Centuri Holdings, Inc.	New Jersey Resources ...	Spire Inc.	Northwest Natural Hol...	ONE Gas, Inc.	Atmos Energy Corpora...	Black Hills Corporation	Spire Inc.	Suburban Prop
116.54 +0.14%	16.72 +0.48%	45.72 +0.32%	65.76 +0.70%	40.26 +0.07%	68.70 +0.51%	129.21 +0.09%	58.71 +0.09%	24.34 +0.33%	17.72 +0.09

NYSE - Nasdaq Real Time Price • USD

Spire Inc. (SR)

Follow Compare

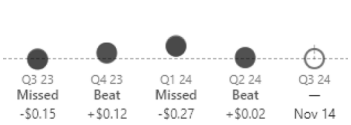
65.76 +0.46 (+0.70%)

As of 10:39 AM EDT. Market Open.

Estimate Trends Fair Value

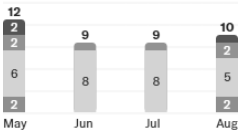
Research Analysis

Earnings Per Share



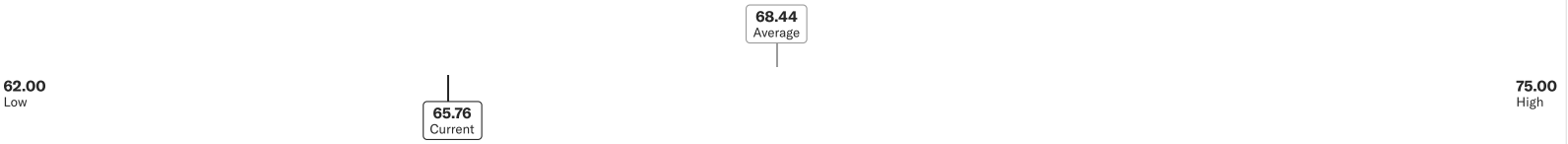
-0.5 Estimate

Analyst Recommendations



Strong Buy
Buy
Hold
Underperform
Sell

Analyst Price Targets



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Earnings Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	6	2	7	8
Avg. Estimate	-0.5	1.45	4.25	4.56
Low Estimate	-0.88	1.36	4.2	4.48
High Estimate	-0.22	1.55	4.38	4.62
Year Ago EPS	-0.78	1.47	4.05	4.25

Revenue Estimate

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
No. of Analysts	1	1	6	6
Avg. Estimate	285M	840.72M	2.74B	2.75B
Low Estimate	285M	840.72M	2.58B	2.06B
High Estimate	285M	840.72M	2.81B	3.05B
Year Ago Sales	310.4M	705.28M	2.67B	2.74B
Sales Growth (year/est)	-8.20%	19.20%	2.70%	0.40%

Earnings History

CURRENCY IN USD	9/30/2023	12/31/2023	3/31/2024	6/30/2024
EPS Est.	-0.63	1.35	3.72	-0.16
EPS Actual	-0.78	1.47	3.45	-0.14
Difference	-0.15	0.12	-0.27	0.02
Surprise %	-23.80%	8.90%	-7.30%	12.50%

EPS Trend

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Current Estimate	-0.5	1.45	4.25	4.56
7 Days Ago	-0.5	1.45	4.25	4.56
30 Days Ago	-0.37	1.45	4.32	4.58
60 Days Ago	-0.39	1.49	4.31	4.57
90 Days Ago	-0.4	1.49	4.32	4.58

EPS Revisions

CURRENCY IN USD	Current Qtr. (Sep 2024)	Next Qtr. (Dec 2024)	Current Year (2024)	Next Year (2025)
Up Last 7 Days	--	--	--	--
Up Last 30 Days	1	--	--	--
Down Last 7 Days	--	--	--	--
Down Last 30 Days	--	--	1	1

Growth Estimates

CURRENCY IN USD	SR	Industry	Sector	S&P 500
Current Qtr.	35.90%	--	--	7.00%
Next Qtr.	-1.40%	--	--	11.40%
Current Year	4.90%	--	--	4.10%
Next Year	7.30%	--	--	13.00%
Next 5 Years (per annum)	6.36%	--	--	11.67%
Past 5 Years (per annum)	24.42%	--	--	--

Upgrades & Downgrades

Maintains	Stifel: Hold to Hold	8/1/2024
Maintains	Morgan Stanley: Equal-Weight to Equal-Weight	6/24/2024
Maintains	Morgan Stanley: Equal-Weight to Equal-Weight	5/28/2024
Maintains	Wells Fargo: Equal-Weight to Equal-Weight	5/2/2024
Downgrade	Mizuho: Buy to Neutral	5/2/2024
Initiated	Ladenburg Thalmann: Neutral	4/26/2024

More Upgrades & Downgrades

Related Tickers

OGS	CPK	NJR	CTRI	SWX	ATO	NWN	BKH	NI	UGI
ONE Gas, Inc.	Chesapeake Utilities C...	New Jersey Resources ...	Centuri Holdings, Inc.	Southwest Gas Holdin...	Atmos Energy Corpora...	Northwest Natural Hol...	Black Hills Corporation	NiSource Inc.	UGI Co
68.70 +0.51%	116.54 +0.14%	45.72 +0.32%	16.72 +0.48%	72.25 +0.80%	129.21 +0.09%	40.26 +0.07%	58.70 +0.06%	32.79 -0.21%	24.60

Atmos Energy (ATO)
(Real Time Quote from BATS)

$128.92 USD

-0.17 (-0.13%)
Updated Aug 29, 2024 10:56 AM ET

Add to portfolio

Zacks Rank:
3-Hold 3
Style Scores:
D Value | F Growth | C Momentum | F VGM
Industry Rank:
Top 8% (21 out of 251)
Industry: Utility - Gas Distribution

View All Zacks #1 Ranked Stocks

Company Summary

Enter Symbol

Founded in 1906, Atmos Energy Corporation, along with its subsidiaries, is engaged in regulated natural gas distribution and storage business. The company serves nearly 3.3 million customers in more than 1,400 communities in eight states from the Blue Ridge Mountains in the East to the Rocky Mountains in the West. The company operates more than 73,000 miles of transmission and distribution lines as well as 5,700 miles of interstate pipelines. Atmos Energy's pipelines are connected to 37 different pipelines across eight states, thereby providing supplier diversity.

Since 2011, Atmos Energy's operating strategy has been focused on modernizing its transmission ...

Read Full Company Summary for ATO here

General Information

Atmos Energy Corporation
1800 THREE LINCOLN CENTRE 5430 LBJ FREEWAY
DALLAS, TX 75240
Phone: 972-934-9227
Fax: 972-855-3040
Web: http://www.atmosenergy.com
Email: investorrelations@atmosenergy.com

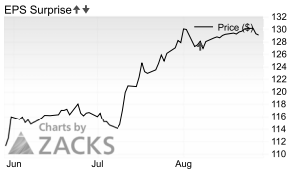
Industry	Utility - Gas Distribution
Sector	Utilities
Fiscal Year End	September
Last Reported Quarter	6/30/2024
Exp Earnings Date	11/13/2024

EPS Information

Current Quarter EPS Consensus Estimate	0.84
Current Year EPS Consensus Estimate	6.79
Estimated Long-Term EPS Growth Rate	7.00
Exp Earnings Date	11/13/2024

Price and EPS Surprise Chart

1 Month | 3 Months | 6 Months | YTD | 1 Year



Interactive Chart | Fundamental Chart

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	1.94
30 Days Ago	1.94
60 Days Ago	1.94
90 Days Ago	1.94

Price And Volume Information

Zacks Rank	
Yesterday's Close	129.09
52 Week High	132.24
52 Week Low	101.00
Beta	0.67
20 Day Moving Average	736,106.12
Target Price Consensus	133.29

% Price Change	
4 Week	0.95
12 Week	12.24
YTD	11.38

% Price Change Relative to S&P 500	
4 Week	-0.32
12 Week	7.46
YTD	-5.00

Share Information	
Shares Outstanding (millions)	155.23
Market Capitalization (millions)	20,039.01
Short Ratio	NA
Last Split Date	5/17/1994

Dividend Information	
Dividend Yield	2.49%
Annual Dividend	$3.22
Payout Ratio	0.47
Change in Payout Ratio	-0.02
Last Dividend Payout / Amount	NA / $0.00

Fundamental Ratios

P/E	
P/E (F1)	19.03
Trailing 12 Months	18.96
PEG Ratio	2.72

EPS Growth	
vs. Previous Year	14.89%
vs. Previous Quarter	-62.11%

Sales Growth	
vs. Previous Year	5.86%
vs. Previous Quarter	-57.41%

Price Ratios	
Price/Book	1.60
Price/Cash Flow	12.83
Price / Sales	4.89

ROE	
6/30/24	8.94
3/31/24	9.01
12/31/23	8.62

ROA	
6/30/24	4.32
3/31/24	4.35
12/31/23	4.15

Current Ratio	
6/30/24	1.73
3/31/24	1.36
12/31/23	1.44

Quick Ratio	
6/30/24	1.57
3/31/24	1.22
12/31/23	1.25

Operating Margin	
6/30/24	25.09
3/31/24	24.65
12/31/23	23.43

Net Margin	
6/30/24	25.09
3/31/24	24.65
12/31/23	23.43

Pre-Tax Margin	
6/30/24	29.64
3/31/24	28.81
12/31/23	26.82

Book Value	
6/30/24	78.48
3/31/24	77.03
12/31/23	74.74

Inventory Turnover	
6/30/24	9.01
3/31/24	8.58
12/31/23	8.36

Debt-to-Equity	
6/30/24	0.65
3/31/24	0.65
12/31/23	0.67

Debt to Capital	
6/30/24	39.24
3/31/24	39.31
12/31/23	40.04

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Chesapeake Utilities (CPK)
(Real Time Quote from BATS)

$116.08 USD

-0.30 (-0.26%)
Updated Aug 29, 2024 10:58 AM ET

Add to portfolio

Zacks Rank:
4-Sell
Style Scores:
D Value | C Growth | D Momentum | D VGM
Industry Rank:
Top 8% (21 out of 251)
Industry: Utility - Gas Distribution

View All Zacks #1 Ranked Stocks
Chesapeake Utilities (CPK) Quote Overview » More Research » Chesapeake Utilities (CPK) Full Company Report

Company Summary

Enter Symbol

Chesapeake Utilities Corporation is a utility company engaged in natural gas distribution and transmission, propane distribution and marketing, advanced information services and other related businesses.Chesapeake's three natural gas distribution divisions serve residential, commercial and industrial customers in southern Delaware, Maryland's Eastern Shore and Florida. The Company's natural gas transmission subsidiary operates an interstate pipeline system that transports gas from various points in Pennsylvania to Delaware and Maryland distribution divisions.

General Information

Chesapeake Utilities Corporation
500 ENERGY LANE
DOVER, DE 19901
Phone: 302-734-6799
Fax: 302-734-6750
Web: http://www.chpk.com
Email: hwatkins@chpk.com

Industry	Utility - Gas Distribution
Sector	Utilities
Fiscal Year End	December
Last Reported Quarter	6/30/2024
Exp Earnings Date	11/7/2024

EPS Information

Current Quarter EPS Consensus Estimate	0.69
Current Year EPS Consensus Estimate	5.39
Estimated Long-Term EPS Growth Rate	NA
Exp Earnings Date	11/7/2024

Research for CPK

1 Month | 3 Months | 6 Months | YTD | 1 Year

Interactive Chart | Fundamental Chart

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	2.00
30 Days Ago	2.00
60 Days Ago	2.00
90 Days Ago	2.00

Price And Volume Information

Zacks Rank	
Yesterday's Close	116.38
52 Week High	120.84
52 Week Low	83.80
Beta	0.60
20 Day Moving Average	83,187.00
Target Price Consensus	124.71

% Price Change	
4 Week	-1.40
12 Week	5.63
YTD	10.18

% Price Change Relative to S&P 500	
4 Week	-2.63
12 Week	1.13
YTD	-6.02

Share Information	
Shares Outstanding (millions)	22.45
Market Capitalization (millions)	2,612.72
Short Ratio	NA
Last Split Date	9/9/2014

Dividend Information	
Dividend Yield	2.20%
Annual Dividend	$2.56
Payout Ratio	0.48
Change in Payout Ratio	0.05
Last Dividend Payout / Amount	6/13/2024 / $0.64

Fundamental Ratios

P/E	
P/E (F1)	21.59
Trailing 12 Months	22.00
PEG Ratio	NA

EPS Growth	
vs. Previous Year	-4.44%
vs. Previous Quarter	-59.05%

Sales Growth	
vs. Previous Year	22.63%
vs. Previous Quarter	-32.34%

Price Ratios	
Price/Book	2.01
Price/Cash Flow	11.82
Price / Sales	3.58

ROE	
6/30/24	9.51
3/31/24	10.17
12/31/23	10.19

ROA	
6/30/24	3.63
3/31/24	3.91
12/31/23	3.93

Current Ratio	
6/30/24	0.38
3/31/24	0.46
12/31/23	0.48

Quick Ratio	
6/30/24	0.32
3/31/24	0.38
12/31/23	0.40

Operating Margin	
6/30/24	15.28
3/31/24	15.50
12/31/23	14.57

Net Margin	
6/30/24	13.61
3/31/24	13.90
12/31/23	13.01

Pre-Tax Margin	
6/30/24	18.24
3/31/24	18.63
12/31/23	17.19

Book Value	
6/30/24	57.49
3/31/24	57.52
12/31/23	70.02

Inventory Turnover	
6/30/24	15.91
3/31/24	15.65
12/31/23	15.94

Debt-to-Equity	
6/30/24	0.91
3/31/24	0.93
12/31/23	0.95

Debt to Capital	
6/30/24	47.65
3/31/24	48.06
12/31/23	48.79

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NewJersey Resources (NJR)
(Real Time Quote from BATS)

$45.58 USD
+0.01 (0.02%)
Updated Aug 29, 2024 10:58 AM ET

Add to portfolio

Zacks Rank:
2-Buy

Style Scores:
C Value | F Growth | C Momentum | D VGM

Industry Rank:
Top 8% (21 out of 251)

Industry: Utility - Gas Distribution

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NewJersey Resources (NJR) Quote Overview » More Research » NewJersey Resources (NJR) Full Company Report

Company Summary

Enter Symbol

New Jersey Resources Corporation is an energy services holding company that, through its subsidiaries, provides safe and reliable natural gas and clean energy services, including transportation, distribution, asset management and home services. NJR is composed of five primary businesses: New Jersey Natural Gas, NJR's principal subsidiary, operates and maintains the natural gas transportation and distribution infrastructure to serve the customers. NJR Clean Energy Ventures invests in, owns and operates solar and onshore wind projects. NJR Energy Services manages a diversified portfolio of natural gas transportation and storage assets and provides physical natural gas services and customized energy solutions. NJR Midstream serves customers from local distributors and producers to electric generators and wholesale marketers. NJR Home Services provides service contracts as well as heating, central air conditioning, water heaters, standby generators, solar and other indoor and outdoor comfort products.

General Information

NewJersey Resources Corporation
1415 Wyckoff Road
Wall, NJ 07719
Phone: 732-938-1480
Fax: 732-938-3154
Web: http://www.njresources.com
Email: aprior@njresources.com

Industry	Utility - Gas Distribution
Sector	Utilities
Fiscal Year End	September
Last Reported Quarter	6/30/2024
Exp Earnings Date	11/19/2024

EPS Information

Current Quarter EPS Consensus Estimate	0.89
Current Year EPS Consensus Estimate	2.95
Estimated Long-Term EPS Growth Rate	NA
Exp Earnings Date	11/19/2024

Price and EPS Surprise Chart

1 Month | 3 Months | 6 Months | YTD | 1 Year

Interactive Chart | Fundamental Chart

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	2.33
30 Days Ago	2.33
60 Days Ago	2.33
90 Days Ago	2.60

Price And Volume Information

Zacks Rank	
Yesterday's Close	45.57
52 Week High	47.37
52 Week Low	38.92
Beta	0.60
20 Day Moving Average	448,661.94
Target Price Consensus	47.20

% Price Change	
4 Week	-2.52
12 Week	3.64
YTD	2.22

% Price Change Relative to S&P 500	
4 Week	-3.74
12 Week	-0.77
YTD	-12.81

Share Information	
Shares Outstanding (millions)	99.17
Market Capitalization (millions)	4,519.07
Short Ratio	NA
Last Split Date	3/4/2015

Dividend Information	
Dividend Yield	3.69%
Annual Dividend	$1.68
Payout Ratio	0.71
Change in Payout Ratio	0.08
Last Dividend Payout / Amount	6/12/2024 / $0.42

Fundamental Ratios

P/E	
P/E (F1)	15.47
Trailing 12 Months	19.39
PEG Ratio	NA

EPS Growth	
vs. Previous Year	-190.00%
vs. Previous Quarter	-106.43%

Sales Growth	
vs. Previous Year	4.38%
vs. Previous Quarter	-58.10%

Price Ratios	
Price/Book	2.10
Price/Cash Flow	10.72
Price / Sales	2.61

ROE	
6/30/24	11.06
3/31/24	12.16
12/31/23	11.13

ROA	
6/30/24	3.47
3/31/24	3.81
12/31/23	3.46

Current Ratio	
6/30/24	0.60
3/31/24	0.70
12/31/23	0.70

Quick Ratio	
6/30/24	0.41
3/31/24	0.56
12/31/23	0.47

Operating Margin	
6/30/24	13.38
3/31/24	14.55
12/31/23	13.12

Net Margin	
6/30/24	13.61
3/31/24	14.46
12/31/23	13.96

Pre-Tax Margin	
6/30/24	16.81
3/31/24	16.69
12/31/23	15.98

Book Value	
6/30/24	21.61
3/31/24	22.17
12/31/23	21.13

Inventory Turnover	
6/30/24	6.25
3/31/24	6.04
12/31/23	6.06

Debt-to-Equity	
6/30/24	1.30
3/31/24	1.25
12/31/23	1.33

Debt to Capital	
6/30/24	56.59
3/31/24	55.58
12/31/23	57.00

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NiSource (NI)
(Real Time Quote from BATS)
$32.70 USD
-0.16 (-0.49%)
Updated Aug 29, 2024 10:58 AM ET

Add to portfolio

Zacks Rank:
2-Buy
Style Scores:
C Value | D Growth | C Momentum | C VGM
Industry Rank:
Top 31% (77 out of 251)
Industry: Utility - Electric Power

View All Zacks #1 Ranked Stocks
NiSource (NI) Quote Overview » More Research » NiSource (NI) Full Company Report

Company Summary

Enter Symbol

NiSource Inc., a Merrillville, IN-based energy holding company, was founded in 1912. The company, together with its subsidiaries, provides natural gas, electricity and other products and services in the United States. Its operating subsidiaries deliver energy to nearly 4 million customers in six states — Ohio, Pennsylvania, Virginia, Kentucky, Maryland and Indiana.

NiSource has one of the nation's largest natural gas distribution networks as measured by number of customers. NiSource's principal subsidiary is NiSource Gas Distribution Group, Inc., which is a natural gas distribution holding company. The company generates the majority of its operating income from ...

Read Full Company Summary for NI here

General Information

NiSource, Inc
801 East 86th Avenue
Merrillville, IN 46410
Phone: 877-647-5990
Fax: 219-647-6085
Web: http://www.nisource.com
Email: investors@nisource.com

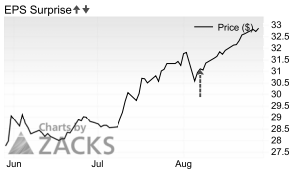
Industry	Utility - Electric Power
Sector	Utilities
Fiscal Year End	December
Last Reported Quarter	6/30/2024
Exp Earnings Date	11/6/2024

EPS Information

Current Quarter EPS Consensus Estimate	0.16
Current Year EPS Consensus Estimate	1.72
Estimated Long-Term EPS Growth Rate	6.00
Exp Earnings Date	11/6/2024

Price and EPS Surprise Chart

1 Month | 3 Months | 6 Months | YTD | 1 Year



Interactive Chart | Fundamental Chart

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	1.00
30 Days Ago	1.00
60 Days Ago	1.00
90 Days Ago	1.00

Price And Volume Information

Zacks Rank	
Yesterday's Close	32.86
52 Week High	33.10
52 Week Low	22.86
Beta	0.50
20 Day Moving Average	4,328,354.50
Target Price Consensus	33.65

% Price Change	
4 Week	5.15
12 Week	14.38
YTD	23.77

% Price Change Relative to S&P 500	
4 Week	3.84
12 Week	9.50
YTD	5.57

Share Information	
Shares Outstanding (millions)	448.51
Market Capitalization (millions)	14,738.03
Short Ratio	NA
Last Split Date	2/23/1998

Dividend Information	
Dividend Yield	3.23%
Annual Dividend	$1.06
Payout Ratio	0.60
Change in Payout Ratio	-0.05
Last Dividend Payout / Amount	7/30/2024 / $0.26

Fundamental Ratios

P/E	
P/E (F1)	19.08
Trailing 12 Months	18.46
PEG Ratio	3.18

EPS Growth	
vs. Previous Year	90.91%
vs. Previous Quarter	-75.29%

Sales Growth	
vs. Previous Year	-0.49%
vs. Previous Quarter	-36.43%

Price Ratios	
Price/Book	1.50
Price/Cash Flow	8.10
Price / Sales	2.81

ROE	
6/30/24	9.15
3/31/24	9.56
12/31/23	10.10

ROA	
6/30/24	2.78
3/31/24	2.69
12/31/23	2.60

Current Ratio	
6/30/24	0.78
3/31/24	0.66
12/31/23	0.85

Quick Ratio	
6/30/24	0.63
3/31/24	0.56
12/31/23	0.76

Operating Margin	
6/30/24	15.65
3/31/24	14.79
12/31/23	13.37

Net Margin	
6/30/24	14.76
3/31/24	14.23
12/31/23	12.98

Pre-Tax Margin	
6/30/24	17.69
3/31/24	16.52
12/31/23	14.78

Book Value	
6/30/24	21.89
3/31/24	21.85
12/31/23	23.34

Inventory Turnover	
6/30/24	5.92
3/31/24	5.84
12/31/23	6.43

Debt-to-Equity	
6/30/24	1.30
3/31/24	1.20
12/31/23	1.15

Debt to Capital	
6/30/24	56.61
3/31/24	54.48
12/31/23	52.17

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Northwest Natural (NWN)
(Real Time Quote from BATS)
$40.12 USD
-0.11 (-0.27%)
Updated Aug 29, 2024 10:58 AM ET

Add to portfolio

Zacks Rank:
2-Buy
Style Scores:
A Value | C Growth | D Momentum | B VGM
Industry Rank:
Top 8% (21 out of 251)
Industry: Utility - Gas Distribution

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Northwest Natural (NWN) Quote Overview » More Research » Northwest Natural (NWN) Full Company Report

Company Summary

Enter Symbol

Northwest Natural Holding Company builds and maintains natural gas distribution systems, as well as invests in natural gas pipeline projects through its subsidiaries. It serves residential, commercial and industrial customers primarily in the United States, Canada and Service Territory. Northwest Natural Holding Company, formerly known as NW Natural Gas Company, is headquartered in Portland, Oregon.

General Information

Northwest Natural Gas Company
250 S.W. TAYLOR STREET
PORTLAND, OR 97204
Phone: 503-226-4211
Fax: 503-273-4822
Web: http://www.nwnaturalholdings.com
Email: nikki.sparley@nwnatural.com

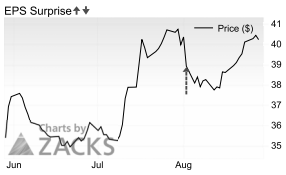
Industry	Utility - Gas Distribution
Sector	Utilities
Fiscal Year End	December
Last Reported Quarter	6/30/2024
Exp Earnings Date	11/1/2024

EPS Information

Current Quarter EPS Consensus Estimate	-0.79
Current Year EPS Consensus Estimate	2.32
Estimated Long-Term EPS Growth Rate	NA
Exp Earnings Date	11/1/2024

Research for NWN

1 Month | 3 Months | 6 Months | YTD | 1 Year



Interactive Chart | Fundamental Chart

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	2.33
30 Days Ago	2.67
60 Days Ago	2.67
90 Days Ago	2.67

Price And Volume Information

Zacks Rank	
Yesterday's Close	40.44
52 Week High	41.66
52 Week Low	34.82
Beta	0.57
20 Day Moving Average	256,695.91
Target Price Consensus	41.20

% Price Change	
4 Week	0.63
12 Week	9.02
YTD	3.31

% Price Change Relative to S&P 500	
4 Week	-0.63
12 Week	4.38
YTD	-11.88

Share Information	
Shares Outstanding (millions)	38.67
Market Capitalization (millions)	1,555.70
Short Ratio	NA
Last Split Date	9/9/1996

Dividend Information	
Dividend Yield	4.85%
Annual Dividend	$1.95
Payout Ratio	0.89
Change in Payout Ratio	0.12
Last Dividend Payout / Amount	7/31/2024 / $0.49

Fundamental Ratios

P/E	
P/E (F1)	17.38
Trailing 12 Months	18.45
PEG Ratio	NA

EPS Growth	
vs. Previous Year	-333.33%
vs. Previous Quarter	-104.14%

Sales Growth	
vs. Previous Year	-10.99%
vs. Previous Quarter	-51.16%

Price Ratios	
Price/Book	1.16
Price/Cash Flow	6.64
Price / Sales	1.36

ROE	
6/30/24	6.31
3/31/24	6.76
12/31/23	7.52

ROA	
6/30/24	1.71
3/31/24	1.82
12/31/23	2.01

Current Ratio	
6/30/24	0.97
3/31/24	1.15
12/31/23	0.86

Quick Ratio	
6/30/24	0.73
3/31/24	0.93
12/31/23	0.70

Operating Margin	
6/30/24	7.18
3/31/24	7.36
12/31/23	7.84

Net Margin	
6/30/24	7.18
3/31/24	7.36
12/31/23	7.84

Pre-Tax Margin	
6/30/24	9.85
3/31/24	10.06
12/31/23	10.54

Book Value	
6/30/24	34.83
3/31/24	35.33
12/31/23	34.91

Inventory Turnover	
6/30/24	6.89
3/31/24	7.96
12/31/23	9.79

Debt-to-Equity	
6/30/24	1.17
3/31/24	1.17
12/31/23	1.11

Debt to Capital	
6/30/24	53.90
3/31/24	53.96
12/31/23	52.61

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Zacks Research is Reported On:

ONE Gas (OGS)
(Real Time Quote from BATS)

$68.33 USD

-0.02 (-0.03%)
Updated Aug 29, 2024 10:58 AM ET

Add to portfolio

Zacks Rank:
3-Hold

Style Scores:
B Value | D Growth | D Momentum | D VGM

Industry Rank:
Top 8% (21 out of 251)

Industry: Utility - Gas Distribution

View All Zacks #1 Ranked Stocks

Company Summary

Enter Symbol

Headquartered in Tulsa, OK, ONE Gas, Inc. is a 100% regulated natural gas distribution utility. The company provides natural gas distribution services to more than 2.3 million customers in Oklahoma, Kansas and Texas. The company has been registering an increase in average customer count in these three states since 2014. As of Dec 31, 2023, it operated 44,800 miles of natural gas distribution and transmission pipelines.

ONE Gas is the successor to the company founded in 1906 as Oklahoma Natural Gas Company, which became ONEOK, Inc. in 1980. On Jan 31, 2014, ONE Gas officially separated from ONEOK.

The company operates through three divisions, namely ...

Read Full Company Summary for OGS here

General Information

ONE Gas, Inc
15 EAST FIFTH STREET
TULSA, OK 74103
Phone: 918-947-7000
Fax: NA
Web: http://www.onegas.com
Email: ir@onegas.com

Industry	Utility - Gas Distribution
Sector	Utilities
Fiscal Year End	December
Last Reported Quarter	6/30/2024
Exp Earnings Date	11/4/2024

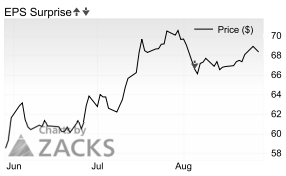
EPS Information

Current Quarter EPS Consensus Estimate	0.43
Current Year EPS Consensus Estimate	3.84
Estimated Long-Term EPS Growth Rate	5.00
Exp Earnings Date	11/4/2024

Research for OGS

Price and EPS Surprise Chart

1 Month | 3 Months | 6 Months | YTD | 1 Year



Interactive Chart | Fundamental Chart

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	3.00
30 Days Ago	3.00
60 Days Ago	3.00
90 Days Ago	3.00

Price And Volume Information

Zacks Rank	
Yesterday's Close	68.35
52 Week High	75.89
52 Week Low	55.50
Beta	0.66
20 Day Moving Average	362,816.66
Target Price Consensus	66.07

% Price Change	
4 Week	-1.84
12 Week	11.23
YTD	7.27

% Price Change Relative to S&P 500	
4 Week	-3.06
12 Week	6.49
YTD	-8.51

Share Information	
Shares Outstanding (millions)	56.65
Market Capitalization (millions)	3,872.32
Short Ratio	NA
Last Split Date	NA

Dividend Information	
Dividend Yield	3.86%
Annual Dividend	$2.64
Payout Ratio	0.67
Change in Payout Ratio	0.05
Last Dividend Payout / Amount	8/14/2024 / $0.66

Fundamental Ratios

P/E	
P/E (F1)	17.80
Trailing 12 Months	17.30
PEG Ratio	3.56

EPS Growth	
vs. Previous Year	-17.24%
vs. Previous Quarter	-72.57%

Sales Growth	
vs. Previous Year	-11.05%
vs. Previous Quarter	-53.30%

Price Ratios	
Price/Book	1.37
Price/Cash Flow	7.42
Price / Sales	1.89

ROE	
6/30/24	8.04
3/31/24	8.37
12/31/23	8.63

ROA	
6/30/24	2.89
3/31/24	3.01
12/31/23	3.09

Current Ratio	
6/30/24	0.41
3/31/24	0.47
12/31/23	0.52

Quick Ratio	
6/30/24	0.32
3/31/24	0.39
12/31/23	0.39

Operating Margin	
6/30/24	10.83
3/31/24	10.86
12/31/23	9.75

Net Margin	
6/30/24	10.83
3/31/24	10.86
12/31/23	9.75

Pre-Tax Margin	
6/30/24	12.78
3/31/24	12.77
12/31/23	11.46

Book Value	
6/30/24	49.90
3/31/24	50.03
12/31/23	49.88

Inventory Turnover	
6/30/24	8.19
3/31/24	8.45
12/31/23	10.35

Debt-to-Equity	
6/30/24	0.76
3/31/24	0.76
12/31/23	0.78

Debt to Capital	
6/30/24	43.17
3/31/24	43.13
12/31/23	43.85

Southwest Gas (SWX)
(Real Time Quote from BATS)

$71.86 USD
+0.18 (0.25%)
Updated Aug 29, 2024 11:00 AM ET

Add to portfolio

Zacks Rank:
3-Hold
Style Scores:
B Value | B Growth | F Momentum | B VGM
Industry Rank:
Top 8% (21 out of 251)
Industry: Utility - Gas Distribution

View All Zacks #1 Ranked Stocks

Company Summary

Enter Symbol

Southwest Gas Corporation, incorporated in March 1931, is a regulated utility that provides natural gas services and has a wholly owned subsidiary, the Paiute Pipeline Company, through which it operates a pipeline transmission system.

In April 2024, the company completed its split of one of its business segments, Centuri Group, Inc. The company executed an initial public offering ("IPO") of 14,260,000 shares of Centuri's common stock at a price to the public of $21 per share. SWX retained nearly 81% interest in Centuri Holdings stock.

Southwest Gas Holdings, Inc. is an energy holding company based in Las Vegas, ...

Read Full Company Summary for SWX here

General Information

Southwest Gas Corporation
8360 SOUTH DURANGO DRIVE POST OFFICE BOX 98510
LAS VEGAS, NV 89193
Phone: 702-876-7237
Fax: 702-876-7037
Web: http://www.swgasholdings.com
Email: justin.forsberg@swgas.com

Industry	Utility - Gas Distribution
Sector	Utilities
Fiscal Year End	December
Last Reported Quarter	6/30/2024
Exp Earnings Date	11/13/2024

EPS Information

Current Quarter EPS Consensus Estimate	0.09
Current Year EPS Consensus Estimate	3.20
Estimated Long-Term EPS Growth Rate	6.00
Exp Earnings Date	11/13/2024

Research for SWX

Price and EPS Surprise Chart

1 Month | 3 Months | 6 Months | YTD | 1 Year

Interactive Chart | Fundamental Chart

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	2.50
30 Days Ago	2.20
60 Days Ago	2.20
90 Days Ago	2.20

Price And Volume Information

Zacks Rank	
Yesterday's Close	71.68
52 Week High	78.47
52 Week Low	56.17
Beta	0.37
20 Day Moving Average	373,189.06
Target Price Consensus	72.33

% Price Change	
4 Week	-3.34
12 Week	-6.15
YTD	13.15

% Price Change Relative to S&P 500	
4 Week	-4.55
12 Week	-10.15
YTD	-3.49

Share Information	
Shares Outstanding (millions)	71.71
Market Capitalization (millions)	5,140.28
Short Ratio	NA
Last Split Date	NA

Dividend Information	
Dividend Yield	3.46%
Annual Dividend	$2.48
Payout Ratio	0.85
Change in Payout Ratio	0.20
Last Dividend Payout / Amount	8/15/2024 / $0.62

Fundamental Ratios

P/E	
P/E (F1)	22.42
Trailing 12 Months	24.63
PEG Ratio	3.74

EPS Growth	
vs. Previous Year	-34.04%
vs. Previous Quarter	-77.37%

Sales Growth	
vs. Previous Year	-8.62%
vs. Previous Quarter	-25.22%

Price Ratios	
Price/Book	1.40
Price/Cash Flow	7.55
Price / Sales	0.97

ROE	
6/30/24	6.18
3/31/24	6.71
12/31/23	7.28

ROA	
6/30/24	1.76
3/31/24	1.86
12/31/23	2.01

Current Ratio	
6/30/24	1.58
3/31/24	1.04
12/31/23	1.12

Quick Ratio	
6/30/24	1.58
3/31/24	1.04
12/31/23	1.12

Operating Margin	
6/30/24	3.96
3/31/24	4.08
12/31/23	4.39

Net Margin	
6/30/24	3.44
3/31/24	3.56
12/31/23	2.78

Pre-Tax Margin	
6/30/24	4.06
3/31/24	4.17
12/31/23	3.63

Book Value	
6/30/24	51.13
3/31/24	46.83
12/31/23	46.28

Inventory Turnover	
6/30/24	NA
3/31/24	NA
12/31/23	NA

Debt-to-Equity	
6/30/24	1.38
3/31/24	1.39
12/31/23	1.39

Debt to Capital	
6/30/24	58.03
3/31/24	58.11
12/31/23	58.75

Zacks Research is Reported On:

BBB Rating: A+
As of 4/5/2024
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Spire (SPIR)
(Real Time Quote from BATS)
$8.32 USD
+0.25 (3.10%)
Updated Aug 29, 2024 11:00 AM ET

Add to portfolio

Zacks Rank:
3-Hold
Style Scores:
F Value | B Growth | C Momentum | D VGM
Industry Rank:
Top 20% (50 out of 251)
Industry: Aerospace - Defense

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Company Summary

Enter Symbol

Spire Global Inc. is a provider of space-based data, analytics and space services. Spire Global Inc., formerly known as NavSight Holdings Inc., is based in VIENNA, Va.

General Information

Spire Global, Inc
8000 TOWERS CRESCENT DRIVE SUITE 1100
VIENNA, VA 22182
Phone: 202-301-5127
Fax: NA
Web: http://www.spire.com
Email: benjamin.hackman@spire.com

Industry	Aerospace - Defense
Sector	Aerospace
Fiscal Year End	December
Last Reported Quarter	6/30/2024
Exp Earnings Date	8/14/2024

EPS Information

Current Quarter EPS Consensus Estimate	-0.23
Current Year EPS Consensus Estimate	-0.96
Estimated Long-Term EPS Growth Rate	NA
Exp Earnings Date	8/14/2024

Research for SPIR

Interactive Chart | Fundamental Chart

Consensus Recommendations

Current (1=Strong Buy, 5=Strong Sell)	2.00
30 Days Ago	1.17
60 Days Ago	1.17
90 Days Ago	1.20

Price And Volume Information

Zacks Rank	
Yesterday's Close	8.07
52 Week High	19.40
52 Week Low	3.27
Beta	2.01
20 Day Moving Average	660,109.88
Target Price Consensus	12.67

% Price Change	
4 Week	-42.11
12 Week	-20.65
YTD	3.20

% Price Change Relative to S&P 500	
4 Week	-42.83
12 Week	-24.03
YTD	-11.98

Share Information	
Shares Outstanding (millions)	24.32
Market Capitalization (millions)	196.24
Short Ratio	NA
Last Split Date	NA

Dividend Information	
Dividend Yield	0.00%
Annual Dividend	$0.00
Payout Ratio	NA
Change in Payout Ratio	NA
Last Dividend Payout / Amount	NA / $0.00

Fundamental Ratios

P/E	
P/E (F1)	NA
Trailing 12 Months	NA
PEG Ratio	NA

EPS Growth	
vs. Previous Year	27.08%
vs. Previous Quarter	-34.62%

Sales Growth	
vs. Previous Year	6.29%
vs. Previous Quarter	-7.35%

Price Ratios	
Price/Book	2.30
Price/Cash Flow	NA
Price / Sales	1.83

ROE	
6/30/24	Pending Next EPS Report
3/31/24	-66.19
12/31/23	-66.20

ROA	
6/30/24	Pending Next EPS Report
3/31/24	-20.82
12/31/23	-21.46

Current Ratio	
6/30/24	Pending Next EPS Report
3/31/24	2.24
12/31/23	1.67

Quick Ratio	
6/30/24	Pending Next EPS Report
3/31/24	2.24
12/31/23	1.67

Operating Margin	
6/30/24	Pending Next EPS Report
3/31/24	-50.45
12/31/23	-52.51

Net Margin	
6/30/24	Pending Next EPS Report
3/31/24	-66.72
12/31/23	-60.51

Pre-Tax Margin	
6/30/24	Pending Next EPS Report
3/31/24	-66.86
12/31/23	-60.44

Book Value	
6/30/24	Pending Next EPS Report
3/31/24	3.51
12/31/23	3.38

Inventory Turnover	
6/30/24	NA
3/31/24	NA
12/31/23	NA

Debt-to-Equity	
6/30/24	Pending Next EPS Report
3/31/24	1.35
12/31/23	1.62

Debt to Capital	
6/30/24	Pending Next EPS Report
3/31/24	57.41
12/31/23	61.80

Podcasts
Earnings Calendar

Zacks Research is Reported On:

At the center of everything we do is a strong commitment to independent research and sharing its profitable discoveries with investors. This dedication to giving investors a trading advantage led to the creation of our proven Zacks Rank stock-rating system. Since 1988 it has more than doubled the S&P 500 with an average gain of +23.68% per year. These returns cover a period from January 1, 1988 through August 5, 2024. Zacks Rank stock-rating system returns are computed monthly based on the beginning of the month and end of the month Zacks Rank stock prices plus any dividends received during that particular month. A simple, equally-weighted average return of all Zacks Rank stocks is calculated to determine the monthly return. The monthly returns are then compounded to arrive at the annual return. Only Zacks Rank stocks included in Zacks hypothetical portfolios at the beginning of each month are included in the return calculations. Zacks Ranks stocks can, and often do, change throughout the month. Certain Zacks Rank stocks for which no month-end price was available, pricing information was not collected, or for certain other reasons have been excluded from these return calculations. Zacks may license the Zacks Mutual Fund rating provided herein to third parties, including but not limited to the issuer.

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Real time prices by BATS. Delayed quotes by Sungard.

NYSE and AMEX data is at least 20 minutes delayed. NASDAQ data is at least 15 minutes delayed.

ATMOS ENERGY CORP. NYSE-ATO

RECENT PRICE 128.64 | P/E RATIO 18.3 (Trailing: 18.9 Median: 20.0) | RELATIVE P/E RATIO 1.05 | DIV'D YLD 2.7% | VALUE LINE

TIMELINESS 4 Lowered 2/16/24
SAFETY 1 Raised 6/6/14
TECHNICAL 4 Lowered 8/23/24
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$112-$158 $135 (5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	150	(+15%)	*7%*
Low	125	(-5%)	*2%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	322	358	367
to Sell	280	295	292
Hld's(000)	137279	137294	137412

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
High:	47.4	58.2	64.8	82.0	93.6	100.8	115.2	121.1	105.3	123.0	125.3	132.2								
Low:	34.9	44.2	50.8	60.0	72.5	76.5	89.2	77.9	84.6	97.7	101.0	110.5								
	79.52	53.69	53.12	48.15	38.10	42.88	49.22	40.82	32.23	26.01	28.00	24.32	22.41	25.73	29.82	28.79	*26.55*	*27.55*	Revenues per sh [A]	*35.70*
	4.19	4.29	4.64	4.72	4.76	5.14	5.42	5.81	6.19	6.62	7.24	7.57	8.03	8.64	9.30	10.04	*10.95*	*11.75*	"Cash Flow" per sh	*13.65*
	2.00	1.97	2.16	2.26	2.10	2.50	2.96	3.09	3.38	3.60	4.00	4.35	4.72	5.12	5.60	6.10	*6.75*	*7.20*	Earnings per sh [AB]	*8.35*
	1.30	1.32	1.34	1.36	1.38	1.40	1.48	1.56	1.68	1.80	1.94	2.10	2.30	2.50	2.72	2.96	*3.22*	*3.46*	Div'ds Decl'd per sh [C■]	*4.25*
	5.20	5.51	6.02	6.90	8.12	9.32	8.32	9.61	10.46	10.72	13.19	14.19	15.38	14.87	17.35	18.90	*20.00*	*20.25*	Cap'l Spending per sh	*20.00*
	22.60	23.52	24.16	24.98	26.14	28.47	30.74	31.48	33.32	36.74	42.87	48.18	53.95	59.71	66.85	73.20	*80.70*	*82.60*	Book Value per sh	*89.15*
	90.81	92.55	90.16	90.30	90.24	90.64	100.39	101.48	103.93	106.10	111.27	119.34	125.88	132.42	140.90	148.49	*155.00*	*158.00*	Common Shs Outst'g [D]	*175.00*
	13.6	12.5	13.2	14.4	15.9	15.9	16.1	17.5	20.8	22.0	21.7	23.2	22.3	18.8	19.3	18.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.5*
	.82	.83	.84	.90	1.01	.89	.85	.88	1.09	1.11	1.17	1.24	1.15	1.02	1.12	1.08			Relative P/E Ratio	*.90*
	4.8%	5.3%	4.7%	4.2%	4.1%	3.5%	3.1%	2.9%	2.4%	2.3%	2.2%	2.1%	2.2%	2.6%	2.5%	2.6%			Avg Ann'l Div'd Yield	*3.1%*
	4940.9	4142.1	3349.9	2759.7	3115.5	2901.8	2821.1	3407.5	4201.7	4275.4	*4115*	*4350*	Revenues ($mill) [A]	*6250*
	289.8	315.1	350.1	382.7	444.3	511.4	580.5	665.6	774.4	885.9	*1025*	*1115*	Net Profit ($mill)	*1475*
	39.2%	38.3%	36.4%	36.6%	27.0%	21.4%	19.5%	18.8%	9.1%	11.4%	*15.5%*	*16.0%*	Income Tax Rate	*25.0%*
	5.9%	7.6%	10.5%	13.9%	14.3%	17.6%	20.6%	19.5%	18.4%	20.7%	*24.9%*	*25.6%*	Net Profit Margin	*23.6%*
	44.3%	43.5%	38.7%	44.0%	34.3%	38.0%	40.0%	38.4%	37.9%	37.9%	*39.0%*	*40.0%*	Long-Term Debt Ratio	*40.0%*
	55.7%	56.5%	61.3%	56.0%	65.7%	62.0%	60.0%	61.6%	62.1%	62.1%	*61.0%*	*60.0%*	Common Equity Ratio	*60.0%*
	5542.2	5650.2	5651.8	6965.7	7263.6	9279.7	11323	12837	15180	17509	*20500*	*21750*	Total Capital ($mill)	*26000*
	6725.9	7430.6	8280.5	9259.2	10371	11788	13355	15064	17240	19607	*22000*	*23100*	Net Plant ($mill)	*28000*
	6.4%	6.6%	7.2%	6.4%	6.9%	6.1%	5.5%	5.5%	5.4%	5.5%	*6.0%*	*6.5%*	Return on Total Cap'l	*7.0%*
	9.4%	9.9%	10.1%	9.8%	9.3%	8.9%	8.5%	8.4%	8.2%	8.1%	*8.0%*	*8.5%*	Return on Shr. Equity	*9.5%*
	9.4%	9.9%	10.1%	9.8%	9.3%	8.9%	8.5%	8.4%	8.2%	8.1%	*8.0%*	*8.5%*	Return on Com Equity	*9.5%*
	4.7%	4.9%	5.1%	4.9%	4.8%	4.6%	4.4%	4.3%	4.2%	4.2%	*4.0%*	*4.5%*	Retained to Com Eq	*4.5%*
	50%	51%	50%	50%	48%	48%	49%	49%	49%	49%	*49%*	*49%*	All Div'ds to Net Prof	*50%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $7876.1 mill. **Due in 5 Yrs** $915.0 mill.
LT Debt $7866.5 mill. **LT Interest** $135.0 mill.
(LT interest earned: 8.3x; total interest coverage: 8.3x)
Leases, Uncapitalized Annual rentals $41.3 mill.

Pfd Stock None

Pension Assets-9/23 $502.4 mill.
Oblig. $431.6 mill.
Common Stock 155,232,827 shs.
as of 8/2/24

MARKET CAP: $20.0 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	51.6	15.4	674.6
Other	2996.1	870.4	1034.0
Current Assets	3047.7	885.8	1708.6
Accts Payable	496.0	336.1	319.4
Debt Due	2386.4	253.4	9.6
Other	720.2	763.1	655.9
Current Liab.	3602.6	1352.6	984.9
Fix. Chg. Cov.	1238%	1059%	1075%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-4.0%	-.5%	*4.0%*
"Cash Flow"	6.5%	7.0%	*6.5%*
Earnings	9.5%	9.0%	*7.0%*
Dividends	7.0%	8.5%	*7.5%*
Book Value	9.5%	12.0%	*5.0%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	914.5	1319.1	605.6	568.3	3407.5
2022	1012.8	1649.8	816.4	722.7	4201.7
2023	1484.0	1541.0	662.7	587.7	4275.4
2024	1158.5	1647.2	701.5	***607.8***	***4115***
2025	***1250***	***1725***	***750***	***625***	***4350***

Fiscal Year Ends	EARNINGS PER SHARE [A B E] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	1.71	2.30	.78	.37	5.12
2022	1.86	2.37	.92	.51	5.60
2023	1.91	2.48	.94	.80	6.10
2024	2.08	2.85	1.08	***.74***	***6.75***
2025	***2.26***	***2.95***	***1.16***	***.83***	***7.20***

Cal-endar	QUARTERLY DIVIDENDS PAID [C■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.575	.575	.575	.625	2.35
2021	.625	.625	.625	.68	2.56
2022	.68	.68	.68	.74	2.78
2023	.74	.74	.74	.805	3.03
2024	.805	.805	.805		

LEGENDS
36.50 x Dividends p sh divided by Interest Rate
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 | 2028 | 2029

% TOT. RETURN 7/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	8.0	9.9
3 yr.	40.3	12.6
5 yr.	32.2	72.0

BUSINESS: Atmos Energy Corporation is engaged primarily in the distribution and sale of natural gas to over three million customers through six regulated natural gas utility operations: Louisiana Division, West Texas Division, Mid-Tex Division, Mississippi Division, Colorado-Kansas Division, and Kentucky/Mid-States Division. Gas sales breakdown for fiscal 2023: 66.5%, residential; 28.0%, commercial; 3.8%, industrial; and 1.7% other. The company sold Atmos Energy Marketing, 1/17. Officers and directors own approximately .5% of common stock (12/23 Proxy). President and Chief Executive Officer: Kevin Akers. Incorporated: Texas. Address: Three Lincoln Centre, Suite 1800, 5430 LBJ Freeway, Dallas, Texas 75240. Telephone: 972-934-9227. Internet: www.atmosenergy.com.

Atmos Energy's long streak of earnings growth will probably remain unbroken in fiscal 2024 (concludes September 30th). During the first nine months, earnings per share of $6.01 were 12.8% above the $5.33 tally posted the previous year. That was made possible partially by positive rate-case outcomes. A drop in bad-debt expense helped, too. Moreover, results were favorably impacted by legislation to bring down property-tax expenses in Texas. But an increase in both depreciation expense and interest charges produced somewhat of an offset. Although the company faces a tough bottom-line matchup in the fourth quarter, we expect full-year profits to be around $6.75 a share. That would mark a 10% or so advance from fiscal 2023's $6.10 figure. Regarding fiscal 2025, share net stands to rise another 7%, to $7.20, assuming additional expansion of operating margins.

Finances are healthy. When the June period ended, cash and equivalents resided at $674.6 million. Furthermore, long-term debt appeared manageable (nearly 40% of total capital) and short-term borrowings were modest. Also, $1.8 billion in common stock and/or debt securities remained available for issuance (out of $5 billion) under a shelf registration statement expiring in March, 2026. Finally, the company had four undrawn revolving credit facilities aggregating $3.1 billion plus a $1.5 billion commercial paper program.

***Value Line* is optimistic about Atmos' performance out to the end of this decade.** It ranks as one of the nation's largest natural gas-only distributors, with more than three million customers across several states, including Texas, Louisiana, and Mississippi. Also, we think the pipeline and storage unit has promising overall growth opportunities, since it operates in one of the most-active drilling regions in the world. The sound balance sheet is another strength.

The top-quality stock has climbed to record highs since our last full-page review in May. The energy firm's good earnings during fiscal 2024 are surely a driving force behind that price move. But long-term total return potential lacks appeal. The equity bears a 4 (Below Average) Timeliness rank, as well.

Frederick L. Harris, III *August 23, 2024*

(A) Fiscal year ends Sept. 30th. **(B)** Diluted shrs. Excl. nonrec. gains (loss): '10, 5¢; '11, (1¢); '18, $1.43; '20, 17¢. Excludes discontinued operations: '11, 10¢; '12, 27¢; '13, 14¢; '17, 13¢. Next earnings report due early Nov. **(C)** Dividends historically paid in early March, June, Sept., and Dec. ■ Div. reinvestment plan. Direct stock purchase plan avail. **(D)** In millions. **(E)** Qtrs may not add due to change in shrs outstanding.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	75
Earnings Predictability	100

CHESAPEAKE UTIL. NYSE-CPK

RECENT PRICE 113.55 | P/E RATIO 23.0 (Trailing: 24.3 Median: 23.0) | RELATIVE P/E RATIO 1.32 | DIV'D YLD 2.3% | VALUE LINE

TIMELINESS 4 Lowered 7/26/24
SAFETY 2 New 6/5/15
TECHNICAL 4 Raised 8/16/24
BETA .80 (1.00 = Market)

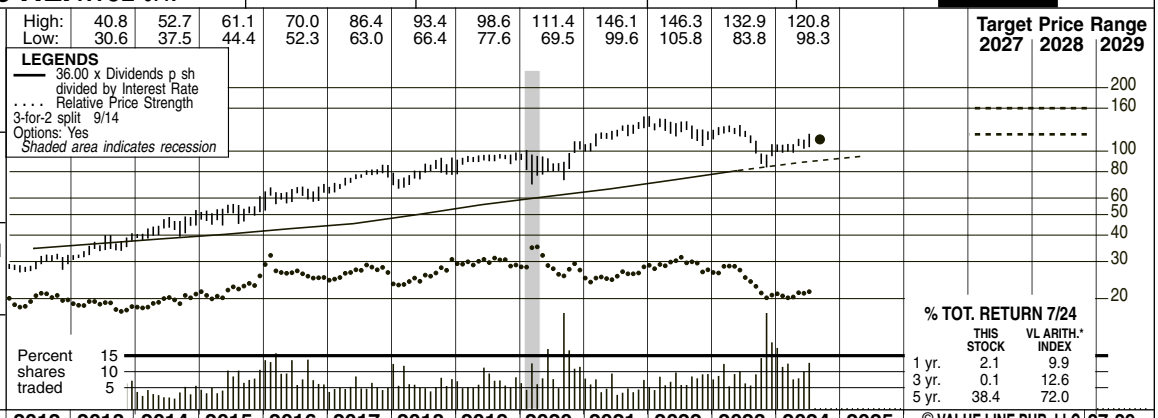
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$95-$155 $125 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	160	(+40%)	*11%*
Low	120	(+5%)	*4%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	126	191	131
to Sell	98	71	124
Hld's(000)	13495	18413	18800



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
28.46	19.07	29.93	29.13	27.26	30.73	34.19	30.07	30.60	37.79	43.81	29.24	27.96	32.28	38.37	30.16	***33.80***	***37.35***	Revenues per sh	***66.00***
2.50	2.15	3.50	3.69	3.95	4.35	4.73	5.05	5.16	5.42	6.47	6.50	7.37	8.28	8.87	6.87	***8.00***	***8.50***	"Cash Flow" per sh	***10.80***
1.39	1.43	1.82	1.91	1.99	2.26	2.47	2.68	2.86	2.68	3.45	3.72	4.21	4.73	4.97	4.73	***4.85***	***5.05***	Earnings per sh [A]	***7.00***
.81	.83	.87	.91	.96	1.01	1.07	1.12	1.19	1.26	1.39	1.55	1.69	1.84	2.03	2.25	***2.46***	***2.64***	Div'ds Decl'd per sh [B]■	***3.25***
3.00	1.89	3.18	3.28	5.00	6.72	6.66	9.47	10.42	10.73	16.47	11.26	9.48	10.59	7.23	8.48	***13.40***	***14.20***	Cap'l Spending per sh	***16.00***
12.02	14.89	15.84	16.78	17.82	19.28	20.59	23.45	27.36	29.75	31.65	34.23	39.92	43.85	46.94	56.04	***59.50***	***62.40***	Book Value per sh	***70.70***
10.24	14.09	14.29	14.35	14.40	14.46	14.59	15.27	16.30	16.34	16.38	16.40	17.46	17.66	17.74	22.24	***22.50***	***22.50***	Common Shs Outst'g [C]	***25.00***
14.2	14.2	12.2	14.2	14.8	15.6	17.7	19.1	21.8	27.8	22.9	24.7	21.6	25.6	25.8	24.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***20.0***
.85	.95	.78	.89	.94	.88	.93	.96	1.14	1.40	1.24	1.32	1.11	1.38	1.49	1.36			Relative P/E Ratio	***1.10***
4.1%	4.1%	3.9%	3.4%	3.3%	2.9%	2.4%	2.2%	1.9%	1.7%	1.8%	1.7%	1.9%	1.5%	1.6%	2.0%			Avg Ann'l Div'd Yield	***2.3%***
498.8	459.2	498.9	617.6	717.5	479.6	488.2	570.0	680.7	670.6	***760***	***840***	Revenues ($mill)	***1650***
36.1	40.2	44.7	43.8	56.6	61.1	70.6	83.5	88.4	87.2	***110***	***115***	Net Profit ($mill)	***175***
39.9%	39.5%	38.8%	39.5%	27.1%	25.6%	25.0%	25.9%	27.4%	24.4%	***26.5%***	***27.0%***	Income Tax Rate	***29.0%***
7.2%	8.8%	9.0%	7.1%	7.9%	12.7%	14.5%	14.6%	13.0%	13.0%	***14.5%***	***13.7%***	Net Profit Margin	***10.6%***
34.5%	29.4%	23.5%	28.9%	37.9%	43.9%	42.2%	41.5%	41.0%	48.8%	***48.0%***	***48.0%***	Long-Term Debt Ratio	***48.0%***
65.5%	70.6%	76.5%	71.1%	62.1%	56.1%	57.8%	58.5%	59.0%	51.2%	***52.0%***	***52.0%***	Common Equity Ratio	***52.0%***
458.8	507.5	583.0	683.7	834.5	1001.7	1205.6	1324.0	1411.2	2433.2	***2575***	***2700***	Total Capital ($mill)	***3400***
689.8	855.0	986.7	1126.0	1384.0	1463.8	1601.2	1744.9	1810.5	2456.4	***2700***	***2925***	Net Plant ($mill)	***3600***
8.5%	8.9%	8.6%	7.3%	7.8%	7.2%	6.8%	7.1%	7.1%	4.3%	***5.5%***	***5.5%***	Return on Total Cap'l	***6.5%***
12.0%	11.2%	10.0%	9.0%	10.9%	10.9%	10.1%	10.8%	10.6%	7.0%	***8.0%***	***8.0%***	Return on Shr. Equity	***10.0%***
12.0%	11.2%	10.0%	9.0%	10.9%	10.9%	10.1%	10.8%	10.6%	7.0%	***8.0%***	***8.0%***	Return on Com Equity	***10.0%***
7.4%	6.8%	6.1%	4.9%	6.7%	6.5%	6.2%	6.7%	6.4%	3.8%	***4.0%***	***4.0%***	Retained to Com Eq	***5.5%***
38%	40%	39%	45%	39%	40%	38%	38%	40%	46%	***50%***	***52%***	All Div'ds to Net Prof	***46%***

CAPITAL STRUCTURE as of 6/30/24
Total Debt $1400.5 mill. **Due in 5 Yrs** $625.0 mill.
LT Debt $1174.8 mill. **LT Interest** $60.0 mill.
(LT interest earned: 4.1x; total interest coverage: 4.1x) (48% of Cap'l)
Leases, Uncapitalized Annual rentals $2.8 mill.
Pfd Stock None
Pension Assets-12/23 $49.4 mill.
Oblig. $51.3 mill.
Common Stock 22,449,929 shs.
as of 8/5/24

MARKET CAP: $2.5 billion (Small Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	6.2	4.9	6.4
Other	187.8	180.8	149.9
Current Assets	194.0	185.7	156.3
Accts Payable	61.5	77.5	69.0
Debt Due	223.6	198.4	225.7
Other	83.9	110.5	115.5
Current Liab.	369.0	386.4	410.2
Fix. Chg. Cov.	692%	514%	610%

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	1.5%	-2.0%	*12.0%*
"Cash Flow"	7.0%	7.0%	*5.0%*
Earnings	9.0%	10.0%	*6.5%*
Dividends	8.0%	10.0%	*8.0%*
Book Value	10.5%	10.5%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	191.2	111.1	107.3	160.4	570.0
2022	222.9	139.5	131.1	187.2	680.7
2023	218.1	135.6	131.5	185.4	670.6
2024	245.7	166.3	***155***	***193.0***	***760***
2025	***265***	***185***	***175***	***215***	***840***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.96	.78	.71	1.28	4.73
2022	2.08	.88	.54	1.47	4.97
2023	2.04	.90	.53	1.26	4.73
2024	2.07	.82	***.58***	***1.38***	***4.85***
2025	***2.16***	***.86***	***.62***	***1.41***	***5.05***

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.405	.405	.44	.44	1.69
2021	.44	.44	.48	.48	1.84
2022	.48	.48	.535	.535	2.03
2023	.535	.535	.59	.59	2.25
2024	.59	.59	.64		

BUSINESS: Chesapeake Utilities Corporation consists of two main units. The Regulated Energy segment distributes natural gas in Delaware, Maryland, and Florida; distributes electricity in Florida; and transmits natural gas on the Delmarva Peninsula and in Florida. The Unregulated Energy operation wholesales and distributes propane; markets natural gas; and provides other unregulated energy services, including midstream services in Ohio. Revenue breakdown for 2023: Regulated Energy, 70.6%; Unregulated Energy, 33.3%; Other, d3.9%. Officers and directors own 1.7% of common stock; BlackRock, 16.1% (3/24 Proxy). Chairman and CEO: Jeffry Householder. Inc.: DE. Address: 500 Energy Lane, Dover, DE 19901. Tel.: (302) 734-6799. Internet: www.chpk.com.

Chesapeake Utilities Corporation's bottom-line performance has been lackluster thus far in 2024. Through the first six months, earnings per share were $2.89, a nickel shy of the $2.94 figure that was registered for the same period last year. This was due partially to expenses, which amounted to $0.07 per share, related to last November's acquisition of Florida City Gas (FCG) from NextEra Energy for nearly $923 million. Results for the period were also held back by a substantial increase in interest charges, reflecting debt issued to help fund the aforementioned purchase. Furthermore, the company's income tax rate rose some. The number of diluted shares outstanding was significantly higher, too, given the impact of stock issued in connection with the FCG transaction. So, at this juncture, it appears that profits will finish around $4.85 per share for the entire year. That would be close to 2023's $4.73 tally. Looking at 2025, however, Chesapeake's bottom line stands to increase in the neighborhood of 4%, to $5.05 a share, supported by such factors as growth in the customer base, incremental contributions from FCG, plus benefits of pipeline expansion projects.

Corporate finances are in good shape. When the second quarter concluded, cash and equivalents sat at $6.4 million. Too, long-term debt seemed manageable, at 48% of total capital, and we think short-term borrowings of $225.7 million were not a big stumbling block. It is also important to state that, in August, the revolving credit facility was boosted by $75 million, to $450 million. All things considered, the energy company ought to continue to satisfy its various commitments, including working capital requirements, capital spending plans, and dividend payments with little trouble.

The stock does not have much to offer, at the moment. Capital appreciation potential over both the 18-month horizon and out to 2027-2029 is nothing to write home about. Moreover, the dividend yield looks unspectacular, when stacked against those of other Natural Gas Utility equities in the *Value Line* universe. Meanwhile, the Timeliness rank resides at 4 (Below Average).

Frederick L. Harris, III *August 23, 2024*

(A) Diluted shrs. Excludes nonrecurring gains (loss): '08, (7¢); '15, 6¢; '17, 87¢; '22, 8¢. Excludes discontinued operations: '19, 24¢; '20, 5¢. Next earnings report due early Nov.

(B) Dividends historically paid in early January, April, July, and October. ■ Dividend reinvestment plan. Direct stock purchase plan available.

(C) In millions, adjusted for split.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	85
Earnings Predictability	100

NEW JERSEY RES. NYSE-NJR

RECENT PRICE **44.12** | P/E RATIO **15.2** (Trailing: 18.7 Median: 17.0) | RELATIVE P/E RATIO **0.87** | DIV'D YLD **3.9%** | **VALUE LINE**

TIMELINESS 4 Raised 3/29/24
SAFETY 2 Lowered 4/17/20
TECHNICAL 4 Lowered 7/26/24
BETA 1.00 (1.00 = Market)

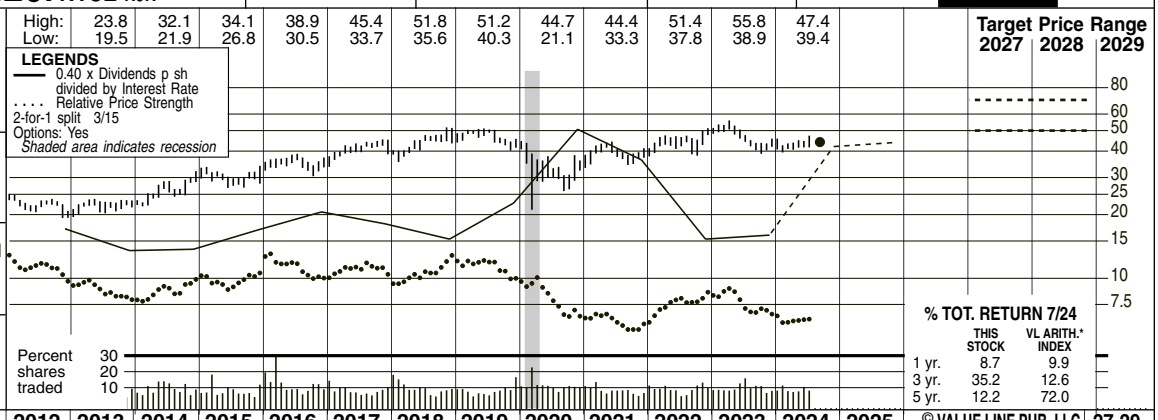
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$37-$58 $48 (10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	70	(+60%)	*15%*
Low	50	(+15%)	*7%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	153	161	167
to Sell	163	143	140
Hld's(000)	69494	70304	70181



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
45.37	31.17	32.05	36.30	27.08	38.38	44.40	32.09	21.90	26.28	33.24	29.01	20.39	22.71	30.38	20.12	***19.00***	***21.00***	Revenues per sh [A]	***25.00***
1.81	1.58	1.63	1.70	1.86	1.93	2.73	2.52	2.46	2.68	3.72	2.99	3.30	3.36	3.86	4.22	***4.50***	***4.50***	"Cash Flow" per sh	***5.25***
1.35	1.20	1.23	1.29	1.36	1.37	2.08	1.78	1.61	1.73	2.72	1.96	2.07	2.16	2.50	2.70	***2.90***	***2.90***	Earnings per sh [B]	***3.50***
.56	.62	.68	.72	.77	.81	.86	.93	.98	1.04	1.11	1.19	1.27	1.36	1.45	1.56	***1.68***	***1.76***	Div'ds Decl'd per sh [C]■	***1.95***
.86	.90	1.05	1.13	1.26	1.33	1.52	3.76	4.15	3.80	4.39	5.83	4.65	5.42	6.50	5.13	***5.00***	***5.50***	Cap'l Spending per sh	***6.25***
8.64	8.29	8.81	9.36	9.80	10.65	11.48	12.99	13.58	14.33	16.18	17.37	19.26	17.18	19.00	20.40	***22.30***	***23.65***	Book Value per sh [D]	***28.35***
84.12	83.17	82.35	82.89	83.05	83.32	84.20	85.19	85.88	86.32	87.69	89.34	95.80	94.95	95.64	97.57	***100.00***	***100.00***	Common Shs Outst'g [E]	***100.00***
12.3	14.9	15.0	16.8	16.8	16.0	11.7	16.6	21.3	22.4	15.6	24.3	17.7	17.5	17.0	17.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***17.0***
.74	.99	.95	1.05	1.07	.90	.62	.84	1.12	1.13	.84	1.29	.91	.94	.98	1.02			Relative P/E Ratio	***.95***
3.3%	3.5%	3.7%	3.3%	3.4%	3.7%	3.5%	3.1%	2.9%	2.7%	2.6%	2.5%	3.5%	3.6%	3.4%	3.3%			Avg Ann'l Div'd Yield	***4.0%***
3738.1	2734.0	1880.9	2268.6	2915.1	2592.0	1953.7	2156.6	2906.0	1963.0	***1900***	***2100***	Revenues ($mill) [A]	***2500***
176.9	153.7	138.1	149.4	240.5	175.0	196.2	207.4	240.3	261.8	***290***	***290***	Net Profit ($mill)	***350***
30.2%	26.3%	15.5%	17.2%	- -	- -	NMF	10.3%	21.4%	15.8%	***21.5%***	***22.0%***	Income Tax Rate	***22.0%***
4.7%	5.6%	7.3%	6.6%	8.2%	6.7%	10.0%	9.6%	8.3%	13.3%	***15.3%***	***13.8%***	Net Profit Margin	***14.0%***
38.2%	43.2%	47.7%	44.6%	45.4%	49.8%	55.1%	57.0%	57.8%	58.2%	***57.5%***	***57.0%***	Long-Term Debt Ratio	***55.0%***
61.8%	56.8%	52.3%	55.4%	54.6%	50.2%	44.9%	43.0%	42.2%	41.8%	***42.5%***	***43.0%***	Common Equity Ratio	***45.0%***
1564.4	1950.6	2230.1	2233.7	2599.6	3088.9	4104.2	3793.0	4302.6	4758.8	***5250***	***5500***	Total Capital ($mill)	***6300***
1884.1	2128.3	2407.7	2609.7	2651.0	3041.2	3983.0	4213.5	4649.9	5022.1	***5400***	***5750***	Net Plant ($mill)	***6500***
12.1%	8.6%	6.9%	7.7%	10.1%	6.4%	5.6%	6.5%	5.6%	5.5%	***5.5%***	***5.5%***	Return on Total Cap'l	***5.5%***
18.3%	13.9%	11.8%	12.1%	16.9%	11.3%	10.6%	12.7%	13.2%	13.2%	***13.0%***	***12.5%***	Return on Shr. Equity	***12.5%***
18.3%	13.9%	11.8%	12.1%	16.9%	11.3%	10.6%	12.7%	13.2%	13.2%	***13.0%***	***12.5%***	Return on Com Equity	***12.5%***
11.0%	7.0%	4.8%	5.0%	10.2%	4.6%	4.3%	5.6%	6.2%	5.6%	***5.5%***	***5.0%***	Retained to Com Eq	***5.5%***
40%	50%	60%	59%	40%	59%	60%	56%	53%	58%	***58%***	***61%***	All Div'ds to Net Prof	***56%***

CAPITAL STRUCTURE as of 6/30/24
Total Debt $3246.0 mill. **Due in 5 Yrs** $580 mill.
LT Debt $2793.7 mill. **LT Interest** $125 mill.
Incl. $9.3 mill. capitalized leases.
(Interest coverage: 4.85x)
Pension Assets-9/23 $405.0 mill.
Oblig. $493.7 mill.
Pfd Stock None

Common Stock 99,167,564 shs.
as of 8/2/24

MARKET CAP: $4.4 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	1.1	1.0	22.4
Other	755.0	531.1	512.0
Current Assets	756.1	532.1	534.4
Accts Payable	156.6	151.8	144.6
Debt Due	499.1	368.3	452.3
Other	448.5	286.5	297.4
Current Liab.	1104.2	806.6	894.3
Fix. Chg. Cov.	545%	520%	310%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-3.0%	-6.0%	*2.5%*
"Cash Flow"	7.0%	4.5%	*5.0%*
Earnings	5.0%	2.5%	*5.0%*
Dividends	6.5%	6.5%	*5.0%*
Book Value	7.5%	7.0%	*4.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	454.3	802.2	367.6	532.5	2156.6
2022	675.8	912.3	552.3	765.5	2906.0
2023	723.6	644.0	264.1	331.3	1963.0
2024	467.2	657.9	275.6	***499.3***	***1900***
2025	***715***	***625***	***305***	***455***	***2100***

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	.46	1.77	d.15	.07	2.16
2022	.69	1.36	d.04	.50	2.50
2023	1.14	1.16	.10	.30	2.70
2024	.74	1.41	d.09	***.84***	***2.90***
2025	***.75***	***1.40***	***.Nil***	***.75***	***2.90***

Calendar	QUARTERLY DIVIDENDS PAID [C] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.3125	.3125	.3125	.3325	1.27
2021	.3325	.3325	.3325	.3625	1.36
2022	.3625	.3625	.3625	.3625	1.45
2023	.39	.39	.39	.39	1.56
2024	.42	.42	.42		

BUSINESS: New Jersey Resources Corp. is a holding company providing retail/wholesale energy svcs. to customers in NJ, and in states from the Gulf Coast to New England, and Canada. New Jersey Natural Gas had 576,000 cust. at 9/30/23. Fiscal 2023 volume: 128 bill. cu. ft. (23% interruptible, 50% residential, commercial & firm transportation, 27% other). N.J. Natural Energy subsidiary provides unregulated retail/wholesale natural gas and related energy svcs. 2023 dep. rate: 2.8%. Has 1,350 empls. Off./dir. own less than 1% of common; BlackRock, 15.9%; Vanguard, 11.4% (12/23 Proxy). CEO, President & Director: Steven D. Westhoven. Incorporated: New Jersey. Address: 1415 Wyckoff Road, Wall, NJ 07719. Telephone: 732-938-1480. Web: www.njresources.com.

New Jersey Resources reported a mixed performance in the fiscal third quarter. (Fiscal year ends September 30th.) Both the top and bottom lines landed below our targets. Quarterly revenues expanded year over year, bolstered by the utility business, though an unfavorable gross-margin contraction negated this segment's contribution to profitability. Clean Energy Ventures also performed favorably on top-line growth, making progress on its capacity expansion pipeline, though a special tax effect offset the segment's profit-comparison versus the prior year. A higher charge for depreciation and larger interest bill further pressured profit margins. Ultimately, the bottom-line result was roughly $0.15 below our target. However, a $0.09 per share loss in the fiscal third quarter is not particularly concerning, and is not out of the ordinary for the natural gas utility's low season.

We have pared back our fiscal 2024 earnings forecast. Our new target of $2.90 per share, now $0.05 lower, is near the bottom of management's guidance range, calling for earnings of $2.85 to $3.00 per share. A historically strong fiscal fourth-quarter performance will be required to meet this expectation, so caution is suggested at this juncture. Asset management agreements coming due in the Energy Services segment should bolster profits in the final stanza of fiscal 2024.

Earnings growth could falter in fiscal 2025. The company has been executing very well against leadership's goal for 7%-9% long-term annual earnings growth. Unique conditions (strong energy prices, specific weather events) have led to the outperformance of this target over the past few years. Barring any unexpected developments, earnings growth may stall in fiscal 2025, before resuming again. The company's core earnings performance will likely benefit from pending rate cases.

The stock may be appealing to certain accounts. The company's evolving market stance as a diversified energy syndicate adds some fundamental stability to the stock (Safety: 2). The utility sector tends to provide strength through market volatility, making this selection suitable for most conservative portfolios. The clean energy transition adds to upside potential.

Earl B. Humes *August 23, 2024*

(A) Fiscal year ends Sept. 30th.
(B) Diluted earnings. Qtly. revenues and egs. may not sum to total due to rounding and change in shares outstanding. Next earnings report due mid-November.
(C) Dividends historically paid in early Jan., April, July, and October. ■ Dividend reinvestment plan available.
(D) Includes regulatory assets in 2023: $585 million, $6.00/share.
(E) In millions, adjusted for 3/15 split.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	50
Earnings Predictability	60

NISOURCE INC. NYSE-NI

RECENT PRICE 31.56 | P/E RATIO 18.0 (Trailing: 17.7 Median: 21.0) | RELATIVE P/E RATIO 1.03 | DIV'D YLD 3.5% | VALUE LINE

TIMELINESS 3 Raised 3/22/24
SAFETY 2 Raised 2/23/24
TECHNICAL 3 Lowered 8/23/24
BETA .95 (1.00 = Market)

18-Month Target Price Range

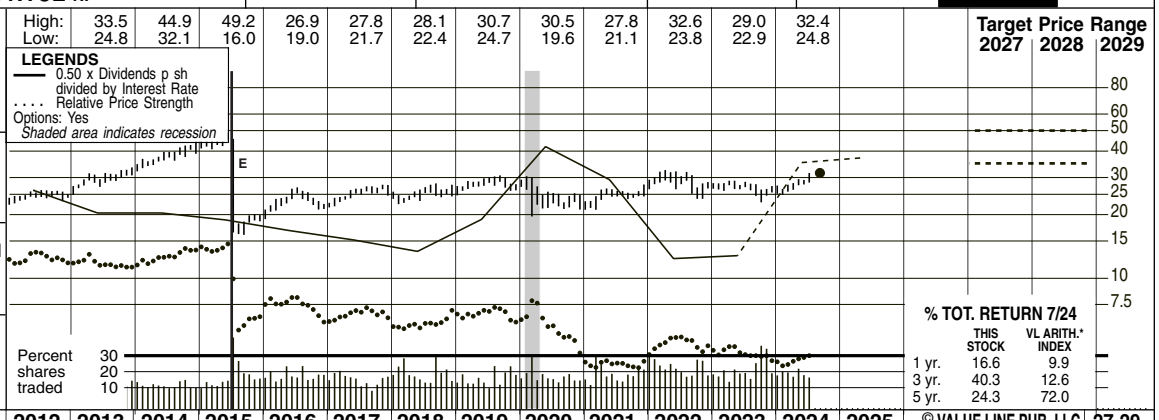
Low-High	Midpoint (% to Mid)
$23-$36	$30 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	50	(+60%)	*14%*
Low	35	(+10%)	*6%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	278	313	331
to Sell	234	253	236
Hld's(000)	394475	413866	425705



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
32.36	24.02	22.99	21.33	16.31	18.04	20.47	14.58	13.90	14.46	13.74	13.63	11.95	12.09	14.23	12.33	*13.00*	*14.00*	Revenues per sh	*16.00*
3.32	2.96	3.19	2.98	3.13	3.41	3.60	2.27	2.71	2.07	2.86	3.17	3.15	3.26	3.47	3.64	*3.80*	*3.90*	"Cash Flow" per sh	*4.25*
1.34	.84	1.06	1.05	1.37	1.57	1.67	.63	1.00	.39	1.30	1.31	1.32	1.37	1.47	1.60	*1.75*	*1.85*	Earnings per sh [A]	*2.20*
.92	.92	.92	.92	.94	.98	1.02	.83	.64	.70	.78	.80	.84	.88	.94	1.00	*1.06*	*1.12*	Div'ds Decl'd per sh [B] ■	*1.20*
3.54	2.81	2.88	3.99	4.83	5.99	6.42	4.26	4.57	5.03	4.88	4.72	4.49	4.53	6.32	5.93	*6.75*	*6.50*	Cap'l Spending per sh	*7.00*
17.24	17.54	17.63	17.71	17.90	18.77	19.54	12.04	12.60	12.82	13.08	13.36	12.44	13.33	13.14	22.71	*23.00*	*24.50*	Book Value per sh [C]	*27.50*
274.26	276.79	279.30	282.18	310.28	313.68	316.04	319.11	323.16	337.02	372.36	382.14	391.76	404.30	411.10	446.38	*450.00*	*450.00*	Common Shs Outst'g [D]	*450.00*
12.1	14.3	15.3	19.4	17.9	18.9	22.7	37.3	23.2	NMF	19.3	21.3	18.7	18.0	19.6	16.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*19.0*
.73	.95	.97	1.22	1.14	1.06	1.19	1.88	1.22	NMF	1.04	1.13	.96	.99	11.8	.97			Relative P/E Ratio	*1.05*
5.7%	7.6%	5.7%	4.5%	3.8%	3.3%	2.7%	3.5%	2.8%	2.8%	3.1%	2.9%	3.4%	3.6%	3.3%	3.7%			Avg Ann'l Div'd Yield	*3.0%*
6470.6	4651.8	4492.5	4874.6	5114.5	5208.9	4681.7	4899.6	5850.6	5505.4	*5850*	*6300*	Revenues ($mill)	*7200*
530.7	198.6	328.1	128.6	478.3	549.8	562.6	626.3	648.2	716.3	*790*	*835*	Net Profit ($mill)	*990*
36.9%	41.6%	35.7%	71.0%	19.7%	17.0%	18.3%	15.7%	17.2%	17.8%	*19.0%*	*19.0%*	Income Tax Rate	*19.0%*
--	--	--	--	--	--	--	--	2.0%	2.3%	*3.0%*	*2.5%*	AFUDC % to Net Profit	*2.5%*
56.9%	60.7%	59.8%	63.5%	55.3%	56.8%	61.6%	56.9%	55.7%	52.2%	*56.0%*	*55.0%*	Long-Term Debt Ratio	*55.0%*
43.1%	39.3%	40.2%	36.5%	37.9%	36.9%	32.5%	33.5%	31.6%	45.5%	*44.0%*	*45.0%*	Common Equity Ratio	*45.0%*
14331	9792.0	10129	11832	12856	13843	14972	16131	17099	21192	*23500*	*24500*	Total Capital ($mill)	*27500*
16017	12112	13068	14360	15543	16912	16620	17882	19843	22275	*24500*	*25750*	Net Plant ($mill)	*28000*
5.3%	4.0%	5.0%	2.6%	5.1%	5.3%	5.0%	4.9%	3.8%	3.4%	*3.5%*	*3.5%*	Return on Total Cap'l	*3.5%*
8.6%	5.2%	8.1%	3.0%	8.3%	9.2%	9.8%	9.0%	9.3%	7.1%	*7.5%*	*7.5%*	Return on Shr. Equity	*8.0%*
8.6%	5.2%	8.1%	3.0%	9.6%	9.7%	10.4%	10.6%	12.0%	7.4%	*7.5%*	*7.5%*	Return on Com Equity	*8.0%*
3.4%	NMF	3.0%	NMF	4.0%	3.8%	3.8%	4.2%	4.0%	2.8%	*3.0%*	*3.0%*	Retained to Com Eq	*3.5%*
61%	NMF	63%	NMF	60%	64%	67%	64%	64%	63%	*61%*	*61%*	All Div'ds to Net Prof	*55%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $13477.0 mill. **Due in 5 Yrs** $5260 mill.
LT Debt $12809.6 mill. **LT Interest** $515 mill.
(Interest cov. earned: 4.5x) (57% of Cap'l)

Leases, Uncapitalized Annual rentals $9.6 mill.
Pension Assets-12/22 $1.4 bill. **Oblig.** $1.4 bill.

Common Stock 448,509,837 shs.
as of 7/31/24

MARKET CAP: $14.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	40.8	2245.4	101.2
Other	2543.5	2254.0	1842.6
Current Assets	2584.3	4499.4	1943.8
Accts Payable	899.5	749.4	584.0
Debt Due	1791.9	3072.4	667.4
Other	1969.1	1443.3	1256.6
Current Liab.	4660.5	5265.1	2508.0
Fix. Chg. Cov.	255%	225%	335%

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-5.0%	-3.5%	*5.5%*
"Cash Flow"	.5%	6.5%	*5.5%*
Earnings	1.5%	15.0%	*9.5%*
Dividends	-.5%	3.5%	*4.5%*
Book Value	-3.0%	.5%	*5.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1545.6	986.0	959.4	1408.6	4899.6
2022	1873.3	1183.2	1089.5	1704.6	5850.6
2023	1966.0	1090.0	1027.4	1422.0	5505.4
2024	1706.3	1084.7	*1200*	*1859*	*5850*
2025	*1840*	*1170*	*1290*	*2000*	*6300*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	.77	.13	.11	.39	1.37
2022	.75	.12	.10	.50	1.47
2023	.77	.11	.19	.53	1.60
2024	.85	.21	*.13*	*.56*	*1.75*
2025	*.85*	*.25*	*.15*	*.60*	*1.85*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.21	.21	.21	.21	.84
2021	.22	.22	.22	.22	.88
2022	.235	.235	.235	.235	.94
2023	.25	.25	.25	.25	1.00
2024	.265	.265	.265		

BUSINESS: NiSource Inc. is a holding company for Northern Indiana Public Service Company (NIPSCO), which supplies electricity and gas to the northern third of Indiana. Customers: 488,833 electric in Indiana, 3,200,000 gas in Indiana, Ohio, Pennsylvania, Kentucky, Virginia, Maryland, through its Columbia subsidiaries. Revenue breakdown, 2024: electrical, 32%; gas, 67%; other, less than 1%. Generating capacity, coal, 69.4%; purchased & other, 30.6%. 2023 reported depreciation rates: 3.5% electric, 2.4% gas. Has 7,364 employees. Chairman: Richard L. Thompson. President & Chief Executive Officer: Lloyd Yates. Incorporated: Indiana. Address: 801 East 86th Avenue, Merrillville, Indiana 46410. Telephone: 877-647-5990. Internet: www.nisource.com.

NiSource reported a solid second-quarter performance. The utility registered earnings per share of $0.21, up from $0.11 in the same period last year. This result was bolstered by key approvals for rate cases in Indiana and Pennsylvania. Lower commodity prices have reduced consumers' energy bills of late, allowing for easier regulatory proceedings. The strong regulatory environment has helped to motivate management to invest more than $1.2 billion in the first six months of 2024. NiSource expanded its financial leverage in the quarter, issuing roughly $1.1 billion in five- and 30-year debentures, while retiring all outstanding preferred stock, signaling confidence in its operating environment and investment pipeline.

Good performance will probably continue throughout the remainder of the year. We've raised our full-year 2024 earnings per share target by $0.05, to $1.75, in line with management's projections. Capital investment will likely accelerate, with lower interest rates expected to begin in September, providing a potential tailwind. Meantime, operating and maintenance costs should prove to be stable throughout the second half of the year. We have slightly tempered our expectations due to strong weather events in July, although management reports having performed well without significant service disruptions despite these difficulties, indicating the company's effective preparedness and responsiveness.

NiSource's long-term outlook is fairly upbeat. Management has projected consistent annual earnings growth of 6% to 8% through 2028, underpinned by a $16.4 billion capital investment plan focused on electric generation (decomissioning coal plants) and gas infrastructure. Regulatory approvals, more-normal commodity prices and underlying economic strength are all crucial to meeting these objective. And, interest in developing data centers in the region could power a tailwind.

The stock price has gained as a result of the recent operating strength. This leaves the total upside out to late decade somewhat supressed. However, conservative accounts will still find much to appreciate, although currently, higher expected returns can be found from other utilities.

Earl B. Humes *August 23, 2024*

(A) Dil. EPS. Excl. gains (losses) on disc. ops.: '08, ($1.14); '15, (30¢); '18, ($1.48). Next egs. report due early November. Qtl'y egs. may not sum to total due to rounding.
(B) Div'ds historically paid in mid-Feb., May, Aug., Nov. ■ Div'd reinv. avail.
(C) Incl. intang in '23: $1485.9 million, $3.33/sh.
(D) In mill.
(E) Spun off Columbia Pipeline Group (7/15)

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	30
Earnings Predictability	65

N.W. NATURAL NYSE-NWN

RECENT PRICE **37.75** | P/E RATIO **13.9** (Trailing: 17.3 Median: 24.0) | RELATIVE P/E RATIO **0.80** | DIV'D YLD **5.2%** | **VALUE LINE**

TIMELINESS 3 Raised 8/16/24
SAFETY 2 Raised 2/23/24
TECHNICAL 4 Lowered 7/26/24
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$27-$44 $36 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	75	(+100%)	*22%*
Low	55	(+45%)	*13%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	115	123	131
to Sell	110	90	105
Hld's(000)	27474	28414	28777

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	46.6	52.6	52.3	66.2	69.5	71.8	74.1	77.3	56.8	57.6	52.4	41.0						
Low:	40.0	40.1	42.0	48.9	56.5	51.5	57.2	42.3	41.7	42.4	35.7	34.8						

LEGENDS
0.60 x Dividends p sh divided by Interest Rate
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029
128 96 80 64 48 40 32 24 16 12

Percent shares traded 15 10 5

% TOT. RETURN 7/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-2.1	9.9
3 yr.	-12.8	12.6
5 yr.	-32.0	72.0

© VALUE LINE PUB. LLC

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025		27-29
	39.16	38.17	30.56	31.72	27.14	28.02	27.64	26.39	23.61	26.52	24.45	24.49	25.29	27.64	29.20	31.82	***28.75***	***28.55***	Revenues per sh	*31.10*
	5.31	5.20	5.18	5.00	4.94	5.04	5.05	4.91	4.93	1.04	5.28	5.15	5.69	6.17	5.71	5.83	***5.55***	***6.55***	"Cash Flow" per sh	*7.15*
	2.57	2.83	2.73	2.39	2.22	2.24	2.16	1.96	2.12	d1.94	2.33	2.19	2.30	2.56	2.54	2.59	***2.30***	***3.00***	Earnings per sh [A]	*3.15*
	1.52	1.60	1.68	1.75	1.79	1.83	1.85	1.86	1.87	1.88	1.89	1.90	1.91	1.92	1.93	1.94	***1.95***	***1.96***	Div'ds Decl'd per sh [B]■	*1.98*
	3.92	5.09	9.35	3.76	4.91	5.13	4.40	4.37	4.87	7.43	7.43	7.95	9.18	9.49	9.53	8.70	***10.00***	***9.50***	Cap'l Spending per sh	*10.00*
	23.71	24.88	26.08	26.70	27.23	27.77	28.12	28.47	29.71	25.85	26.41	28.42	29.05	30.04	33.08	34.12	***37.40***	***36.95***	Book Value per sh [D]	*39.00*
	26.50	26.53	26.58	26.76	26.92	27.08	27.28	27.43	28.63	28.74	28.88	30.47	30.59	31.13	35.53	37.63	***40.00***	***42.00***	Common Shs Outst'g [C]	*45.00*
	18.1	15.2	17.0	19.0	21.1	19.4	20.7	23.7	26.9	- -	26.6	30.9	25.0	19.5	19.6	16.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*20.0*
	1.09	1.01	1.08	1.19	1.34	1.09	1.09	1.19	1.41	- -	1.44	1.65	1.28	1.06	1.13	.96			Relative P/E Ratio	*1.10*
	3.3%	3.7%	3.6%	3.9%	3.8%	4.2%	4.1%	4.0%	3.3%	3.0%	3.0%	2.8%	3.3%	3.8%	3.9%	4.5%			Avg Ann'l Div'd Yield	*3.3%*
	754.0	723.8	676.0	762.2	706.1	746.4	773.7	860.4	1037.4	1197.5	***1150***	***1200***	Revenues ($mill)	*1400*
	58.7	53.7	58.9	d55.6	67.3	65.3	70.3	78.7	86.3	93.9	***92.5***	***125***	Net Profit ($mill)	*140*
	41.5%	40.0%	40.9%	- -	26.4%	16.2%	23.1%	25.8%	25.2%	25.7%	***25.0%***	***25.0%***	Income Tax Rate	*25.0%*
	7.8%	7.4%	8.7%	NMF	9.5%	8.8%	9.1%	9.1%	8.3%	7.8%	***8.0%***	***10.5%***	Net Profit Margin	*10.1%*
	44.8%	42.5%	44.4%	47.9%	48.1%	48.2%	49.2%	52.8%	51.5%	52.6%	***52.5%***	***55.0%***	Long-Term Debt Ratio	*55.0%*
	55.2%	57.5%	55.6%	52.1%	51.9%	51.8%	50.8%	47.2%	48.5%	47.4%	***47.5%***	***45.0%***	Common Equity Ratio	*45.0%*
	1389.0	1357.7	1529.8	1426.0	1468.9	1672.0	1748.8	1979.7	2421.6	2709.2	***3150***	***3450***	Total Capital ($mill)	*3900*
	2121.6	2182.7	2260.9	2255.0	2421.4	2438.9	2654.8	2871.4	3114.4	3358.0	***3750***	***3900***	Net Plant ($mill)	*4200*
	5.8%	5.5%	5.1%	NMF	5.8%	5.2%	5.2%	5.1%	3.6%	3.5%	***3.0%***	***3.5%***	Return on Total Cap'l	*3.5%*
	7.6%	6.9%	6.9%	NMF	8.8%	7.5%	7.9%	8.4%	7.3%	7.3%	***6.0%***	***8.0%***	Return on Shr. Equity	*8.0%*
	7.6%	6.9%	6.9%	NMF	8.8%	7.5%	7.9%	8.4%	7.3%	7.3%	***6.0%***	***8.0%***	Return on Com Equity	*8.0%*
	1.1%	.6%	.9%	NMF	2.1%	1.4%	1.7%	2.4%	2.1%	1.7%	***1.0%***	***2.5%***	Retained to Com Eq	*2.5%*
	85%	92%	87%	NMF	76%	82%	79%	71%	79%	75%	***85%***	***65%***	All Div'ds to Net Prof	*63%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $1654.7 mill. **Due in 5 Yrs** $1415 mill.
LT Debt $1574.8 mill. **LT Interest** $80 mill.

(Total interest coverage: 5.0x)

Pension Assets-12/23 $283.0 mill.
Oblig. $425.5 mill.

Pfd Stock None

Common Stock 38,670,272 shares
as of 7/26/24

MARKET CAP $1.5 billion (Small Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	29.3	32.9	65.2
Other	714.9	568.5	357.9
Current Assets	744.2	601.4	423.1
Accts Payable	180.7	145.4	93.6
Debt Due	348.9	240.7	79.9
Other	369.1	310.8	262.0
Current Liab.	898.7	696.9	435.5
Fix. Chg. Cov.	320%	240%	315%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-2.5%	- -	*4.5%*
"Cash Flow"	1.0%	2.5%	*5.0%*
Earnings	-1.0%	2.5%	*6.5%*
Dividends	1.5%	.5%	*.5%*
Book Value	1.0%	.5%	*4.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	315.9	148.9	101.5	294.1	860.4
2022	350.3	195.0	116.8	375.3	1037.4
2023	462.4	237.9	141.5	355.7	1197.5
2024	433.5	211.7	***130***	***374.8***	***1150***
2025	***450***	***220***	***135***	***395***	***1200***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.94	d.02	d.67	1.31	2.56
2022	1.80	.05	d.56	1.36	2.54
2023	2.01	.03	d.65	1.21	2.59
2024	1.69	d.07	***d.70***	***1.38***	***2.30***
2025	***2.10***	***.05***	***d.60***	***1.45***	***3.00***

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.4775	.4775	.4775	.48	1.91
2021	.48	.48	.48	.483	1.92
2022	.483	.483	.483	.485	1.93
2023	.485	.485	.485	.488	1.94
2024	.488	.488	.488		

BUSINESS: Northwest Natural Holding Co. distributes natural gas to 1,000 communities, 795,000 customers, in Oregon (88% of customers) and in southwest Washington state. Principal cities served: Portland and Eugene, OR; Vancouver, WA. Service area population: 3.7 mill. (77% in OR). Company buys gas supply from Canadian and U.S. producers; has transportation rights on Northwest Pipeline system. Owns local underground storage. Rev. breakdown: residential, 38%; commercial, 23%; industrial, gas transportation, 39%. Employs 1,380. BlackRock Inc. owns 17.6% of shares; Vanguard, 12.4%; Off./Dir., .84% (4/24 proxy). CEO: David H. Anderson. Inc.: Oregon. Address: 220 NW 2nd Ave., Portland, OR 97209. Tel.: 503-226-4211. Internet: www.nwnatural.com.

Northwest Natural's second-quarter results reflect challenging regulatory conditions. The company reported a net loss of $2.8 million, or $0.07 per share, landing below our earnings target of $0.05. The broader economic environment in Oregon showed positive signs with low unemployment, but a regulatory lag on the company's investments added pressure from the top down. Inflation compounded matters as operating expenses rose. Too, increased pension costs didn't help. However, healthy customer growth and a focus on cost-saving measures should contribute to the bottom line when the seasons turn.

We've lowered our 2024 full-year earnings target. We look for earnings to decline to $2.30 per share, down from $2.50 previously. The new target is in line with management's guidance range. This assumes a rate case approval, which we expect in November. This case should help earnings to grow roughly 15% year over year in the fourth quarter. A significant rate adjustment is overdue, and the success of this rate case should more than offset the inflationary pressures which have hurt earnings performance.

Expansion should take a slower pace out to late decade. We think the bottom line is likely to recover nicely in 2025 on the back of the November rate case. Thereafter, we do not see a particularly strong driver for growth. Customer expansion at about 80 basis points per year is the main catalyst, and housing permits in the operating region are trending upwards. Still, the high cost of capital is restricting rate base growth. The company's water and wastewater utilities could add marginally, with customer growth averaging about 3% and tuck-in acquisition opportunities. Even then, earnings per share may only expand about 5% annually after 2025.

With the shares trading near multi-year lows, this stock looks attractively valued. The macroeconomic backdrop has certainly been far from ideal. Fortunately, we think operating conditions will slowly improve as interest rates and inflation come down. This leaves the stock at a discount, enhancing its upside potential and current dividend yield. Some accounts may also appreciate the company's investments in innovative clean energy technology.

Earl B. Humes *August 23, 2024*

(A) Diluted earnings per share. Excludes nonrecurring items: '08, ($0.03); '09, $0.06; May not sum due to rounding. Next earnings report due in early November.

(B) Dividends historically paid in mid-February, May, August, and November.
■ Dividend reinvestment plan available.
(C) In millions.

(D) Includes intangibles. In 2023: $163 million, $4.33/share.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	25
Earnings Predictability	15

ONE GAS, INC. NYSE-OGS

RECENT PRICE **66.89** | P/E RATIO **16.7** (Trailing: 16.9 Median: 21.0) | RELATIVE P/E RATIO **0.96** | DIV'D YLD **4.0%** | **VALUE LINE**

TIMELINESS 3 Raised 12/8/23
SAFETY 2 New 6/2/17
TECHNICAL 4 Raised 8/16/24
BETA .85 (1.00 = Market)

18-Month Target Price Range

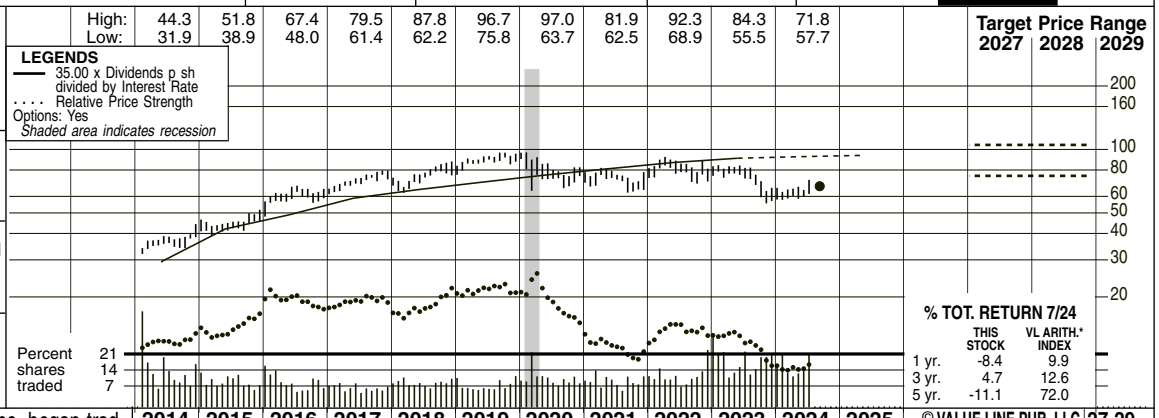
Low-High	Midpoint (% to Mid)
$44-$79	$62 (-10%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	105	(+55%)	*15%*
Low	75	(+10%)	*7%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	148	159	170
to Sell	153	160	147
Hld's(000)	51074	52932	51905



The shares of ONE Gas, Inc. began trading "regular-way" on the New York Stock Exchange on February 3, 2014. That happened as a result of the separation of ONEOK's natural gas distribution operation. Regarding the details of the spinoff, on January 31, 2014, ONEOK distributed one share of OGS common stock for every four shares of ONEOK common stock held by ONEOK shareholders of record as of the close of business on January 21. It should be mentioned that ONEOK did not retain any ownership interest in the new company.

CAPITAL STRUCTURE as of 6/30/24
Total Debt $3206.6 mill. **Due in 5 Yrs** $890.0 mill.
LT Debt $2146.9 mill. **LT Interest** $120.0 mill.
(LT interest earned: 3.4x; total interest coverage: 3.4x)
Leases, Uncapitalized Annual rentals $6.7 mill.
Pfd Stock None
Pension Assets-12/23 $977.0 mill.
Oblig. $962.1 mill.
Common Stock 56,654,351 shs.
as of 7/29/24
MARKET CAP: $3.8 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	9.7	18.8	10.7
Other	1207.9	746.4	589.5
Current Assets	1217.6	765.2	600.2
Accts Payable	360.5	278.1	165.0
Debt Due	572.7	888.9	1059.7
Other	256.2	310.2	232.3
Current Liab.	1189.4	1477.2	1457.0
Fix. Chg. Cov.	540%	390%	410%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	- -	7.0%	*9.5%*
"Cash Flow"	- -	7.0%	*9.0%*
Earnings	- -	6.0%	*3.5%*
Dividends	- -	8.5%	*2.5%*
Book Value	- -	4.5%	*4.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	625.3	315.6	273.9	593.8	1808.6
2022	971.5	428.9	359.4	818.2	2578.0
2023	1032.1	398.1	335.8	606.0	2372.0
2024	758.3	354.1	***320***	***617.6***	***2050***
2025	***800***	***375***	***350***	***675***	***2200***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	1.79	.56	.38	1.12	3.85
2022	1.83	.59	.44	1.23	4.08
2023	1.84	.58	.45	1.27	4.14
2024	1.75	.48	***.41***	***1.26***	***3.90***
2025	***1.85***	***.55***	***.43***	***1.27***	***4.10***

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.54	.54	.54	.54	2.16
2021	.58	.58	.58	.58	2.32
2022	.62	.62	.62	.62	2.48
2023	.65	.65	.65	.65	2.60
2024	.66	.66	.66		

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	© VALUE LINE PUB. LLC	27-29
	34.92	29.62	27.30	29.43	31.08	31.32	28.78	33.72	46.58	41.95	***36.30***	***38.95***	Revenues per sh	*70.15*
	4.52	4.82	5.43	5.96	6.32	6.96	7.36	7.71	8.13	9.04	***9.10***	***9.45***	"Cash Flow" per sh	*13.95*
	2.07	2.24	2.65	3.02	3.25	3.51	3.68	3.85	4.08	4.14	***3.90***	***4.10***	Earnings per sh [A]	*5.00*
	.84	1.20	1.40	1.68	1.84	2.00	2.16	2.32	2.48	2.60	***2.64***	***2.68***	Div'ds Decl'd per sh [B]■	*2.85*
	5.70	5.63	5.91	6.81	7.50	7.91	8.87	9.23	11.01	11.79	***12.10***	***12.30***	Cap'l Spending per sh	*12.60*
	34.45	35.24	36.12	37.47	38.86	40.35	42.01	43.81	46.69	48.91	***50.15***	***53.55***	Book Value per sh	*60.20*
	52.08	52.26	52.28	52.31	52.57	52.77	53.17	53.63	55.35	56.55	***56.50***	***56.50***	Common Shs Outst'g [C]	*57.00*
	17.8	19.8	22.7	23.5	23.1	25.3	21.7	18.9	19.9	18.0	*Bold figures are*		Avg Ann'l P/E Ratio	*18.0*
	.94	1.00	1.19	1.18	1.25	1.35	1.11	1.02	1.16	1.01	*Value Line*		Relative P/E Ratio	*1.00*
	2.3%	2.7%	2.3%	2.4%	2.5%	2.3%	2.7%	3.2%	3.1%	3.5%	*estimates*		Avg Ann'l Div'd Yield	*3.2%*
	1818.9	1547.7	1427.2	1539.6	1633.7	1652.7	1530.3	1808.6	2578.0	2372.0	***2050***	***2200***	Revenues ($mill)	*4000*
	109.8	119.0	140.1	159.9	172.2	186.7	196.4	206.4	221.7	231.2	***220***	***230***	Net Profit ($mill)	*285*
	38.4%	38.0%	37.8%	36.4%	23.7%	18.7%	17.5%	16.3%	17.3%	14.9%	***16.5%***	***16.5%***	Income Tax Rate	*20.0%*
	6.0%	7.7%	9.8%	10.4%	10.5%	11.3%	12.8%	11.4%	8.6%	9.7%	***10.7%***	***10.5%***	Net Profit Margin	*7.1%*
	40.1%	39.5%	38.7%	37.8%	38.6%	37.7%	41.5%	61.1%	50.7%	43.8%	***45.0%***	***45.0%***	Long-Term Debt Ratio	*51.0%*
	59.9%	60.5%	61.3%	62.2%	61.4%	62.3%	58.5%	38.9%	49.3%	56.2%	***55.0%***	***55.0%***	Common Equity Ratio	*49.0%*
	2995.3	3042.9	3080.7	3153.5	3328.1	3415.5	3815.7	6032.9	5246.2	4926.3	***5150***	***5500***	Total Capital ($mill)	*7000*
	3293.7	3511.9	3731.6	4007.6	4283.7	4565.2	4867.1	5190.8	5628.8	6135.2	***6550***	***6925***	Net Plant ($mill)	*8200*
	4.4%	4.7%	5.2%	5.8%	5.9%	6.4%	6.0%	3.9%	5.0%	5.9%	***5.5%***	***5.5%***	Return on Total Cap'l	*5.5%*
	6.1%	6.5%	7.4%	8.2%	8.4%	8.8%	8.8%	8.8%	8.6%	8.4%	***8.0%***	***7.5%***	Return on Shr. Equity	*8.5%*
	6.1%	6.5%	7.4%	8.2%	8.4%	8.8%	8.8%	8.8%	8.6%	8.4%	***8.0%***	***7.5%***	Return on Com Equity	*8.5%*
	3.7%	3.1%	3.5%	3.7%	3.7%	3.8%	3.7%	3.5%	3.4%	3.2%	***2.5%***	***2.5%***	Retained to Com Eq	*3.5%*
	40%	53%	52%	55%	56%	56%	58%	60%	60%	62%	***68%***	***66%***	All Div'ds to Net Prof	*57%*

BUSINESS: ONE Gas, Inc. provides natural gas distribution services to more than two million customers. There are three divisions: Oklahoma Natural Gas, Kansas Gas Service, and Texas Gas Service. The company purchased 160 Bcf of natural gas supply in 2023, compared to 165 Bcf in 2022. Total volumes delivered by customer (fiscal 2023): transportation, 59.3%; residential, 29.7%; commercial & industrial, 10.6%; other, .4%. ONE Gas has around 3,900 employees. BlackRock owns 14.5% of common stock; The Vanguard Group, 11.6%; American Century Investment, 7.5%; officers and directors, 1.5% (4/24 Proxy). CEO: Robert S. McAnnally. Incorporated: Oklahoma. Address: 15 East Fifth Street, Tulsa, Oklahoma 74103. Tel.: 918-947-7000. Internet: www.onegas.com.

Results for ONE Gas have been uninspiring so far this year. Through the first half, earnings per share of $2.23 were 8% lower than the $2.42 tally registered in 2023. This stemmed, to some degree, from increased employee-related costs, reflecting planned investments in the company's workforce and ongoing insourcing efforts. Depreciation and amortization expense rose, too, given additional capital investments. Also, sales volumes dropped and interest expense climbed. But new rates provided somewhat of an offset. Nevertheless, at this juncture, it seems that full-year profits will decline around 6%, to $3.90 per share, compared to 2023's $4.14 total. Regarding 2025, however, we believe a 5% rebound, to $4.10 a share, is possible. That's based, to a certain extent, on our assumption that business conditions cooperate.

The Financial Strength rating is solid, at B++. When the June period concluded, cash and equivalents were $10.7 million. Moreover, ONE Gas possesses a nearly $1.3 billion revolving credit facility expiring in March, 2028. Also, at the end of the second quarter, long-term debt was a reasonable 43% of total capital and short-term borrowings did not seem to be a big issue. All told, the energy firm ought to continue to satisfy its various obligations with minimal difficulty.

This year's capital expenditures, including asset removal costs, are anticipated to be around $750 million. (That would be modestly above the 2023 figure of $728.7 million.) Nearly 75% of the budget is dedicated to system integrity and pipeline replacement projects. It's worth mentioning that the energy firm projects total spending to be around $4.2 billion between 2024 and 2028, with roughly the same percentage of funds allocated to where they are currently. Those objectives appear achievable assuming, of course, that the balance sheet stays in sound shape.

These shares should be of interest to conservative, income-focused investors. The dividend yield looks decent versus other stocks in our Natural Gas Utility Industry. Consider, also, the 2 (Above Average) Safety rank and good grade for Price Stability.

Frederick L. Harris, III *August 23, 2024*

(A) Diluted EPS. Excludes nonrecurring gain: 2017, $0.06. Next earnings report due early Nov. Quarterly EPS figures for 2022 don't equal total due to rounding.
(B) Dividends historically paid in early March, June, Sept., and Dec. ■ Dividend reinvestment plan. Direct stock purchase plan.
(C) In millions.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	50
Earnings Predictability	100

SOUTHWEST GAS NYSE-SWX

RECENT PRICE **70.90** | P/E RATIO **18.8** (Trailing: 27.9 Median: 21.0) | RELATIVE P/E RATIO **1.08** | DIV'D YLD **3.5%** | **VALUE LINE**

TIMELINESS — Suspended 11/17/23
SAFETY 2 Raised 2/23/24
TECHNICAL — Suspended 11/17/23
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$49-$83	$66 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	85	(+20%)	8%
Low	65	(-10%)	1%

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	103	130	122
to Sell	140	144	149
Hld's(000)	64845	66489	65977

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	56.0	64.2	63.7	79.6	86.9	86.0	92.9	81.6	73.5	95.6	68.0	78.5						
Low:	42.0	47.2	50.5	53.5	72.3	62.5	73.3	45.7	57.0	59.5	53.8	57.6						
Revenues per sh	48.53	42.00	40.18	41.07	41.77	42.08	45.61	52.00	51.82	53.00	54.31	56.72	57.68	60.91	73.90	76.22	*70.55*	*73.95*
"Cash Flow" per sh	5.76	6.16	6.46	6.81	7.73	8.24	8.47	8.62	9.29	8.83	8.14	9.40	9.87	9.46	3.91	8.29	*9.40*	*10.15*
Earnings per sh A	1.39	1.94	2.27	2.43	2.86	3.11	3.01	2.92	3.18	3.62	3.68	3.94	4.14	3.39	d3.10	2.13	*3.25*	*3.90*
Div'ds Decl'd per sh B■†	.90	.95	1.00	1.06	1.18	1.32	1.46	1.62	1.80	1.98	2.08	2.18	2.28	2.38	2.48	2.48	*2.48*	*2.52*
Cap'l Spending per sh	6.79	4.81	4.73	8.29	8.57	7.86	8.53	10.30	11.15	12.97	14.44	17.06	14.43	11.84	12.80	12.19	*11.35*	*12.50*
Book Value per sh	23.49	24.44	25.62	26.66	28.35	30.47	31.95	33.61	35.03	37.74	42.47	45.56	46.77	48.89	47.95	47.72	*53.20*	*54.35*
Common Shs Outst'g C	44.19	45.09	45.56	45.96	46.15	46.36	46.52	47.38	47.48	48.09	53.03	55.01	57.19	60.42	67.12	71.56	*73.00*	*73.00*
Avg Ann'l P/E Ratio	20.3	12.2	14.0	15.7	15.0	15.8	17.9	19.4	21.6	22.2	20.6	21.3	16.8	19.9	- -	29.1		
Relative P/E Ratio	1.22	.81	.89	.98	.95	.89	.94	.98	1.13	1.12	1.11	1.13	.86	1.08	- -	1.68		
Avg Ann'l Div'd Yield	3.2%	4.0%	3.2%	2.8%	2.8%	2.7%	2.7%	2.9%	2.6%	2.5%	2.7%	2.6%	3.3%	3.5%	3.2%	4.0%		
Revenues ($mill)	2121.7	2463.6	2460.5	2548.8	2880.0	3119.9	3298.9	3680.5	4960.0	5454.0	*5150*	*5400*						
Net Profit ($mill)	141.1	138.3	152.0	173.8	182.3	213.9	232.3	200.8	d203.3	150.9	*240*	*285*						
Income Tax Rate	35.7%	36.4%	33.9%	32.8%	25.3%	20.5%	21.6%	16.1%	NMF	21.2%	*21.0%*	*21.0%*						
Net Profit Margin	6.7%	5.6%	6.2%	6.8%	6.3%	6.9%	7.0%	5.5%	NMF	2.8%	*4.6%*	*5.3%*						
Long-Term Debt Ratio	52.4%	49.3%	48.2%	49.8%	48.3%	47.9%	50.5%	58.2%	57.8%	57.4%	*58.0%*	*58.0%*						
Common Equity Ratio	47.6%	50.7%	51.8%	50.2%	51.7%	52.1%	49.5%	41.8%	42.2%	42.6%	*42.0%*	*42.0%*						
Total Capital ($mill)	3123.9	3143.5	3213.5	3613.3	4359.3	4806.4	5407.2	7069.5	7621.4	8024.5	*9250*	*9450*						
Net Plant ($mill)	3658.4	3891.1	4132.0	4523.7	5093.2	5685.2	6176.1	7594.0	7024.5	7518.2	*8000*	*8500*						
Return on Total Cap'l	5.7%	5.5%	5.8%	5.8%	5.2%	5.4%	5.3%	3.5%	NMF	1.9%	*2.5%*	*3.0%*						
Return on Shr. Equity	9.5%	8.7%	9.1%	9.6%	8.1%	8.5%	8.7%	6.8%	NMF	4.4%	*6.0%*	*7.0%*						
Return on Com Equity	9.5%	8.7%	9.1%	9.6%	8.1%	8.5%	8.7%	6.8%	NMF	4.4%	*6.0%*	*7.0%*						
Retained to Com Eq	5.0%	4.0%	4.1%	4.5%	3.6%	3.9%	4.0%	2.1%	NMF	NMF	*1.5%*	*2.5%*						
All Div'ds to Net Prof	47%	54%	55%	53%	55%	54%	54%	69%	NMF	116%	*76%*	*65%*						

Bold figures are Value Line estimates

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	27-29
Revenues per sh	*76.65*
"Cash Flow" per sh	*10.53*
Earnings per sh A	*4.20*
Div'ds Decl'd per sh B■†	*2.60*
Cap'l Spending per sh	*12.00*
Book Value per sh	*58.65*
Common Shs Outst'g C	*75.00*
Avg Ann'l P/E Ratio	*18.0*
Relative P/E Ratio	*.90*
Avg Ann'l Div'd Yield	*3.4%*
Revenues ($mill)	*5750*
Net Profit ($mill)	*315*
Income Tax Rate	*21.0%*
Net Profit Margin	*5.5%*
Long-Term Debt Ratio	*56.0%*
Common Equity Ratio	*44.0%*
Total Capital ($mill)	*10000*
Net Plant ($mill)	*9250*
Return on Total Cap'l	*3.0%*
Return on Shr. Equity	*7.0%*
Return on Com Equity	*7.0%*
Retained to Com Eq	*2.5%*
All Div'ds to Net Prof	*62%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $5205.8 mill. **Due in 5 Yrs** $1008 mill.
LT Debt $5063.6 mill. **LT Interest** $300 mill.
(Total interest coverage: 1.45x) (58% of Cap'l)

Leases, Uncapitalized Annual rentals $24.9 mill.
Pension Assets-12/23 $1202.0 mill.
Oblig. $1352.2 mill.

Pfd Stock None

Common Stock 71,711,480 shs.
as of 7/26/24

MARKET CAP: $5.1 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	123.1	106.5	599.6
Other	3584.6	1774.6	1132.0
Current Assets	3707.7	1881.1	1731.6
Accts Payable	662.1	346.9	264.3
Debt Due	1587.4	671.1	142.2
Other	1173.5	666.8	689.7
Current Liab.	1173.5	1684.8	1096.2
Fix. Chg. Cov.	265%	145%	165%

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	3.5%	3.0%	*6.0%*
"Cash Flow"	4.0%	1.5%	*8.5%*
Earnings	5.5%	4.5%	*10.0%*
Dividends	8.5%	7.0%	*5.5%*
Book Value	6.5%	7.0%	*7.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	885.9	821.4	888.7	1084.5	3680.5
2022	1267.4	1146.1	1125.6	1420.9	4960.0
2023	1603.3	1293.6	1169.5	1387.6	5454.0
2024	1581.0	1182.2	*1100*	*1286.8*	*5150*
2025	*1660*	*1240*	*1225*	*1275*	*5400*

Calendar	EARNINGS PER SHARE A D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2021	2.03	.43	d.19	1.15	3.39
2022	1.58	d.10	d.18	d4.18	d3.10
2023	.67	.40	.04	1.02	2.13
2024	1.22	.25	*.20*	*1.58*	*3.25*
2025	*1.75*	*.65*	*.15*	*1.35*	*3.90*

Calendar	QUARTERLY DIVIDENDS PAID B■† Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.545	.570	.570	.570	2.26
2021	.570	.595	.595	.595	2.36
2022	.595	.62	.62	.62	2.46
2023	.62	.62	.62	.62	2.48
2024	.62	.62			

BUSINESS: Southwest Gas Holdings, Inc. is the parent holding company of Southwest Gas. Centuri Group spun-off 4/22/24. Southwest Gas is a regulated gas distributor serving 2.2 million customers in Arizona, Nevada, and California. 2023 margin mix: residential 68%; small commercial, 20%; large commercial and industrial, 8%; transportation, 4%. Total throughput: 2.2 billion therms. Southwest has 2,371 employees; Centuri 12,572. Off. & dir. own .4% of common stock; Carl C. Icahn, 15.4%; BlackRock, 13.0%; The Vanguard Group, 10.1%; (3/24 Proxy). Chairman: Michael J. Melarkey. Pres. & CEO: Karen S. Haller. Inc.: DE. Addr.: 8360 S. Durango Drive, P.O. Box 98510 Las Vegas, Nevada 89193. Telephone: 702-876-7237. Internet: www.swgas.com.

Southwest Gas Holdings delivered a weak second-quarter performance. The quarter was highlighted by the successful completion of the Centuri initial public offering (IPO), marking a strategic shift towards focusing on its regulated natural gas utility operations. Southwest still owned approximately 75% of Centuri following the IPO. The company's core utility business benefited from strong customer growth, particularly in the Phoenix and Las Vegas markets, and from recent rate case outcomes in Nevada, leading to an $8 million increase in net income year over year. Good cost management and regulatory execution there resulted in strong profit margins. However, earnings declined overall due to separation costs, reduced volumes at Centuri and a higher interest expense.

We expect a strong second half of 2024 to materialize on the bottom line. In the IPO's wake, performance should recover nicely. The utility business will likely grow with strong demographic and economic trends in its service area. Too, ongoing strategic capital investments and further regulatory approvals set the stage for a robust result at the end of the year. The company also plans to continue its separation of Centuri, with various options available to enhance shareholder value.

Southwest Gas is well positioned to benefit from long-term tailwinds in energy demand. The utility's footprint in rapidly growing regions is likely to produce strong organic growth opportunities. Investments in infrastructure expansion and system hardening should lead to rate-base growth of about 6% to 8% over the next few years. The company's renewed focus on maintaining a strong balance sheet and disciplined capital allocation should bolster performance from potential regulatory changes or market volatility. However, balancing investments against energy affordability could prove more challenging than anticipated.

The stock is best suited to conservative income investors. After the recent corporate restructuring activities, the stock price has strengthened somewhat. Based on our growth forecasts to late decade, total return potential doesn't stand out at this juncture.

Earl B. Humes *August 23, 2024*

(A) Diluted earnings. Excl. nonrec. gains (losses): '22, 10¢. Next egs. report due early November. **(B)** Dividends historically paid early March, June, September, and December.
■† Div'd reinvestment and stock purchase plan avail. **(C)** In millions.
(D) Totals may not sum due to rounding.

Company's Financial Strength	A
Stock's Price Stability	75
Price Growth Persistence	35
Earnings Predictability	10

SPIRE INC. NYSE-SR

RECENT PRICE **63.48** | P/E RATIO **15.3** (Trailing: 15.3 Median: 19.0) | RELATIVE P/E RATIO **0.88** | DIV'D YLD **4.9%** | **VALUE LINE**

TIMELINESS 3 Raised 2/16/24
SAFETY 2 Raised 6/20/03
TECHNICAL 4 Raised 8/16/24
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$48-$73 $61 (-5%)

2027-29 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	100	(+60%)	*16%*
Low	75	(+20%)	*9%*

Institutional Decisions

	3Q2023	4Q2023	1Q2024
to Buy	131	140	135
to Sell	144	123	134
Hld's(000)	48374	48459	48507

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
High:	48.5	55.2	61.0	71.2	82.9	81.1	88.0	88.0	77.9	79.2	75.8	68.0						
Low:	37.4	44.0	49.1	57.1	62.3	60.1	71.7	50.6	59.3	61.5	53.8	56.4						

LEGENDS
26.50 x Dividends p sh divided by Interest Rate
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2027 2028 2029

% TOT. RETURN 7/24

	THIS STOCK	VL ARITH.* INDEX
1 yr.	10.0	9.9
3 yr.	7.0	12.6
5 yr.	-1.2	72.0

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100.44	85.49	77.83	71.48	49.90	31.10	37.68	45.59	33.68	36.07	38.78	38.30	35.96	43.24	41.88	50.12	*45.15*	*45.25*	Revenues per sh [A]	*57.25*
4.22	4.56	4.11	4.62	4.58	3.12	3.87	6.15	6.16	6.54	7.55	7.12	5.25	9.09	8.44	8.60	*8.90*	*9.25*	"Cash Flow" per sh	*11.00*
2.64	2.92	2.43	2.86	2.79	2.02	2.35	3.16	3.24	3.43	4.33	3.52	1.44	4.96	3.95	3.85	*4.30*	*4.55*	Earnings per sh [A B]	*5.50*
1.49	1.53	1.57	1.61	1.66	1.70	1.76	1.84	1.96	2.10	2.25	2.37	2.49	2.60	2.74	2.88	*3.02*	*3.16*	Div'ds Decl'd per sh [C ■]	*3.60*
2.57	2.36	2.56	3.02	4.83	4.00	3.96	6.68	6.42	9.08	9.86	16.15	12.37	12.09	10.52	12.45	*14.30*	*11.25*	Cap'l Spending per sh	*14.50*
22.12	23.32	24.02	25.56	26.67	32.00	34.93	36.30	38.73	41.26	44.51	45.14	44.19	46.74	49.08	50.29	*52.75*	*55.50*	Book Value per sh [D]	*66.05*
21.99	22.17	22.29	22.43	22.55	32.70	43.18	43.36	45.65	48.26	50.67	50.97	51.60	51.70	52.50	53.20	*58.00*	*60.00*	Common Shs Outst'g [E]	*62.00*
14.3	13.4	13.7	13.0	14.5	21.3	19.8	16.5	19.6	19.8	16.7	22.8	51.1	13.6	17.5	17.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
.86	.89	.87	.82	.92	1.20	1.04	.83	1.03	1.00	.90	1.21	2.62	.73	1.01	1.00			Relative P/E Ratio	*.90*
3.9%	3.9%	4.7%	4.3%	4.1%	4.0%	3.8%	3.5%	3.1%	3.1%	3.1%	3.0%	3.4%	3.8%	4.0%	4.3%			Avg Ann'l Div'd Yield	*4.1%*
1627.2	1976.4	1537.3	1740.7	1965.0	1952.4	1855.4	2235.5	2198.5	2666.3	*2620*	*2715*	Revenues ($mill) [A]	*3550*
84.6	136.9	144.2	161.6	214.2	184.6	88.6	271.7	220.8	217.5	*240*	*260*	Net Profit ($mill)	*340*
27.6%	31.2%	32.5%	32.4%	- -	15.7%	12.3%	20.1%	21.1%	15.1%	*19.5%*	*19.5%*	Income Tax Rate	*24.0%*
5.2%	6.9%	9.4%	9.3%	10.9%	9.5%	4.8%	12.2%	10.0%	8.2%	*9.2%*	*9.6%*	Net Profit Margin	*9.6%*
55.1%	53.0%	50.9%	50.0%	45.7%	45.0%	49.0%	52.5%	51.2%	54.9%	*51.0%*	*51.0%*	Long-Term Debt Ratio	*51.0%*
44.9%	47.0%	49.1%	50.0%	54.3%	49.7%	46.1%	43.2%	44.6%	41.3%	*45.0%*	*45.0%*	Common Equity Ratio	*45.0%*
3359.4	3345.1	3601.9	3986.3	4155.5	4625.6	4946.0	5597.3	5777.0	6471.3	*6800*	*7400*	Total Capital ($mill)	*9100*
2759.7	2941.2	3300.9	3665.2	3970.5	4352.0	4680.1	5055.7	5370.4	5778.9	*6150*	*6530*	Net Plant ($mill)	*7675*
3.1%	5.1%	4.9%	5.0%	6.3%	5.1%	2.9%	5.8%	4.9%	4.8%	*5.0%*	*5.0%*	Return on Total Cap'l	*5.5%*
5.6%	8.7%	8.2%	8.1%	9.5%	7.3%	3.5%	10.2%	7.8%	7.5%	*8.0%*	*8.0%*	Return on Shr. Equity	*8.5%*
5.6%	8.7%	8.2%	8.1%	9.5%	7.9%	3.2%	10.6%	8.0%	7.6%	*8.0%*	*8.0%*	Return on Com Equity	*8.5%*
1.5%	3.7%	3.3%	3.3%	4.7%	2.7%	NMF	5.1%	2.5%	1.9%	*2.0%*	*1.5%*	Retained to Com Eq	*2.5%*
73%	58%	59%	60%	51%	66%	NMF	54%	71%	76%	*77%*	*79%*	All Div'ds to Net Prof	*70%*

CAPITAL STRUCTURE as of 6/30/24
Total Debt $4500.3 mill. **Due in 5 Yrs**$2310.0 mill.
LT Debt $3422.3 mill. **LT Interest** $140.0 mill.
(Total interest coverage: 2.4x)

Leases, Uncapitalized Annual rentals $9.8 mill.
Pension Assets-9/23 $630.3 mill.
Oblig. $832.5 mill.
Pfd Stock $242.0 mill. **Pfd Div'd** $14.8 mill.
Common Stock 57,750,474 shs.
as of 7/28/24

MARKET CAP: $3.7 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2022	2023	6/30/24
Cash Assets	6.5	5.6	7.4
Other	1585.5	1071.3	818.4
Current Assets	1592.0	1076.9	825.8
Accts Payable	617.4	253.1	205.2
Debt Due	1318.7	1112.1	1078.0
Other	417.5	390.2	426.6
Current Liab.	2353.6	1755.4	1709.8
Fix. Chg. Cov.	393%	294%	310%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '21-'23 to '27-'29
Revenues	-1.0%	4.5%	*4.0%*
"Cash Flow"	8.0%	5.0%	*4.0%*
Earnings	5.0%	3.0%	*4.5%*
Dividends	5.0%	5.5%	*4.5%*
Book Value	5.5%	3.5%	*5.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.)[A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	512.6	1104.9	327.8	290.2	2235.5
2022	555.4	880.9	448.0	314.2	2198.5
2023	814.0	1123.4	418.5	310.4	2666.3
2024	756.6	1128.5	414.1	*320.8*	*2620*
2025	*795*	*1140*	*445*	*335*	*2715*

Fiscal Year Ends	EARNINGS PER SHARE [A B F] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2021	1.65	3.55	.03	d.26	4.96
2022	1.01	3.27	d.10	d.20	3.95
2023	1.66	3.33	d.48	d.66	3.85
2024	1.52	3.58	d.28	*d.52*	*4.30*
2025	*1.50*	*3.45*	*d.16*	*d.24*	*4.55*

Calendar	QUARTERLY DIVIDENDS PAID [C ■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2020	.6225	.6225	.6225	.6225	2.49
2021	.65	.65	.65	.65	2.60
2022	.685	.685	.685	.685	2.74
2023	.72	.72	.72	.72	2.88
2024	.755	.755			

BUSINESS: Spire Inc., formerly known as the Laclede Group, Inc., is a holding company for natural gas utilities, which distributes natural gas across Missouri, including the cities of St. Louis and Kansas City, Alabama, and Mississippi. Has roughly 1.7 million customers. Acquired Missouri Gas 9/13, Alabama Gas Co 9/14. Utility therms sold and transported in fiscal 2023: 3.2 bill. Revenue mix for regulated operations: residential, 67%; commercial and industrial, 25%; transportation, 5%; other, 3%. Officers and directors own 2.9% of common shares; American Century Companies, 15.4% (12/23 proxy). Chairman: Edward Glotzbach; CEO: Steve Lindsey. Inc.: Missouri. Address: 700 Market Street, St. Louis, Missouri 63101. Tel.: 314-342-0500. Internet: www.spireenergy.com.

Spire's earnings ought to improve nicely in fiscal 2024 (ends September 30th). Through the first nine months, the bottom line advanced 7%, to $4.82 a share, versus the prior-year figure of $4.51. This was made possible partially by the Gas Utility unit, which benefited from new rates. The Midstream segment and Gas Marketing division posted better results for that period, too. If there are no major downside surprises during the fourth quarter, full-year per-share profits may recover some 12%, to $4.30, compared to fiscal 2023's $3.85 tally. Regarding next year, we think earnings per share can rise another 6% or so, to $4.55, assuming that business conditions cooperate. Improvements in operational effectiveness should lend additional support.

The capital spending budget for this year was boosted from $800 million to $830 million (prompted by the further deployment of advanced meters). That's around 25% higher than the fiscal 2023 level of $662.5 million. Funds are being deployed to such areas as infrastructure upgrades at the utilities and new business development initiatives. Leadership adds that it expects total expenditures from fiscal 2024 through fiscal 2033 to be $7.3 billion (increased from $7.2 billion previously). Assuming that finances remain in solid condition, we believe that Spire will have little trouble achieving those goals.

We are optimistic about the company's performance out to 2027-2029. The gas utilities presently serve about 1.7 million customers in Mississippi, Alabama, and Missouri. Also, the other operations, especially pipelines, hold promise. Additional expansionary projects and technological enhancements in customer service and elsewhere should be beneficial to Spire, as well. Finally, future acquisitions are likely, given the sound balance sheet, but size and timing factors prevent us from including them in our figures. So, at the current configuration, annual bottom-line growth stands to be in the range of 5%-7% over the 3- to 5-year horizon.

The stock's main attraction is the dividend yield, which stacks up well versus those of other equities in *Value Line's* Natural Gas Utility Industry.

Frederick L. Harris, III August 23, 2024

(A) Fiscal year ends Sept. 30th. **(B)** Based on diluted shares outstanding. Excludes gain from discontinued operations: '08, 94¢. Next earnings report due late Oct. **(C)** Dividends paid in early January, April, July, and October. ■ Dividend reinvestment plan available. **(D)** Incl. deferred charges. In '23: $1,171.6 mill., $22.02/sh. **(E)** In millions. **(F)** Qtly. egs. may not sum due to rounding or change in shares outstanding.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	35
Earnings Predictability	45

Choice among methods of estimating share yield

The search for the growth component in the discounted cash flow model.

David A. Gordon, Myron J. Gordon, and Lawrence I. Gould

The yield at which a share of stock is selling, also called its expected return or required return, is an important statistic in finance. Firms use it in choosing among investment opportunities and financing alternatives, and investors use it in making portfolio decisions. Nevertheless, the yield at which a share is selling is a difficult quantity to measure, which has limited its use in the practice of finance. This paper develops and tests a basis for choice among alternative methods of estimating a share's yield.

A share's yield, like a bond's yield, is the discount rate that equates its expected future payments with its current price. A bond's yield is easy to measure under the common practice of ignoring default risk, as the future payments are then known with certainty. The future payments on a share, however, are dividends and market price, and these payments are uncertain.

The common practice is to represent these future dividend payments with estimates of two numbers: One is the coming dividend, and the other is a growth rate. The latter can be an estimate of the long-run growth rate in the dividend or of the growth rate in price over the coming period. In the latter case, the estimate is called the expected holding-period return (EHPR); in the former case, it is called the discounted cash flow yield (DCFY).[1] In either case, the estimate of a share's yield reduces to the sum of its dividend yield and a future growth rate, with the latter inferred in some way from historical data.

There is a wide variety of acceptable methods for using historical data to estimate future growth. This variation in method is illustrated in the testimony of expert witnesses before public utility commissions on the fair return for a public utility. In these cases, the estimates and the methods used are a matter of public record. Some idea of the various methods can be found in Morin (1984) and Kolbe, Read, and Hall (1984). The performance of alternative estimating methods has been examined in Gordon (1974), Kolbe, Read, and Hall (1984), Brigham, Shome, and Vinson (1985), and Harris (1986).

We have derived our basis for comparing the accuracy of alternative methods for estimating the DCFY on a share from the generally accepted propositions that yield should vary according to risk, and that beta is the best estimate of risk. Hence, the DCFY should vary among shares with beta, and, between two methods for estimating growth, the superior method is the one for which the variation in yield among shares is explained better by the variation in beta among the shares.

First we present simple, plausible, and objective measurement rules for implementing four popular and/or attractive methods for estimating the DCFY. We then describe how sample statistics may be used to judge the accuracy of each method. We also describe how the CAPM model has been used to estimate share yield and explain why we do not compare it with the various DCFY methods. The following section carries out the comparison with samples of utility and industrial shares, and the last section pre-

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sents the conclusions that may be drawn from the findings.

ALTERNATIVE MEASUREMENT RULES FOR A SHARE'S YIELD

Under the DCF method or model for estimating the expected return on a stock, the yield for the jth stock is:

$$DCFY_{jt} = DYD_{jt} + GR_{jt}, \quad (1)$$

where:

$DCFY_{jt}$ = DCF yield on the jth stock at time t,

DYD_{jt} = dividend yield on the jth stock at time t, and

GR_{jt} = long-run growth rate in the dividend on the jth stock that investors expect at time t.

In what follows, we omit the time and firm subscripts on the variables when they are not required. Also, DCFY will refer to the unknown true yield on a share.

The difficult problem in arriving at the DCFY is estimation of the long-run growth rate that investors expect. Four estimates of that quantity are:

EGR = rate of growth in earnings per share over a prior time period, usually the last five years;

DGR = rate of growth in dividend per share over a prior time period, usually the last five years;

FRG = consensus among security analyst forecasts of the growth rate in earnings, over the next five years; and

BRG = an average over the prior five years of the product of the retention rate b and rate of return on common equity r on a stock.

The estimate of share yield that incorporates each of these estimates of growth is denoted KEGR, KDGR, KFRG, and KBRG, respectively.

A case can be made for each of the four methods for estimating growth. KEGR, KDGR, and KBRG have been widely used in public utility testimony and in research on stock valuation models. The rationale for KEGR is the belief that the past growth rate in earnings is the best predictor of future growth in earnings and dividends. The rationale for KDGR is that the future growth rate in dividends is the statistic we want to estimate, and the past dividend record is free of the noise in past earnings.[2] The rationale for KBRG is that all variables will grow at this rate if the firm earns r and retains b. Furthermore, as Gordon and Gould (1980) show, KEGR and KDGR will be biased in one direction or another if r and b have changed over the last five years. As for KFRG, security analysts are professionals employed to forecast future performance; their forecasts are widely accepted by investors. The IBES collection of forecast growth rates of security analysts compiled by Lynch, Jones, and Ryan has increased the popularity of this estimate.

As stated earlier, we may also take the yield on a share as the sum of the dividend yield and the expected rate of growth in price over the coming period. This estimate of a share's yield is widely used in testing the CAPM, with the average HPR over the prior five years commonly used in such empirical work. On the other hand, this estimate of a share's yield varies so widely among firms and over time as to be patently in error as an estimate of share yield.[3]

BASIS OF COMPARISON

To compare the accuracy of the four estimates of the DCFY stated above, we regress the data under each estimate on beta for a sample of shares. If KEGR is the estimate,

$$KEGR_j = \alpha_0 + \alpha_1 BETA_j + \epsilon_j. \quad (2)$$

The rationale for this expression lies in the risk premium theory of share yield, where the share yield is equal to the interest rate plus a risk premium that varies with the share's relative risk. Hence, if BETA is an error-free index of relative risk, α_0 is equal to the interest rate, and α_1 is the risk premium on the market portfolio or standard share.[4]

The higher the correlation between KEGR and BETA, assuming that α_1 is positive, the greater the confidence we may have in KEGR as an estimate of DCFY. We cannot rely solely on the correlation, though, in selecting among the methods for estimating DCFY. Errors in KEGR as a basis for estimating the DCFY on the jth share have random and systematic components. The former is ϵ_j, and its average value can be taken as the root mean square error of the regression (MSE). The larger the root MSE of the regression, the less attractive KEGR is as an estimate of share yield, because the error makes the problem of choice between $KEGR_j$ and $KEGR_j - \epsilon_j$ more acute. (That problem will be discussed shortly.)

The systematic error is the difference between the unknown true yield on the jth share, $DCFY_j$, and the value predicted by Equation (2). There is no obvious measure of the systematic error, as we do not know $DCFY_j$, but sample values of α_0 may provide information on its average value. The difference between α_0 and the interest rate is an indicator of systematic error, because the difference is zero under the risk premium theory. Error in the measurement of BETA biases α_0 upward, but, with the same BETA for each share used in all four regressions, differences in α_0 are indicators of systematic error.[5]

In addition to regression statistics, the sample mean and standard deviation of KEGR is a source of information on its accuracy as a method for the estimation of DCFY. If the mean departs radically from the long-term bond rate, or if the standard deviation indicates an unreasonable range of variation among shares, the accuracy of the method is open to question. Also, the sample mean may be a source of information on the systematic error for a method of estimation. Hence, sample values for the mean, standard deviation, correlation, root MSE, and constant term all contribute to a judgment on a method's accuracy for estimating the DCFY on a share. Unfortunately, there is no simple criterion for choice among the alternatives.

Once a conclusion is reached on the most accurate method for estimating DCFY — say, KEGR — we then have the problem of choice between $KEGR_j$ and $KEGR_j - \epsilon_j$ for the jth share. If the random error in $KEGR_j$ is due to error in its measurement for the jth share, we simply use the value predicted by Equation (2), which is $KEGR_j - \epsilon_j$. On the other hand, KEGR and DCFY may vary among shares with other (omitted) variables as well as BETA, in which case ϵ_j is also due to the omitted variables, and $KEGR_j$ may be the better estimate of DCFY. Unfortunately, we have no basis for choice among these two hypotheses, and the smaller the root MSE the less troublesome the problem of choice between them.

A more favorable tax treatment of capital gains over dividends should make investors prefer capital gains to dividends. As Brennan (1973) has shown, the yield investors require on a share would then vary with the excess of its dividend yield over the interest rate. To recognize this, Equation (2) becomes

$$KEGR_j = \alpha_0 + \alpha_1 BETA_j + \alpha_2 DMI_j + \epsilon_j, \qquad (3)$$

with DMI_j the excess of the dividend yield over the interest rate for the jth firm. Although the tax effect should make α_2 positive, its information in DMI on share risk would tend to make α_2 negative. That is, dividend yield varies inversely with expected growth, and we would find α_2 negative insofar as growth is risky. To the extent that these two influences of the dividend yield offset each other, α_2 will tend toward zero.

The CAPM theory of how expected return varies among shares has been proposed as an alternative to the DCF model for measuring yield. Its value for the jth stock is

$$EHPR_j = INTR + BETA_j[EHPR_m - INTR], \qquad (4)$$

where:

$EHPR_j$ = expected holding-period return on the jth share,

INTR = one-period risk-free interest rate,

$EHPR_m$ = expected holding-period return on the market portfolio.

There is an important difference between this CAPM model of share yield and the DCF model represented by Equation (1). The latter is merely an instrument for measuring share yield: There is nothing in the DCF model that explains the variation in yield among shares. The CAPM, on the other hand, is a theory on why and how yield varies among shares, but one must go outside of the theory to estimate the variables on the right-hand side of Equation (4). Given rules for estimating the variables, EHPR and BETA, empirical work then provides a joint test of the theory and the estimating rules, such as we are carrying out here.[6]

The CAPM nonetheless has been used to estimate share yield in testimony before regulatory commissions by assigning numbers to each of the quantities on the right-hand side of Equation (4). For INTR, a long-term bond yield is sometimes used instead of a one-period rate. BETA is estimated by conventional methods.

The big problem is the expected return on the market portfolio. Here the practice has been to use the average realized risk premium over a period of about fifty years as the estimate of $EHPR_m - INTR$ in Equation (4). Although the implicit assumption is that the risk premium is a constant over time, we would expect the premium to change from one period to the next for various reasons, among them changes in the interest rate, the risk premium on the market portfolio, and the relative taxation of interest and share income. Hence, this estimate of share yield is more or less in error at any particular time, but we have no way of estimating this error and comparing the method with the others.

COMPARATIVE PERFORMANCE

We carried out our empirical work with a sample of 75 large electric and gas utility firms and a sample of 244 firms that includes 169 industrial firms drawn from the S&P 400. We obtained share yield under the four methods for estimating it as of the start of the year for the years 1984, 1985, and 1986.

For the explanatory variables, BETA for each share on each date was obtained by regressing the monthly HPRs for the share on the monthly HPRs for the S&P 500 over the prior five years. DMI for a share is its dividend yield less the interest rate on the one-month Treasury bill at the start of each year. EGR and DGR are the growth rates in earnings and in dividends per share, respectively, over the prior five years as reported on the Value Line Tape. BRG is a weighted

average of the retention growth rates over the prior five years,[7] and FRG is the average of forecast growth rates in earnings over the next five years reported by IBES. The corresponding estimates of share yield were obtained by adding the dividend yield at the start of each year to the estimate of growth.

Table 1 presents the statistics that we obtained with KBRG and KFRG as the estimates of DCFY for the sample of utility shares and of all shares. The means of KBRG for the utility shares seems reasonable, with the interest rate on ten-year government bonds the standard of comparison, the latter being 11.67%, 10.43%, and 9.19% at the start of 1984, 1985, and 1986, respectively.[8] The standard deviations for KBRG are small enough to make its range of variation well within the bounds of reason. The lower means for all shares reveal that the means for industrial shares are below the means for utility shares.[9] This casts doubt on the accuracy of KBRG as a basis for estimating the DCFY on industrial shares, because industrials are riskier than utility shares.

The beta model explains none of the variation in KBRG among utility shares, but the two-factor model is a substantial improvement. The DMI coefficient, α_2, is positive and significant in every year, meaning that the unfavorable tax effect of a high dividend yield dominates the favorable risk effect. The coefficient on BETA is positive and significant in two of the three years. The only disturbing feature of the data is the sharp fall in R^2 and the corresponding rise in the root MSE relative to the standard deviation of KBRG as we go from 1984 to 1986.

The KBRG statistics for all shares are substantially inferior to the utility share statistics. This forces the unhappy conclusion that, for industrial shares, BETA is a poor measure of risk, or KBRG is a poor measure of DCFY, or both.

The KFRG statistics for the utility sample are superior to the KBRG statistics. The means are reasonable under the two criteria of being above the interest rate and moving with it. The range of variation of KFRG suggested by its standard deviations seems reasonable. The statistics for the beta model are a slight improvement on the corresponding statistics for KBRG. Furthermore, the two-factor model does a good job of explaining the variation in KFRG among

TABLE 1

Sample and Regression Statistics for KBRG and KFRG, Utility Shares and All Shares, 1984, 1985, and 1986

	KBRG			KFRG		
	1984	1985	1986	1984	1985	1986
			UTILITY SHARES (75)			
Mean	14.84	14.38	12.93	15.64	14.56	12.93
Standard Deviation	2.51	1.87	1.80	2.26	1.43	1.42
Beta Model α_0	14.26	13.96	13.05	15.14	13.48	12.74
α_1	1.44	1.21	−0.28	1.25	3.09	0.42
t-statistic	(0.97)	(1.12)	(0.19)	(0.93)	(4.14)	(0.37)
Root MSE	2.52	1.87	1.81	2.26	1.29	1.43
R^2	0.013	0.017	0.001	0.012	0.190	0.002
Two-Factor Model α_0	12.45	12.75	12.42	13.30	12.46	11.97
α_1	3.45	2.11	0.11	3.28	3.85	0.89
t-statistic	(3.13)	(2.19)	(0.08)	(3.83)	(6.33)	(0.88)
α_2	0.68	0.45	0.34	0.68	0.38	0.41
t-statistic	(8.22)	(4.88)	(2.81)	(10.73)	(6.52)	(4.65)
Root MSE	1.82	1.63	1.73	1.41	1.03	1.26
R^2	0.491	0.262	0.100	0.620	0.491	0.232
			ALL SHARES (244)			
Mean	12.98	13.19	11.86	16.17	15.87	14.31
Standard Deviation	3.86	3.21	3.52	2.60	2.32	2.30
Beta Model α_0	15.00	14.71	13.90	15.56	14.50	12.57
α_1	−2.47	−1.91	−2.40	0.74	1.72	2.05
t-statistic	(4.23)	(4.15)	(4.25)	(1.83)	(5.29)	(5.70)
Root MSE	3.73	3.10	3.40	2.59	2.20	2.16
R^2	0.069	0.066	0.069	0.014	0.104	0.118
Two-Factor Model α_0	14.34	14.42	13.95	15.40	14.61	12.75
α_1	0.09	−1.18	−2.51	1.37	1.44	1.61
t-statistic	(0.13)	(2.04)	(3.45)	(2.69)	(3.52)	(3.49)
α_2	0.48	0.17	−0.02	0.12	−0.06	−0.10
t-statistic	(6.04)	(2.09)	(0.24)	(2.01)	(1.12)	(1.53)
Root MSE	3.49	3.08	3.41	2.57	2.20	2.16
R^2	0.191	0.083	0.070	0.030	0.108	0.127

utility shares. The R^2s are higher here than for KBRG in every year. Finally, α_2 is positive and significant in every year, and α_1 is not significant only in 1986.

The implicit means of KFRG for the industrial shares seem high but not beyond reason. On the other hand, the regression statistics for the all-shares sample are not good, which leads to the same unhappy conclusion for industrial shares as we reached for KBRG.

Table 2 presents the statistics that we obtained using KEGR and KDGR as estimates of the DCFY on the shares in our samples. Comparison of the regression statistics with those in Table 1 reveals that KEGR and KDGR, particularly the former, fall short by a wide margin of the performance of KBRG and KFRG as estimates of the DCFY on a share.

CONCLUSION

We have compared the accuracy of four methods for estimating the growth component of the discounted cash flow yield on a share: past growth rate in earnings (KEGR), past growth rate in dividends (KDGR), past retention growth rate (KBRG), and forecasts of growth by security analysts (KFRG). Criteria for the comparison were the reasonableness of sample means and standard deviations and the success of beta and dividend yield in explaining the variation in DCF yield among shares. For our sample of utility shares, KFRG performed well, with KBRG, KDGR, and KEGR following in that order, and with KEGR a distant fourth. If we had used past growth in price, it would have been an even more distant fifth. Nevertheless, none of the four estimates of growth performed well under the criteria for a sample that included industrial shares.

Before closing, we have three observations to make. First, the superior performance by KFRG should come as no surprise. All four estimates of growth rely upon past data, but in the case of KFRG a larger body of past data is used, filtered through a group of security analysts who adjust for abnormalities that are not considered relevant for future growth. We assume this is done by any analyst who develops retention growth estimates of yield for a firm. If we had done this for all seventy-five firms in our utility sample, it is likely that the correlations

TABLE 2

Sample and Regression Statistics for KEGR and KDGR, Utility Shares and All Shares, 1984, 1985, and 1986

	KEGR			KDGR		
	1984	1985	1986	1984	1985	1986
			UTILITY SHARES (75)			
Mean	16.16	0.32	14.91	16.49	15.76	14.13
Standard Deviation	3.31	3.47	4.66	3.12	2.41	2.21
Beta Model α_0	15.45	16.18	0.51	15.75	14.53	12.30
α_1	1.75	0.40	−7.87	1.83	3.53	3.99
t-statistic	(0.89)	(0.20)	(2.16)	(0.99)	(2.64)	(2.32)
Root MSE	3.32	3.49	4.55	3.12	2.32	2.15
R^2	0.010	0.001	0.060	0.013	0.087	0.069
Two-Factor Model α_0	14.20	15.83	18.76	14.10	13.56	12.64
α_1	3.13	0.66	−8.03	3.65	4.25	3.78
t-statistic	(1.66)	(0.32)	(2.18)	(2.23)	(3.26)	(2.20)
α_2	0.47	0.13	−0.13	0.61	0.35	−0.18
t-statistic	(3.32)	(0.66)	(0.42)	(5.02)	(2.86)	(1.21)
Root MSE	3.11	3.50	4.58	2.70	2.21	2.14
R^2	0.142	0.007	0.063	0.269	0.180	0.087
			ALL SHARES (244)			
Mean	11.14	9.42	7.88	15.08	13.63	11.35
Standard Deviation	10.67	11.67	11.45	6.08	6.30	6.71
Beta Model α_0	15.96	18.28	19.55	15.15	0.04	15.39
α_1	−5.90	−11.16	−13.70	−0.09	−1.78	−4.74
t-statistic	(3.62)	(7.07)	(8.10)	(0.09)	(1.92)	(4.41)
Root MSE	10.41	10.65	10.18	6.09	6.27	6.47
R^2	0.051	0.171	0.213	0.000	0.015	0.074
Two-Factor Model α_0	14.84	18.01	19.91	14.31	14.11	14.79
α_1	−1.56	−10.49	−14.62	3.17	0.63	−3.25
t-statistic	(0.77)	(5.27)	(6.72)	(2.73)	(0.55)	(2.36)
α_2	0.81	0.15	−0.21	0.61	0.55	0.34
t-statistic	(3.51)	(0.55)	(0.67)	(4.57)	(3.47)	(1.72)
Root MSE	10.18	10.67	10.19	5.86	6.13	6.45
R^2	0.097	0.172	0.215	0.080	0.062	0.085

would have been as good or better than those obtained with the analyst forecasts of growth.

Second, we examined shares and not portfolios, because our objective is to estimate the DCFY for shares and not for portfolios. As common practice in testing the CAPM has been to execute tests on portfolios instead of shares, we classified our population of shares into ten portfolios on the basis of their beta values. Regression statistics were substantially unchanged, except that correlations increased dramatically.

Finally, we must acknowledge that we have no basis for estimating the expected HPR or DCF yield for industrial shares with any confidence. Theories on financial decision-making in industrial corporations that rely on that statistic have a weak empirical foundation.

[1] The EHPR is a one-period return, while the DCFY is a yield to maturity measure. The two may differ in actuality because of measurement problems, but they also may differ in theory. That is, they may differ in the same way that interest rates on bonds of different maturities may differ. See Gordon and Gould (1984a). This source of difference between EHPR and DCFY will be ignored here.

[2] A widely accepted hypothesis is that dividends contain information on earnings, because management sets the dividend to pay out a stable fraction of normal or permanent earnings.

[3] Over a five-year period, there may even be a negative rate of growth in price for a large number of firms. Furthermore, this negative growth rate may be larger in absolute value than the dividend yield, which leads to the conclusion that investors are holding such shares to earn a negative return. The frequency of negative rates of growth in price is reduced as the prior time period used in its calculation increases in length. As that takes place, however, the estimate of the expected return for a firm approaches a constant or a constant plus the dividend yield. The expected return on a share is one statistic for which it is an error to assume that expectations are on average realized.

[4] Equation (2) is similar to the CAPM according to Sharpe, Lintner, and Mossin. They arrived at this expression under very rigorous assumptions. The heuristic risk premium model is adequate for our purposes.

[5] It may be thought that Theil's (1966) decomposition of the difference between the actual and predicted values of a variable can be used here, but in fact that decomposition applies to a different problem. It assumes that the observed (actual) past values of a variable are free of error, and it decomposes the error in a model that is employed to explain the past values. The purpose of Theil's decomposition is to cast light on the possible error in using the model to predict future values of the dependent variable. Our problem is to determine which set of observed values is closest to the true values, with the risk premium theory of share yield and BETA as the source of information on the true values. Theil's method would be appropriate for decomposing the difference between the actual and predicted values of the *realized* holding-period return on a share. The actual values here can be observed without error.

[6] There is an enormous volume of empirical work devoted to discovering whether the theory is true, but this empirical work does not provide useful estimates of the EHPR on a share. To test the truth of Equation (4), the practice has been to regress EHPR on BETA for a sample of firms with the average realized HPR over the prior five or so years used as an estimate of the EHPR. Because of the large error in the realized HPR over a prior time period, as noted earlier, neither the actual values of the dependent variable nor the values predicted by the model are usable as estimates of share yield. See Fama and MacBeth (1973) and Friend, Westerfield, and Granito (1978).

[7] BRG for a year is earnings less dividend divided by the end-of-year book value. The estimate of the expected value as of the start of 1986 is 0.3BRG85 + 0.25BRG84 + 0.20BRG83 + 0.15BRG83 + 0.10BRG82. If any value of BRG was negative, it was set equal to zero.

[8] We expect the yields on shares to be above the risk-free interest rate, but with a high enough interest rate the more favorable tax treatment of shares can reduce the yield below the interest rate. Interest rates were not that high in these years. See Gordon and Gould (1984b).

[9] The statistics reported for all shares and for utility shares were also obtained for industrial shares. All methods of estimation performed so poorly for industrial shares, however, as to suggest no confidence can be placed in any of them. To save space, we do not present statistics for the industrial shares. Whatever we want to know about them can be deduced by comparing the data for all shares and utility shares.

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Corporate Income Taxes and the Cost of Capital: A Correction

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equanimity a writing-down of the value of their reserves, or unless one is prepared to forego the possibility of exchange-rate adjustment, any major extension of the gold exchange standard is dependent upon the introduction of guarantees. It is misleading to suggest that the multiple key-currency system is an alternative to a guarantee, as implied by Roosa [6, pp. 5-7 and 9-12].

IV. *Conclusion*

The most noteworthy conclusion to be drawn from this analysis is that the successful operation of a multiple key-currency system would require both exchange guarantees and continuing cooperation between central bankers of a type that would effectively limit their choice as to the form in which they hold their reserves. Yet these are two of the conditions whose undesirability has frequently been held to be an obstacle to implementation of the alternative proposal to create a world central bank. The multiple key-currency proposal represents an attempt to avoid the impracticality supposedly associated with a world central bank, but if both proposals in fact depend on the fulfillment of similar conditions, it is difficult to convince oneself that the sacrifice of the additional liquidity that an almost closed system would permit is worth while. Unless, of course, the object of the exercise is to reinforce discipline rather than to expand liquidity.

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Corporate Income Taxes and the Cost of Capital: A Correction

The purpose of this communication is to correct an error in our paper "The Cost of Capital, Corporation Finance and the Theory of Investment" (this *Review*, June 1958). In our discussion of the effects of the present method of taxing corporations on the valuation of firms, we said (p. 272):

> The deduction of interest in computing taxable corporate profits will prevent the arbitrage process from making the value of all firms in a given class proportional to the expected returns generated by their

physical assets. Instead, it can be shown (by the same type of proof used for the original version of Proposition I) that *the market values of firms in each class must be proportional in equilibrium to their expected returns net of taxes (that is, to the sum of the interest paid and expected net stockholder income)*. (Italics added.)

The statement in italics, unfortunately, is wrong. For even though one firm may have an *expected* return after taxes (our $\overline{X}^{\tau}$) twice that of another firm in the same risk-equivalent class, it will not be the case that the *actual* return after taxes (our X^{τ}) of the first firm will always be twice that of the second, if the two firms have different degrees of leverage.[1] And since the distribution of returns after taxes of the two firms will not be proportional, there can be no "arbitrage" process which forces their values to be proportional to their expected after-tax returns.[2] In fact, it can be shown—and this time it really will be shown—that "arbitrage" will make values within any class a function not only of expected after-tax returns, but of the tax rate and the degree of leverage. This means, among other things, that the tax advantages of debt financing are somewhat greater than we originally suggested and, to this extent, the quantitative difference between the valuations implied by our position and by the traditional view is narrowed. It still remains true, however, that under our analysis the tax advantages of debt are the *only* permanent advantages so that the gulf between the two views in matters of interpretation and policy is as wide as ever.

I. *Taxes, Leverage, and the Probability Distribution of After-Tax Returns*

To see how the distribution of after-tax earnings is affected by leverage, let us again denote by the random variable X the (long-run average) earnings before interest and taxes generated by the currently owned assets of a given firm in some stated risk class, k.[3] From our definition of a risk class it follows that X can be expressed in the form $\overline{X}Z$, where $\overline{X}$ is the expected value of X, and the random variable $Z=X/\overline{X}$, having the same value for all firms in class k, is a drawing from a distribution, say $f_k(Z)$. Hence the

[1] With some exceptions, which will be noted when they occur, we shall preserve here both the notation and the terminology of the original paper. A working knowledge of both on the part of the reader will be presumed.

[2] Barring, of course, the trivial case of universal linear utility functions. Note that in deference to Professor Durand (see his Comment on our paper and our reply, this *Review*, Sept. 1959, *49*, 639–69) we here and throughout use quotation marks when referring to arbitrage.

[3] Thus our X corresponds essentially to the familiar EBIT concept of the finance literature. The use of EBIT and related "income" concepts as the basis of valuation is strictly valid only when the underlying real assets are assumed to have perpetual lives. In such a case, of course, EBIT and "cash flow" are one and the same. This was, in effect, the interpretation of X we used in the original paper and we shall retain it here both to preserve continuity and for the considerable simplification it permits in the exposition. We should point out, however, that the perpetuity interpretation is much less restrictive than might appear at first glance. Before-tax cash flow and EBIT can also safely be equated even where assets have finite lives as soon as these assets attain a steady state age distribution in which annual replacements equal annual depreciation. The subject of finite lives of assets will be further discussed in connection with the problem of the cut-off rate for investment decisions.

random variable X^τ, measuring the after-tax return, can be expressed as:

$$(1)\quad X^\tau = (1-\tau)(X-R) + R = (1-\tau)X + \tau R = (1-\tau)\overline{X}Z + \tau R$$

where τ is the marginal corporate income tax rate (assumed equal to the average), and R is the interest bill. Since $E(X^\tau) \equiv \overline{X}^\tau = (1-\tau)\overline{X} + \tau R$ we can substitute $\overline{X}^\tau - \tau R$ for $(1-\tau)\overline{X}$ in (1) to obtain:

$$(2)\qquad X^\tau = (\overline{X}^\tau - \tau R)Z + \tau R = \overline{X}^\tau\left(1 - \frac{\tau R}{\overline{X}^\tau}\right)Z + \tau R.$$

Thus, if the tax rate is other than zero, the shape of the distribution of X^τ will depend not only on the "scale" of the stream $\overline{X}^\tau$ and on the distribution of Z, but also on the tax rate and the degree of leverage (one measure of which is $R/\overline{X}^\tau$). For example, if Var $(Z) = \sigma^2$, we have:

$$\text{Var}\,(X^\tau) = \sigma^2(\overline{X}^\tau)^2\left(1 - \tau\frac{R}{\overline{X}^\tau}\right)^2$$

implying that for given $\overline{X}^\tau$ the variance of after-tax returns is smaller, the higher τ and the degree of leverage.[4]

II. *The Valuation of After-Tax Returns*

Note from equation (1) that, from the investor's point of view, the long-run average stream of after-tax returns appears as a sum of two components: (1) an uncertain stream $(1-\tau)\overline{X}Z$; and (2) a sure stream τR.[5] This suggests that the equilibrium market value of the combined stream can be found by capitalizing each component separately. More precisely, let ρ^τ be the rate at which the market capitalizes the expected returns net of tax of an unlevered company of size $\overline{X}$ in class k, i.e.,

$$\rho^\tau = \frac{(1-\tau)\overline{X}}{V_U} \quad \text{or} \quad V_U = \frac{(1-\tau)\overline{X}}{\rho^\tau};^6$$

[4] It may seem paradoxical at first to say that leverage *reduces* the variability of outcomes, but remember we are here discussing the variability of total returns, interest plus net profits. The variability of stockholder net profits will, of course, be greater in the presence than in the absence of leverage, though relatively less so than in an otherwise comparable world of no taxes. The reasons for this will become clearer after the discussion in the next section.

[5] The statement that τR—the tax saving per period on the interest payments—is a sure stream is subject to two qualifications. First, it must be the case that firms can always obtain the tax benefit of their interest deductions either by offsetting them directly against other taxable income in the year incurred; or, in the event no such income is available in any given year, by carrying them backward or forward against past or future taxable earnings; or, in the extreme case, by merger of the firm with (or its sale to) another firm that can utilize the deduction. Second, it must be assumed that the tax rate will remain the same. To the extent that neither of these conditions holds exactly then some uncertainty attaches even to the tax savings, though, of course, it is of a different kind and order from that attaching to the stream generated by the assets. For simplicity, however, we shall here ignore these possible elements of delay or of uncertainty in the tax saving; but it should be kept in mind that this neglect means that the subsequent valuation formulas overstate, if anything, the value of the tax saving for any given permanent level of debt.

[6] Note that here, as in our original paper, we neglect dividend policy and "growth" in the

and let r be the rate at which the market capitalizes the sure streams generated by debts. For simplicity, assume this rate of interest is a constant independent of the size of the debt so that

$$r = \frac{R}{D} \quad \text{or} \quad D = \frac{R}{r}.^{7}$$

Then we would expect the value of a levered firm of size $\overline{X}$, with a permanent level of debt D_L in its capital structure, to be given by:

$$V_L = \frac{(1-\tau)\overline{X}}{\rho\tau} + \frac{\tau R}{r} = V_U + \tau D_L.^{8} \tag{3}$$

In our original paper we asserted instead that, within a risk class, market value would be proportional to expected after-tax return $\overline{X}^{\tau}$ (cf. our original equation [11]), which would imply:

$$V_L = \frac{\overline{X}^{\tau}}{\rho^{\tau}} = \frac{(1-\tau)\overline{X}}{\rho^{\tau}} + \frac{\tau R}{\rho^{\tau}} = V_U + \frac{r}{\rho^{\tau}}\tau D_L. \tag{4}$$

We will now show that if (3) does not hold, investors can secure a more efficient portfolio by switching from relatively overvalued to relatively undervalued firms. Suppose first that unlevered firms are overvalued or that

$$V_L - \tau D_L < V_U.$$

An investor holding m dollars of stock in the unlevered company has a right to the fraction m/V_U of the eventual outcome, i.e., has the uncertain income

$$Y_U = \left(\frac{m}{V_U}\right)(1-\tau)\overline{X}Z.$$

Consider now an alternative portfolio obtained by investing m dollars as follows: (1) the portion,

$$m\left(\frac{S_L}{S_L + (1-\tau)D_L}\right),$$

is invested in the stock of the levered firm, S_L; and (2) the remaining portion,

$$m\left(\frac{(1-\tau)D_L}{S_L + (1-\tau)D_L}\right),$$

sense of opportunities to invest at a rate of return greater than the market rate of return. These subjects are treated extensively in our paper, "Dividend Policy, Growth and the Valuation of Shares," *Jour. Bus.*, Univ. Chicago, Oct. 1961, 411–33.

[7] Here and throughout, the corresponding formulas when the rate of interest rises with leverage can be obtained merely by substituting $r(L)$ for r, where L is some suitable measure of leverage.

[8] The assumption that the debt is permanent is not necessary for the analysis. It is employed here both to maintain continuity with the original model and because it gives an upper bound on the value of the tax saving. See in this connection footnote 5 and footnote 9.

is invested in its bonds. The stock component entitles the holder to a fraction,

$$\frac{m}{S_L + (1-\tau)D_L},$$

of the net profits of the levered company or

$$\left(\frac{m}{S_L + (1-\tau)D_L}\right)[(1-\tau)(\overline{X}Z - R_L)].$$

The holding of bonds yields

$$\left(\frac{m}{S_L + (1-\tau)D_L}\right)[(1-\tau)R_L].$$

Hence the total outcome is

$$Y_L = \left(\frac{m}{(S_L + (1-\tau)D_L)}\right)[(1-\tau)\overline{X}Z]$$

and this will dominate the uncertain income Y_U if (and only if)

$$S_L + (1-\tau)D_L \equiv S_L + D_L - \tau D_L \equiv V_L - \tau D_L < V_U.$$

Thus, in equilibrium, V_U cannot exceed $V_L - \tau D_L$, for if it did investors would have an incentive to sell shares in the unlevered company and purchase the shares (and bonds) of the levered company.

Suppose now that $V_L - \tau D_L > V_U$. An investment of m dollars in the stock of the levered firm entitles the holder to the outcome

$$\begin{aligned} Y_L &= (m/S_L)[(1-\tau)(\overline{X}Z - R_L)] \\ &= (m/S_L)(1-\tau)\overline{X}Z - (m/S_L)(1-\tau)R_L. \end{aligned}$$

Consider the following alternative portfolio: (1) borrow an amount $(m/S_L)(1-\tau)D_L$ for which the interest cost will be $(m/S_L)(1-\tau)R_L$ (assuming, of course, that individuals and corporations can borrow at the same rate, r); and (2) invest m plus the amount borrowed, i.e.,

$$m + \frac{m(1-\tau)D_L}{S_L} = m\frac{S_L + (1-\tau)D_L}{S_L} = (m/S_L)[V_L - \tau D_L]$$

in the stock of the unlevered firm. The outcome so secured will be

$$(m/S_L)\left(\frac{V_L - \tau D_L}{V_U}\right)(1-\tau)\overline{X}Z.$$

Subtracting the interest charges on the borrowed funds leaves an income of

$$Y_U = (m/S_L)\left(\frac{V_L - \tau D_L}{V_U}\right)(1-\tau)\overline{X}Z - (m/S_L)(1-\tau)R_L$$

which will dominate Y_L if (and only if) $V_L - \tau D_L > V_U$. Thus, in equilibrium, both $V_L - \tau D_L > V_U$ and $V_L - \tau D_L < V_U$ are ruled out and (3) must hold.

III. *Some Implications of Formula* (3)

To see what is involved in replacing (4) with (3) as the rule of valuation, note first that both expressions make the value of the firm a function of leverage and the tax rate. The difference between them is a matter of the size and source of the tax advantages of debt financing. Under our original formulation, values within a class were strictly proportional to expected earnings after taxes. Hence the tax advantage of debt was due solely to the fact that the deductibility of interest payments implied a higher level of after-tax income for any given level of before-tax earnings (i.e., higher by the amount τR since $\overline{X}^{\tau}=(1-\tau)\overline{X}+\tau R$). Under the corrected rule (3), however, there is an additional gain due to the fact that the extra after-tax earnings, τR, represent a sure income in contrast to the uncertain outcome $(1-\tau)\overline{X}$. Hence τR is capitalized at the more favorable certainty rate, $1/r$, rather than at the rate for uncertain streams, $1/\rho^{\tau}$.[9]

Since the difference between (3) and (4) is solely a matter of the rate at which the tax savings on interest payments are capitalized, the required changes in all formulas and expressions derived from (4) are reasonably straightforward. Consider, first, the before-tax earnings yield, i.e., the ratio of expected earnings before interest and taxes to the value of the firm.[10] Dividing both sides of (3) by V and by $(1-\tau)$ and simplifying we obtain:

$$\frac{\overline{X}}{V}=\frac{\rho^{\tau}}{1-\tau}\left[1-\tau\frac{D}{V}\right] \tag{31.c}$$

which replaces our original equation (31) (p. 294). The new relation differs from the old in that the coefficient of D/V in the original (31) was smaller by a factor of r/ρ^{τ}.

Consider next the after-tax earnings yield, i.e., the ratio of interest payments plus profits after taxes to total market value.[11] This concept was discussed extensively in our paper because it helps to bring out more clearly the differences between our position and the traditional view, and because it facilitates the construction of empirical tests of the two hypotheses about the valuation process. To see what the new equation (3) implies for this yield we need merely substitute $\overline{X}^{\tau}-\tau R$ for $(1-\tau)\overline{X}$ in (3) obtaining:

[9] Remember, however, that in one sense formula (3) gives only an upper bound on the value of the firm since $\tau R/r=\tau D$ is an exact measure of the value of the tax saving only where both the tax rate and the level of debt are assumed to be fixed forever (and where the firm is certain to be able to use its interest deduction to reduce taxable income either directly or via transfer of the loss to another firm). Alternative versions of (3) can readily be developed for cases in which the debt is not assumed to be permanent, but rather to be outstanding only for some specified finite length of time. For reasons of space, we shall not pursue this line of inquiry here beyond observing that the shorter the debt period considered, the closer does the valuation formula approach our original (4). Hence, the latter is perhaps still of some interest if only as a lower bound.

[10] Following usage common in the field of finance we referred to this yield as the "average cost of capital." We feel now, however, that the term "before-tax earnings yield" would be preferable both because it is more immediately descriptive and because it releases the term "cost of capital" for use in discussions of optimal investment policy (in accord with standard usage in the capital budgeting literature).

[11] We referred to this yield as the "after-tax cost of capital." Cf. the previous footnote.

$$(5) \qquad V = \frac{\overline{X}^{\tau} - \tau R}{\rho^{\tau}} + \tau D = \frac{\overline{X}^{\tau}}{\rho^{\tau}} + \tau \frac{\rho^{\tau} - r}{\rho^{\tau}} D,$$

from which it follows that the after-tax earnings yield must be:

$$(11.c) \qquad \frac{\overline{X}^{\tau}}{V} = \rho^{\tau} - \tau(\rho^{\tau} - r) D/V.$$

This replaces our original equation (11) (p. 272) in which we had simply $\overline{X}^{\tau}/V = \rho^{\tau}$. Thus, in contrast to our earlier result, the corrected version (11.c) implies that even the after-tax yield is affected by leverage. The predicted rate of decrease of $\overline{X}^{\tau}/V$ with D/V, however, is still considerably smaller than under the naive traditional view, which, as we showed, implied essentially $\overline{X}^{\tau}/V = \rho^{\tau} - (\rho^{\tau} - r) D/V$. See our equation (17) and the discussion immediately preceding it (p. 277).[12] And, of course, (11.c) implies that the effect of leverage on $\overline{X}^{\tau}/V$ is *solely* a matter of the deductibility of interest payments whereas, under the traditional view, going into debt would lower the cost of capital regardless of the method of taxing corporate earnings.

Finally, we have the matter of the after-tax yield on *equity* capital, i.e., the ratio of net profits after taxes to the value of the shares.[13] By subtracting D from both sides of (5) and breaking $\overline{X}^{\tau}$ into its two components—expected net profits after taxes, $\bar{\pi}^{\tau}$, and interest payments, $R = rD$—we obtain after simplifying:

$$(6) \qquad S = V - D = \frac{\bar{\pi}^{\tau}}{\rho^{\tau}} - (1 - \tau)\left(\frac{\rho^{\tau} - r}{\rho^{\tau}}\right) D.$$

From (6) it follows that the after-tax yield on equity capital must be:

$$(12.c) \qquad \frac{\bar{\pi}^{\tau}}{S} = \rho^{\tau} + (1 - \tau)[\rho^{\tau} - r] D/S$$

which replaces our original equation (12), $\bar{\pi}^{\tau}/S = \rho^{\tau} + (\rho^{\tau} - r) D/S$ (p. 272). The new (12.c) implies an increase in the after-tax yield on equity capital as leverage increases which is smaller than that of our original (12) by a factor of $(1 - \tau)$. But again, the linear increasing relation of the corrected (12.c) is still fundamentally different from the naive traditional view which asserts the cost of equity capital to be completely independent of leverage (at least as long as leverage remains within "conventional" industry limits).

IV. *Taxes and the Cost of Capital*

From these corrected valuation formulas we can readily derive corrected measures of the cost of capital in the capital budgeting sense of the minimum prospective yield an investment project must offer to be just worth

[12] The i_k^* of (17) is the same as ρ^{τ} in the present context, each measuring the ratio of net profits to the value of the shares (and hence of the whole firm) in an unlevered company of the class.

[13] We referred to this yield as the "after-tax cost of equity capital." Cf. footnote 9.

undertaking from the standpoint of the present stockholders. If we interpret earnings streams as perpetuities, as we did in the original paper, then we actually have two equally good ways of defining this minimum yield: either by the required increase in before-tax earnings, $d\overline{X}$, or by the required increase in earnings net of taxes, $d\overline{X}(1-\tau)$.[14] To conserve space, however, as well as to maintain continuity with the original paper, we shall concentrate here on the before-tax case with only brief footnote references to the net-of-tax concept.

Analytically, the derivation of the cost of capital in the above sense amounts to finding the minimum value of $d\overline{X}/dI$ for which $dV=dI$, where I denotes the level of new investment.[15] By differentiating (3) we see that:

$$(7) \qquad \frac{dV}{dI} = \frac{1-\tau}{\rho^\tau}\frac{d\overline{X}}{dI} + \tau\frac{dD}{dI} \geq 1 \qquad \text{if } \frac{d\overline{X}}{dI} \geq \frac{1-\tau\dfrac{dD}{dI}}{1-\tau}\rho^\tau.$$

Hence the before tax required rate of return cannot be defined without reference to financial policy. In particular, for an investment considered as being financed entirely by new equity capital $dD/dI=0$ and the required rate of return or marginal cost of equity financing (neglecting flotation costs) would be:

$$\rho^S = \frac{\rho^\tau}{1-\tau}.$$

This result is the same as that in the original paper (see equation [32], p. 294) and is applicable to any other sources of financing where the remuneration to the suppliers of capital is not deductible for tax purposes. It applies, therefore, to preferred stock (except for certain partially deductible issues of public utilities) and would apply also to retained earnings were it not for the favorable tax treatment of capital gains under the personal income tax.

For investments considered as being financed entirely by new debt capital $dI=dD$ and we find from (7) that:

$$(33.c) \qquad \rho^D = \rho^\tau$$

which replaces our original equation (33) in which we had:

$$(33) \qquad \rho^D = \rho^S - \frac{\tau}{1-\tau}r.$$

[14] Note that we use the term "earnings net of taxes" rather than "earnings after taxes." We feel that to avoid confusion the latter term should be reserved to describe what will actually appear in the firm's accounting statements, namely the net cash flow including the tax savings on the interest (our $\overline{X}^\tau$). Since financing sources cannot in general be allocated to particular investments (see below), the after-tax or accounting concept is not useful for capital budgeting purposes, although it can be extremely useful for valuation equations as we saw in the previous section.

[15] Remember that when we speak of the minimum required yield on an investment we are referring in principle only to investments which increase the *scale* of the firm. That is, the new

Thus for borrowed funds (or any other tax-deductible source of capital) the marginal cost or before-tax required rate of return is simply the market rate of capitalization for net of tax unlevered streams and is thus independent of both the tax rate and the interest rate. This required rate is lower than that implied by our original (33), but still considerably higher than that implied by the traditional view (see esp. pp. 276–77 of our paper) under which the before-tax cost of borrowed funds is simply the interest rate, r.

Having derived the above expressions for the marginal costs of debt and equity financing it may be well to warn readers at this point that these expressions represent at best only the hypothetical extremes insofar as costs are concerned and that neither is directly usable as a cut-off criterion for investment planning. In particular, care must be taken to avoid falling into the famous "Liquigas" fallacy of concluding that if a firm intends to float a bond issue in some given year then its cut-off rate should be set that year at ρ^D; while, if the next issue is to be an equity one, the cut-off is ρ^S. The point is, of course, that no investment can meaningfully be regarded as 100 per cent equity financed if the firm makes any use of debt capital—and most firms do, not only for the tax savings, but for many other reasons having nothing to do with "cost" in the present static sense (cf. our original paper pp. 292–93). And no investment can meaningfully be regarded as 100 per cent debt financed when lenders impose strict limitations on the maximum amount a firm can borrow relative to its equity (and when most firms actually plan on normally borrowing less than this external maximum so as to leave themselves with an emergency reserve of unused borrowing power). Since the firm's long-run capital structure will thus contain both debt and equity capital, investment planning must recognize that, over the long pull, *all* of the firm's assets are really financed by a mixture of debt and equity capital even though only one kind of capital may be raised in any particular year. More precisely, if L^* denotes the firm's long-run "target" debt ratio (around which its actual debt ratio will fluctuate as it "alternately" floats debt issues and retires them with internal or external equity) then the firm can assume, to a first approximation at least, that for any particular investment $dD/dI = L^*$. Hence, the relevant marginal cost of capital for investment planning, which we shall here denote by ρ^*, is:

$$\rho^* = \frac{1 - \tau_L^*}{1 - \tau}\rho^\tau = \rho^S - \frac{\tau}{1 - \tau}\rho^D L^* = \rho^S(1 - L^*) + \rho^D L^*.$$

That is, the appropriate cost of capital for (repetitive) investment decisions over time is, to a first approximation, a weighted average of the costs of debt and equity financing, the weights being the proportions of each in the "target" capital structure.[16]

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assets must be in the same "class" as the old. See in this connection, J. Hirshleifer, "Risk, the Discount Rate and Investment Decisions," *Am. Econ. Rev.*, May 1961, *51*, 112–20 (especially pp. 119–20). See also footnote 16.

[16] From the formulas in the text one can readily derive corresponding expressions for the required net-of-tax yield, or net-of-tax cost of capital for any given financing policy. Specifi-

V. *Some Concluding Observations*

Such, then, are the major corrections that must be made to the various formulas and valuation expressions in our earlier paper. In general, we can say that the force of these corrections has been to increase somewhat the estimate of the tax advantages of debt financing under our model and consequently to reduce somewhat the quantitative difference between the estimates of the effects of leverage under our model and under the naive traditional view. It may be useful to remind readers once again that the existence of a tax advantage for debt financing—even the larger advantage of the corrected version—does not necessarily mean that corporations should at all times seek to use the maximum possible amount of debt in their capital structures. For one thing, other forms of financing, notably retained earnings, may in some circumstances be cheaper still when the tax status of investors under the personal income tax is taken into account. More important, there are, as we pointed out, limitations imposed by lenders (see pp. 292–93), as well as many other dimensions (and kinds of costs) in real-world problems of financial strategy which are not fully comprehended within the framework of static equilibrium models, either our own or those of the traditional variety. These additional considerations, which are typically grouped under the rubric of "the need for preserving flexibility," will normally imply the maintenance by the corporation of a substantial reserve of untapped borrowing power. The tax advantage of debt may well tend to lower the optimal size of that reserve, but it is hard to believe that advantages of the size contemplated under our model could justify any substantial reduction, let alone their complete elimination. Nor do the data

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cally, let $\tilde{\rho}(L)$ denote the required net-of-tax yield for investment financed with a proportion of debt $L=dD/dI$. (More generally L denotes the proportion financed with tax deductible sources of capital.) Then from (7) we find:

$$\tilde{\rho}(L)=(1-\tau)\frac{d\overline{X}}{dI}=(1-L\tau)\rho^{\tau} \tag{8}$$

and the various costs can be found by substituting the appropriate value for L. In particular, if we substitute in this formula the "target" leverage ratio, L^*, we obtain:

$$\tilde{\rho}^*\equiv\tilde{\rho}(L^*)=(1-\tau L^*)\rho^{\tau}$$

and $\tilde{\rho}^*$ measures the average net-of-tax cost of capital in the sense described above.

Although the before-tax and the net-of-tax approaches to the cost of capital provide equally good criteria for investment decisions when assets are assumed to generate perpetual (i.e., non-depreciating) streams, such is not the case when assets are assumed to have finite lives (even when it is also assumed that the firm's assets are in a steady state age distribution so that our X or EBIT is approximately the same as the net cash flow before taxes). See footnote 3 above. In the latter event, the correct method for determining the desirability of an investment would be, in principle, to discount the net-of-tax stream at the net-of-tax cost of capital. Only under this net-of-tax approach would it be possible to take into account the deductibility of depreciation (and also to choose the most advantageous depreciation policy for tax purposes). Note that we say that the net-of-tax approach is correct "in principle" because, strictly speaking, nothing in our analysis (or anyone else's, for that matter) has yet established that it is indeed legitimate to "discount" an uncertain stream. One can hope that subsequent research will show the analogy to discounting under the certainty case is a valid one; but, at the moment, this is still only a hope.

indicate that there has in fact been a substantial increase in the use of debt (except relative to preferred stock) by the corporate sector during the recent high tax years.[17]

As to the differences between our modified model and the traditional one, we feel that they are still large in quantitative terms and still very much worth trying to detect. It is not only a matter of the two views having different implications for corporate financial policy (or even for national tax policy). But since the two positions rest on fundamentally different views about investor behavior and the functioning of the capital markets, the results of tests between them may have an important bearing on issues ranging far beyond the immediate one of the effects of leverage on the cost of capital.

FRANCO MODIGLIANI AND MERTON H. MILLER*

[17] See, e.g., Merton H. Miller, "The Corporate Income Tax and Corporate Financial Policies," in *Staff Reports to the Commission on Money and Credit* (forthcoming).

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Consumption, Savings and Windfall Gains: Comment

In her recent article in this *Review* [3], Margaret Reid attempted to answer previous articles by Bodkin [1] and Jones [2] challenging the validity of the permanent income hypothesis. Bodkin and Jones used income and expenditure data for those consumer units who had received the soldiers' bonus (National Service Life Insurance dividends) during 1950, the year of the urban consumption survey [4]. These bonuses were regarded as windfall gains for the purposes of their analyses.

Professor Reid used data from the same survey, but her windfall gains were represented by "other money receipts." These are defined as "inheritances and occasional large gifts of money from persons outside the family . . . and net receipts from the settlement of fire and accident policies" [4, Vol. 1, p. xxix]. She assumed that the soldiers' bonus was included, and that it accounted for about one-half of other money receipts. Here she made an unfortunate mistake in interpreting the data for the main critical purpose of her article.

The soldiers' bonus is not part of "other money receipts" (O) but rather a part of "disposable money income" (Y). It is the main part of an item in the disposable money income category called "military pay, allotments, and pensions" [4, Vol. 11, p. xxix].

This would appear to alter completely the relationship of Professor Reid's main findings to the Bodkin results and to change the windfall interpretation of the O variable. Surely, fire and accident policy settlements are not windfall income, but rather a (partial) recovery of real assets previously lost. Likewise, inheritances are probably best considered as a long-anticipated increase in assets—not an increase in transitory income.

The discovery of this error probably does not affect whatever importance Professor Reid's secondary finding may have: ". . . the need, in any study of

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THE COST OF CAPITAL, CORPORATION FINANCE AND THE THEORY OF INVESTMENT

By FRANCO MODIGLIANI AND MERTON H. MILLER*

What is the "cost of capital" to a firm in a world in which funds are used to acquire assets whose yields are uncertain; and in which capital can be obtained by many different media, ranging from pure debt instruments, representing money-fixed claims, to pure equity issues, giving holders only the right to a pro-rata share in the uncertain venture? This question has vexed at least three classes of economists: (1) the corporation finance specialist concerned with the techniques of financing firms so as to ensure their survival and growth; (2) the managerial economist concerned with capital budgeting; and (3) the economic theorist concerned with explaining investment behavior at both the micro and macro levels.[1]

In much of his formal analysis, the economic theorist at least has tended to side-step the essence of this cost-of-capital problem by proceeding as though physical assets—like bonds—could be regarded as yielding known, sure streams. Given this assumption, the theorist has concluded that the cost of capital to the owners of a firm is simply the rate of interest on bonds; and has derived the familiar proposition that the firm, acting rationally, will tend to push investment to the point

* The authors are, respectively, professor and associate professor of economics in the Graduate School of Industrial Administration, Carnegie Institute of Technology. This article is a revised version of a paper delivered at the annual meeting of the Econometric Society, December 1956. The authors express thanks for the comments and suggestions made at that time by the discussants of the paper, Evsey Domar, Robert Eisner and John Lintner, and subsequently by James Duesenberry. They are also greatly indebted to many of their present and former colleagues and students at Carnegie Tech who served so often and with such remarkable patience as a critical forum for the ideas here presented.

[1] The literature bearing on the cost-of-capital problem is far too extensive for listing here. Numerous references to it will be found throughout the paper though we make no claim to completeness. One phase of the problem which we do not consider explicitly, but which has a considerable literature of its own is the relation between the cost of capital and public utility rates. For a recent summary of the "cost-of-capital theory" of rate regulation and a brief discussion of some of its implications, the reader may refer to H. M. Somers [20].

where the marginal yield on physical assets is equal to the market rate of interest.[2] This proposition can be shown to follow from either of two criteria of rational decision-making which are equivalent under certainty, namely (1) the maximization of profits and (2) the maximization of market value.

According to the first criterion, a physical asset is worth acquiring if it will increase the net profit of the owners of the firm. But net profit will increase only if the expected rate of return, or yield, of the asset exceeds the rate of interest. According to the second criterion, an asset is worth acquiring if it increases the value of the owners' equity, *i.e.*, if it adds more to the market value of the firm than the costs of acquisition. But what the asset adds is given by capitalizing the stream it generates at the market rate of interest, and this capitalized value will exceed its cost if and only if the yield of the asset exceeds the rate of interest. Note that, under either formulation, the cost of capital is equal to the rate of interest on bonds, regardless of whether the funds are acquired through debt instruments or through new issues of common stock. Indeed, in a world of sure returns, the distinction between debt and equity funds reduces largely to one of terminology.

It must be acknowledged that some attempt is usually made in this type of analysis to allow for the existence of uncertainty. This attempt typically takes the form of superimposing on the results of the certainty analysis the notion of a "risk discount" to be subtracted from the expected yield (or a "risk premium" to be added to the market rate of interest). Investment decisions are then supposed to be based on a comparison of this "risk adjusted" or "certainty equivalent" yield with the market rate of interest.[3] No satisfactory explanation has yet been provided, however, as to what determines the size of the risk discount and how it varies in response to changes in other variables.

Considered as a convenient approximation, the model of the firm constructed via this certainty—or certainty-equivalent—approach has admittedly been useful in dealing with some of the grosser aspects of the processes of capital accumulation and economic fluctuations. Such a model underlies, for example, the familiar Keynesian aggregate investment function in which aggregate investment is written as a function of the rate of interest—the same riskless rate of interest which appears later in the system in the liquidity-preference equation. Yet few would maintain that this approximation is adequate. At the macroeconomic level there are ample grounds for doubting that the rate of interest has

[2] Or, more accurately, to the marginal cost of borrowed funds since it is customary, at least in advanced analysis, to draw the supply curve of borrowed funds to the firm as a rising one. For an advanced treatment of the certainty case, see F. and V. Lutz [13].

[3] The classic examples of the certainty-equivalent approach are found in J. R. Hicks [8] and O. Lange [11].

as large and as direct an influence on the rate of investment as this analysis would lead us to believe. At the microeconomic level the certainty model has little descriptive value and provides no real guidance to the finance specialist or managerial economist whose main problems cannot be treated in a framework which deals so cavalierly with uncertainty and ignores all forms of financing other than debt issues.[4]

Only recently have economists begun to face up seriously to the problem of the cost of capital *cum* risk. In the process they have found their interests and endeavors merging with those of the finance specialist and the managerial economist who have lived with the problem longer and more intimately. In this joint search to establish the principles which govern rational investment and financial policy in a world of uncertainty two main lines of attack can be discerned. These lines represent, in effect, attempts to extrapolate to the world of uncertainty each of the two criteria—profit maximization and market value maximization—which were seen to have equivalent implications in the special case of certainty. With the recognition of uncertainty this equivalence vanishes. In fact, the profit maximization criterion is no longer even well defined. Under uncertainty there corresponds to each decision of the firm not a unique profit outcome, but a plurality of mutually exclusive outcomes which can at best be described by a subjective probability distribution. The profit outcome, in short, has become a random variable and as such its maximization no longer has an operational meaning. Nor can this difficulty generally be disposed of by using the mathematical expectation of profits as the variable to be maximized. For decisions which affect the expected value will also tend to affect the dispersion and other characteristics of the distribution of outcomes. In particular, the use of debt rather than equity funds to finance a given venture may well increase the expected return to the owners, but only at the cost of increased dispersion of the outcomes.

Under these conditions the profit outcomes of alternative investment and financing decisions can be compared and ranked only in terms of a *subjective* "utility function" of the owners which weighs the expected yield against other characteristics of the distribution. Accordingly, the extrapolation of the profit maximization criterion of the certainty model has tended to evolve into utility maximization, sometimes explicitly, more frequently in a qualitative and heuristic form.[5]

The utility approach undoubtedly represents an advance over the certainty or certainty-equivalent approach. It does at least permit us

[4] Those who have taken a "case-method" course in finance in recent years will recall in this connection the famous Liquigas case of Hunt and Williams, [9, pp. 193–96] a case which is often used to introduce the student to the cost-of-capital problem and to poke a bit of fun at the economist's certainty-model.

[5] For an attempt at a rigorous explicit development of this line of attack, see F. Modigliani and M. Zeman [14].

to explore (within limits) some of the implications of different financing arrangements, and it does give some meaning to the "cost" of different types of funds. However, because the cost of capital has become an essentially subjective concept, the utility approach has serious drawbacks for normative as well as analytical purposes. How, for example, is management to ascertain the risk preferences of its stockholders and to compromise among their tastes? And how can the economist build a meaningful investment function in the face of the fact that any given investment opportunity might or might not be worth exploiting depending on precisely who happen to be the owners of the firm at the moment?

Fortunately, these questions do not have to be answered; for the alternative approach, based on market value maximization, can provide the basis for an operational definition of the cost of capital and a workable theory of investment. Under this approach any investment project and its concomitant financing plan must pass only the following test: Will the project, as financed, raise the market value of the firm's shares? If so, it is worth undertaking; if not, its return is less than the marginal cost of capital to the firm. Note that such a test is entirely independent of the tastes of the current owners, since market prices will reflect not only their preferences but those of all potential owners as well. If any current stockholder disagrees with management and the market over the valuation of the project, he is free to sell out and reinvest elsewhere, but will still benefit from the capital appreciation resulting from management's decision.

The potential advantages of the market-value approach have long been appreciated; yet analytical results have been meager. What appears to be keeping this line of development from achieving its promise is largely the lack of an adequate theory of the effect of financial structure on market valuations, and of how these effects can be inferred from objective market data. It is with the development of such a theory and of its implications for the cost-of-capital problem that we shall be concerned in this paper.

Our procedure will be to develop in Section I the basic theory itself and to give some brief account of its empirical relevance. In Section II, we show how the theory can be used to answer the cost-of-capital question and how it permits us to develop a theory of investment of the firm under conditions of uncertainty. Throughout these sections the approach is essentially a partial-equilibrium one focusing on the firm and "industry." Accordingly, the "prices" of certain income streams will be treated as constant and given from outside the model, just as in the standard Marshallian analysis of the firm and industry the prices of all inputs and of all other products are taken as given. We have chosen to focus at this level rather than on the economy as a whole because it

is at the level of the firm and the industry that the interests of the various specialists concerned with the cost-of-capital problem come most closely together. Although the emphasis has thus been placed on partial-equilibrium analysis, the results obtained also provide the essential building blocks for a general equilibrium model which shows how those prices which are here taken as given, are themselves determined. For reasons of space, however, and because the material is of interest in its own right, the presentation of the general equilibrium model which rounds out the analysis must be deferred to a subsequent paper.

I. *The Valuation of Securities, Leverage, and the Cost of Capital*

A. *The Capitalization Rate for Uncertain Streams*

As a starting point, consider an economy in which all physical assets are owned by corporations. For the moment, assume that these corporations can finance their assets by issuing common stock only; the introduction of bond issues, or their equivalent, as a source of corporate funds is postponed until the next part of this section.

The physical assets held by each firm will yield to the owners of the firm—its stockholders—a stream of "profits" over time; but the elements of this series need not be constant and in any event are uncertain. This stream of income, and hence the stream accruing to any share of common stock, will be regarded as extending indefinitely into the future. We assume, however, that the mean value of the stream over time, or average profit per unit of time, is finite and represents a random variable subject to a (subjective) probability distribution. We shall refer to the average value over time of the stream accruing to a given share as the return of that share; and to the mathematical expectation of this average as the expected return of the share.[6] Although individual investors may have different views as to the shape of the probability distri-

[6] These propositions can be restated analytically as follows: The assets of the ith firm generate a stream:

$$X_i(1), X_i(2) \cdots X_i(T)$$

whose elements are random variables subject to the joint probability distribution:

$$\chi_i[X_i(1), X_i(2) \cdots X_i(t)].$$

The return to the ith firm is defined as:

$$X_i = \lim_{T\to\infty} \frac{1}{T} \sum_{t=1}^{T} X_i(t).$$

X_i is itself a random variable with a probability distribution $\Phi_i(X_i)$ whose form is determined uniquely by χ_i. The expected return $\bar{X}_i$ is defined as $\bar{X}_i = E(X_i) = \int_{X_i} X_i \Phi_i(X_i) dX_i$. If N_i is the number of shares outstanding, the return of the ith share is $x_i = (1/N)X_i$ with probability distribution $\phi_i(x_i)dx_i = \Phi_i(Nx_i)d(Nx_i)$ and expected value $\bar{x}_i = (1/N)\bar{X}_i$.

bution of the return of any share, we shall assume for simplicity that they are at least in agreement as to the expected return.[7]

This way of characterizing uncertain streams merits brief comment. Notice first that the stream is a stream of profits, not dividends. As will become clear later, as long as management is presumed to be acting in the best interests of the stockholders, retained earnings can be regarded as equivalent to a fully subscribed, pre-emptive issue of common stock. Hence, for present purposes, the division of the stream between cash dividends and retained earnings in any period is a mere detail. Notice also that the uncertainty attaches to the mean value over time of the stream of profits and should not be confused with variability over time of the successive elements of the stream. That variability and uncertainty are two totally different concepts should be clear from the fact that the elements of a stream can be variable even though known with certainty. It can be shown, furthermore, that whether the elements of a stream are sure or uncertain, the effect of variability per se on the valuation of the stream is at best a second-order one which can safely be neglected for our purposes (and indeed most others too).[8]

The next assumption plays a strategic role in the rest of the analysis. We shall assume that firms can be divided into "equivalent return" classes such that the return on the shares issued by any firm in any given class is proportional to (and hence perfectly correlated with) the return on the shares issued by any other firm in the same class. This assumption implies that the various shares within the same class differ, at most, by a "scale factor." Accordingly, if we adjust for the difference in scale, by taking the *ratio* of the return to the expected return, the probability distribution of that ratio is identical for all shares in the class. It follows that all relevant properties of a share are uniquely characterized by specifying (1) the class to which it belongs and (2) its expected return.

The significance of this assumption is that it permits us to classify firms into groups within which the shares of different firms are "homogeneous," that is, perfect substitutes for one another. We have, thus, an analogue to the familiar concept of the industry in which it is the commodity produced by the firms that is taken as homogeneous. To complete this analogy with Marshallian price theory, we shall assume in the

[7] To deal adequately with refinements such as differences among investors in estimates of expected returns would require extensive discussion of the theory of portfolio selection. Brief references to these and related topics will be made in the succeeding article on the general equilibrium model.

[8] The reader may convince himself of this by asking how much he would be willing to rebate to his employer for the privilege of receiving his annual salary in equal monthly installments rather than in irregular amounts over the year. See also J. M. Keynes [10, esp. pp. 53–54].

analysis to follow that the shares concerned are traded in perfect markets under conditions of atomistic competition.[9]

From our definition of homogeneous classes of stock it follows that in equilibrium in a perfect capital market the price per dollar's worth of expected return must be the same for all shares of any given class. Or, equivalently, in any given class the price of every share must be proportional to its expected return. Let us denote this factor of proportionality for any class, say the kth class, by $1/\rho_k$. Then if p_j denotes the price and $\bar{x}_j$ is the expected return per share of the jth firm in class k, we must have:

$$p_j = \frac{1}{\rho_k}\bar{x}_j; \tag{1}$$

or, equivalently,

$$\frac{\bar{x}_j}{p_j} = \rho_k \text{ a constant for all firms } j \text{ in class } k. \tag{2}$$

The constants ρ_k (one for each of the k classes) can be given several economic interpretations: (a) From (2) we see that each ρ_k is the expected rate of return of any share in class k. (b) From (1) $1/\rho_k$ is the price which an investor has to pay for a dollar's worth of expected return in the class k. (c) Again from (1), by analogy with the terminology for perpetual bonds, ρ_k can be regarded as the market rate of capitalization for the expected value of the uncertain streams of the kind generated by the kth class of firms.[10]

B. *Debt Financing and Its Effects on Security Prices*

Having developed an apparatus for dealing with uncertain streams we can now approach the heart of the cost-of-capital problem by dropping the assumption that firms cannot issue bonds. The introduction of debt-financing changes the market for shares in a very fundamental way. Because firms may have different proportions of debt in their capi-

[9] Just what our classes of stocks contain and how the different classes can be identified by outside observers are empirical questions to which we shall return later. For the present, it is sufficient to observe: (1) Our concept of a class, while not identical to that of the industry is at least closely related to it. Certainly the basic characteristics of the probability distributions of the returns on assets will depend to a significant extent on the product sold and the technology used. (2) What are the appropriate class boundaries will depend on the particular problem being studied. An economist concerned with general tendencies in the market, for example, might well be prepared to work with far wider classes than would be appropriate for an investor planning his portfolio, or a firm planning its financial strategy.

[10] We cannot, on the basis of the assumptions so far, make any statements about the relationship or spread between the various ρ's or capitalization rates. Before we could do so we would have to make further specific assumptions about the way investors believe the probability distributions vary from class to class, as well as assumptions about investors' preferences as between the characteristics of different distributions.

tal structure, shares of different companies, even in the same class, can give rise to different probability distributions of returns. In the language of finance, the shares will be subject to different degrees of financial risk or "leverage" and hence they will no longer be perfect substitutes for one another.

To exhibit the mechanism determining the relative prices of shares under these conditions, we make the following two assumptions about the nature of bonds and the bond market, though they are actually stronger than is necessary and will be relaxed later: (1) All bonds (including any debts issued by households for the purpose of carrying shares) are assumed to yield a constant income per unit of time, and this income is regarded as certain by all traders regardless of the issuer. (2) Bonds, like stocks, are traded in a perfect market, where the term perfect is to be taken in its usual sense as implying that any two commodities which are perfect substitutes for each other must sell, in equilibrium, at the same price. It follows from assumption (1) that all bonds are in fact perfect substitutes up to a scale factor. It follows from assumption (2) that they must all sell at the same price per dollar's worth of return, or what amounts to the same thing must yield the same rate of return. This rate of return will be denoted by r and referred to as the rate of interest or, equivalently, as the capitalization rate for sure streams. We now can derive the following two basic propositions with respect to the valuation of securities in companies with different capital structures:

Proposition I. Consider any company j and let $\overline{X}_j$ stand as before for the expected return on the assets owned by the company (that is, its expected profit before deduction of interest). Denote by D_j the market value of the debts of the company; by S_j the market value of its common shares; and by $V_j \equiv S_j + D_j$ the market value of all its securities or, as we shall say, the market value of the firm. Then, our Proposition I asserts that we must have in equilibrium:

$$V_j \equiv (S_j + D_j) = \overline{X}_j/\rho_k, \text{ for any firm } j \text{ in class } k. \tag{3}$$

That is, the *market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate ρ_k appropriate to its class.*

This proposition can be stated in an equivalent way in terms of the firm's "average cost of capital," $\overline{X}_j/V_j$, which is the ratio of its expected return to the market value of all its securities. Our proposition then is:

$$\frac{\overline{X}_j}{(S_j + D_j)} \equiv \frac{\overline{X}_j}{V_j} = \rho_k, \text{ for any firm } j, \text{ in class } k. \tag{4}$$

That is, *the average cost of capital to any firm is completely independent of*

its capital structure and is equal to the capitalization rate of a pure equity stream of its class.

To establish Proposition I we will show that as long as the relations (3) or (4) do not hold between any pair of firms in a class, arbitrage will take place and restore the stated equalities. We use the term arbitrage advisedly. For if Proposition I did not hold, an investor could buy and sell stocks and bonds in such a way as to exchange one income stream for another stream, identical in all relevant respects but selling at a lower price. The exchange would therefore be advantageous to the investor quite independently of his attitudes toward risk.[11] As investors exploit these arbitrage opportunities, the value of the overpriced shares will fall and that of the underpriced shares will rise, thereby tending to eliminate the discrepancy between the market values of the firms.

By way of proof, consider two firms in the same class and assume for simplicity only, that the expected return, $\overline{X}$, is the same for both firms. Let company 1 be financed entirely with common stock while company 2 has some debt in its capital structure. Suppose first the value of the levered firm, V_2, to be larger than that of the unlevered one, V_1. Consider an investor holding s_2 dollars' worth of the shares of company 2, representing a fraction α of the total outstanding stock, S_2. The return from this portfolio, denoted by Y_2, will be a fraction α of the income available for the stockholders of company 2, which is equal to the total return X_2 less the interest charge, rD_2. Since under our assumption of homogeneity, the anticipated total return of company 2, X_2, is, under all circumstances, the same as the anticipated total return to company 1, X_1, we can hereafter replace X_2 and X_1 by a common symbol X. Hence, the return from the initial portfolio can be written as:

$$Y_2 = \alpha(X - rD_2). \tag{5}$$

Now suppose the investor sold his αS_2 worth of company 2 shares and acquired instead an amount $s_1 = \alpha(S_2 + D_2)$ of the shares of company 1. He could do so by utilizing the amount αS_2 realized from the sale of his initial holding and borrowing an additional amount αD_2 on his own credit, pledging his new holdings in company 1 as a collateral. He would thus secure for himself a fraction $s_1/S_1 = \alpha(S_2 + D_2)/S_1$ of the shares and earnings of company 1. Making proper allowance for the interest payments on his personal debt αD_2, the return from the new portfolio, Y_1, is given by:

[11] In the language of the theory of choice, the exchanges are movements from inefficient points in the interior to efficient points on the boundary of the investor's opportunity set; and not movements between efficient points along the boundary. Hence for this part of the analysis nothing is involved in the way of specific assumptions about investor attitudes or behavior other than that investors behave consistently and prefer more income to less income, *ceteris paribus*.

$$(6) \qquad Y_1 = \frac{\alpha(S_2 + D_2)}{S_1} X - r\alpha D_2 = \alpha \frac{V_2}{V_1} X - r\alpha D_2.$$

Comparing (5) with (6) we see that as long as $V_2 > V_1$ we must have $Y_1 > Y_2$, so that it pays owners of company 2's shares to sell their holdings, thereby depressing S_2 and hence V_2; and to acquire shares of company 1, thereby raising S_1 and thus V_1. We conclude therefore that levered companies cannot command a premium over unlevered companies because investors have the opportunity of putting the equivalent leverage into their portfolio directly by borrowing on personal account.

Consider now the other possibility, namely that the market value of the levered company V_2 is less than V_1. Suppose an investor holds initially an amount s_1 of shares of company 1, representing a fraction α of the total outstanding stock, S_1. His return from this holding is:

$$Y_1 = \frac{s_1}{S_1} X = \alpha X.$$

Suppose he were to exchange this initial holding for another portfolio, also worth s_1, but consisting of s_2 dollars of stock of company 2 and of d dollars of bonds, where s_2 and d are given by:

$$(7) \qquad s_2 = \frac{S_2}{V_2} s_1, \qquad d = \frac{D_2}{V_2} s_1.$$

In other words the new portfolio is to consist of stock of company 2 and of bonds in the proportions S_2/V_2 and D_2/V_2, respectively. The return from the stock in the new portfolio will be a fraction s_2/S_2 of the total return to stockholders of company 2, which is $(X - rD_2)$, and the return from the bonds will be rd. Making use of (7), the total return from the portfolio, Y_2, can be expressed as follows:

$$Y_2 = \frac{s_2}{S_2}(X - rD_2) + rd = \frac{s_1}{V_2}(X - rD_2) + r\frac{D_2}{V_2} s_1 = \frac{s_1}{V_2} X = \alpha \frac{S_1}{V_2} X$$

(since $s_1 = \alpha S_1$). Comparing Y_2 with Y_1 we see that, if $V_2 < S_1 \equiv V_1$, then Y_2 will exceed Y_1. Hence it pays the holders of company 1's shares to sell these holdings and replace them with a mixed portfolio containing an appropriate fraction of the shares of company 2.

The acquisition of a mixed portfolio of stock of a levered company j and of bonds in the proportion S_j/V_j and D_j/V_j respectively, may be regarded as an operation which "undoes" the leverage, giving access to an appropriate fraction of the unlevered return X_j. It is this possibility of undoing leverage which prevents the value of levered firms from being consistently less than those of unlevered firms, or more generally prevents the average cost of capital $\overline{X}_j/V_j$ from being systematically higher for levered than for nonlevered companies in the same class.

Since we have already shown that arbitrage will also prevent V_2 from being larger than V_1, we can conclude that in equilibrium we must have $V_2 = V_1$, as stated in Proposition I.

Proposition II. From Proposition I we can derive the following proposition concerning the rate of return on common stock in companies whose capital structure includes some debt: the expected rate of return or yield, i, on the stock of any company j belonging to the kth class is a linear function of leverage as follows:

$$i_j = \rho_k + (\rho_k - r) D_j/S_j. \tag{8}$$

That is, *the expected yield of a share of stock is equal to the appropriate capitalization rate ρ_k for a pure equity stream in the class, plus a premium related to financial risk equal to the debt-to-equity ratio times the spread between ρ_k and r.* Or equivalently, the market price of any share of stock is given by capitalizing its expected return at the continuously variable rate i_j of (8).[12]

A number of writers have stated close equivalents of our Proposition I although by appealing to intuition rather than by attempting a proof and only to insist immediately that the results were not applicable to the actual capital markets.[13] Proposition II, however, so far as we have been able to discover is new.[14] To establish it we first note that, by definition, the expected rate of return, i, is given by:

$$i_j \equiv \frac{\overline{X}_j - rD_j}{S_j}. \tag{9}$$

From Proposition I, equation (3), we know that:

$$\overline{X}_j = \rho_k(S_j + D_j).$$

Substituting in (9) and simplifying, we obtain equation (8).

[12] To illustrate, suppose $\overline{X} = 1000$, $D = 4000$, $r = 5$ per cent and $\rho_k = 10$ per cent. These values imply that $V = 10{,}000$ and $S = 6000$ by virtue of Proposition I. The expected yield or rate of return per share is then:

$$i = \frac{1000 - 200}{6000} = .1 + (.1 - .05)\frac{4000}{6000} = 13\tfrac{1}{3} \text{ per cent.}$$

[13] See, for example, J. B. Williams [21, esp. pp. 72–73]; David Durand [3]; and W. A. Morton [15]. None of these writers describe in any detail the mechanism which is supposed to keep the average cost of capital constant under changes in capital structure. They seem, however, to be visualizing the equilibrating mechanism in terms of switches by investors between stocks and bonds as the yields of each get out of line with their "riskiness." This is an argument quite different from the pure arbitrage mechanism underlying our proof, and the difference is crucial. Regarding Proposition I as resting on investors' attitudes toward risk leads inevitably to a misunderstanding of many factors influencing relative yields such as, for example, limitations on the portfolio composition of financial institutions. See below, esp. Section I.D.

[14] Morton does make reference to a linear yield function but only " . . . for the sake of simplicity and because the particular function used makes no essential difference in my conclusions" [15, p. 443, note 2].

C. *Some Qualifications and Extensions of the Basic Propositions*

The methods and results developed so far can be extended in a number of useful directions, of which we shall consider here only three: (1) allowing for a corporate profits tax under which interest payments are deductible; (2) recognizing the existence of a multiplicity of bonds and interest rates; and (3) acknowledging the presence of market imperfections which might interfere with the process of arbitrage. The first two will be examined briefly in this section with some further attention given to the tax problem in Section II. Market imperfections will be discussed in Part D of this section in the course of a comparison of our results with those of received doctrines in the field of finance.

Effects of the Present Method of Taxing Corporations. The deduction of interest in computing taxable corporate profits will prevent the arbitrage process from making the value of all firms in a given class proportional to the expected returns generated by their physical assets. Instead, it can be shown (by the same type of proof used for the original version of Proposition I) that the market values of firms in each class must be proportional in equilibrium to their expected return net of taxes (that is, to the sum of the interest paid and expected net stockholder income). This means we must replace each $\overline{X}_j$ in the original versions of Propositions I and II with a new variable $\overline{X}_j^{\tau}$ representing the total income net of taxes generated by the firm:

$$\overline{X}_j^{\tau} \equiv (\overline{X}_j - rD_j)(1 - \tau) + rD_j \equiv \bar{\pi}_j^{\tau} + rD_j, \tag{10}$$

where $\bar{\pi}_j^{\tau}$ represents the expected net income accruing to the common stockholders and τ stands for the average rate of corporate income tax.[15]

After making these substitutions, the propositions, when adjusted for taxes, continue to have the same form as their originals. That is, Proposition I becomes:

$$\frac{\overline{X}_j^{\tau}}{V_j} = \rho_k^{\tau}, \text{ for any firm in class } k, \tag{11}$$

and Proposition II becomes

$$i_j \equiv \frac{\bar{\pi}_j^{\tau}}{S_j} = \rho_j^{\tau} + (\rho_k^{\tau} - r)D_j/S_j \tag{12}$$

where ρ_k^{τ} is the capitalization rate for income net of taxes in class k.

Although the form of the propositions is unaffected, certain interpretations must be changed. In particular, the after-tax capitalization rate

[15] For simplicity, we shall ignore throughout the tiny element of progression in our present corporate tax and treat τ as a constant independent of $(X_j - rD_j)$.

$\rho_k{}^r$ can no longer be identified with the "average cost of capital" which is $\rho_k = \overline{X}_j/V_j$. The difference between $\rho_k{}^r$ and the "true" average cost of capital, as we shall see, is a matter of some relevance in connection with investment planning within the firm (Section II). For the description of market behavior, however, which is our immediate concern here, the distinction is not essential. To simplify presentation, therefore, and to preserve continuity with the terminology in the standard literature we shall continue in this section to refer to $\rho_k{}^r$ as the average cost of capital, though strictly speaking this identification is correct only in the absence of taxes.

Effects of a Plurality of Bonds and Interest Rates. In existing capital markets we find not one, but a whole family of interest rates varying with maturity, with the technical provisions of the loan and, what is most relevant for present purposes, with the financial condition of the borrower.[16] Economic theory and market experience both suggest that the yields demanded by lenders tend to increase with the debt-equity ratio of the borrowing firm (or individual). If so, and if we can assume as a first approximation that this yield curve, $r = r\ (D/S)$, whatever its precise form, is the same for all borrowers, then we can readily extend our propositions to the case of a rising supply curve for borrowed funds.[17]

Proposition I is actually unaffected in form and interpretation by the fact that the rate of interest may rise with leverage; while the average cost of *borrowed* funds will tend to increase as debt rises, the average cost of funds from *all* sources will still be independent of leverage (apart from the tax effect). This conclusion follows directly from the ability of those who engage in arbitrage to undo the leverage in any financial structure by acquiring an appropriately mixed portfolio of bonds and stocks. Because of this ability, the ratio of earnings (*before* interest charges) to market value—*i.e.*, the average cost of capital from all

[16] We shall not consider here the extension of the analysis to encompass the time structure of interest rates. Although some of the problems posed by the time structure can be handled within our comparative statics framework, an adequate discussion would require a separate paper.

[17] We can also develop a theory of bond valuation along lines essentially parallel to those followed for the case of shares. We conjecture that the curve of bond yields as a function of leverage will turn out to be a nonlinear one in contrast to the linear function of leverage developed for common shares. However, we would also expect that the rate of increase in the yield on new issues would not be substantial in practice. This relatively slow rise would reflect the fact that interest rate increases by themselves can never be completely satisfactory to creditors as compensation for their increased risk. Such increases may simply serve to raise r so high relative to ρ that they become self-defeating by giving rise to a situation in which even normal fluctuations in earnings may force the company into bankruptcy. The difficulty of borrowing more, therefore, tends to show up in the usual case not so much in higher rates as in the form of increasingly stringent restrictions imposed on the company's management and finances by the creditors; and ultimately in a complete inability to obtain new borrowed funds, at least from the institutional investors who normally set the standards in the market for bonds.

sources—must be the same for all firms in a given class.[18] In other words, the increased cost of borrowed funds as leverage increases will tend to be offset by a corresponding reduction in the yield of common stock. This seemingly paradoxical result will be examined more closely below in connection with Proposition II.

A significant modification of Proposition I would be required only if the yield curve $r=r(D/S)$ were different for different borrowers, as might happen if creditors had marked preferences for the securities of a particular class of debtors. If, for example, corporations as a class were able to borrow at lower rates than individuals having equivalent personal leverage, then the average cost of capital to corporations might fall slightly, as leverage increased over some range, in reflection of this differential. In evaluating this possibility, however, remember that the relevant interest rate for our arbitrage operators is the rate on brokers' loans and, historically, that rate has not been noticeably higher than representative corporate rates.[19] The operations of holding companies and investment trusts which can borrow on terms comparable to operating companies represent still another force which could be expected to wipe out any marked or prolonged advantages from holding levered stocks.[20]

Although Proposition I remains unaffected as long as the yield curve is the same for all borrowers, the relation between common stock yields and leverage will no longer be the strictly linear one given by the original Proposition II. If r increases with leverage, the yield i will still tend to

[18] One normally minor qualification might be noted. Once we relax the assumption that all bonds have certain yields, our arbitrage operator faces the danger of something comparable to "gambler's ruin." That is, there is always the possibility that an otherwise sound concern—one whose long-run expected income is greater than its interest liability—might be forced into liquidation as a result of a run of temporary losses. Since reorganization generally involves costs, and because the operation of the firm may be hampered during the period of reorganization with lasting unfavorable effects on earnings prospects, we might perhaps expect heavily levered companies to sell at a slight discount relative to less heavily indebted companies of the same class.

[19] Under normal conditions, moreover, a substantial part of the arbitrage process could be expected to take the form, not of having the arbitrage operators go into debt on personal account to put the required leverage into their portfolios, but simply of having them reduce the amount of corporate bonds they already hold when they acquire underpriced unlevered stock. Margin requirements are also somewhat less of an obstacle to maintaining any desired degree of leverage in a portfolio than might be thought at first glance. Leverage could be largely restored in the face of higher margin requirements by switching to stocks having more leverage at the corporate level.

[20] An extreme form of inequality between borrowing and lending rates occurs, of course, in the case of preferred stocks, which can not be directly issued by individuals on personal account. Here again, however, we would expect that the operations of investment corporations plus the ability of arbitrage operators to sell off their holdings of preferred stocks would act to prevent the emergence of any substantial premiums (for this reason) on capital structures containing preferred stocks. Nor are preferred stocks so far removed from bonds as to make it impossible for arbitrage operators to approximate closely the risk and leverage of a corporate preferred stock by incurring a somewhat smaller debt on personal account.

rise as D/S increases, but at a decreasing rather than a constant rate. Beyond some high level of leverage, depending on the exact form of the interest function, the yield may even start to fall.[21] The relation between i and D/S could conceivably take the form indicated by the curve MD

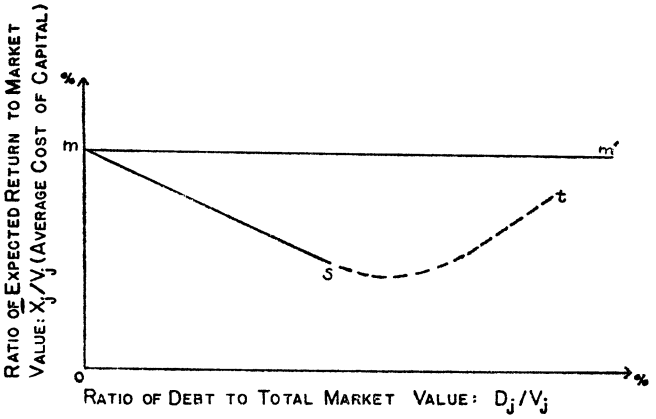

FIGURE 1

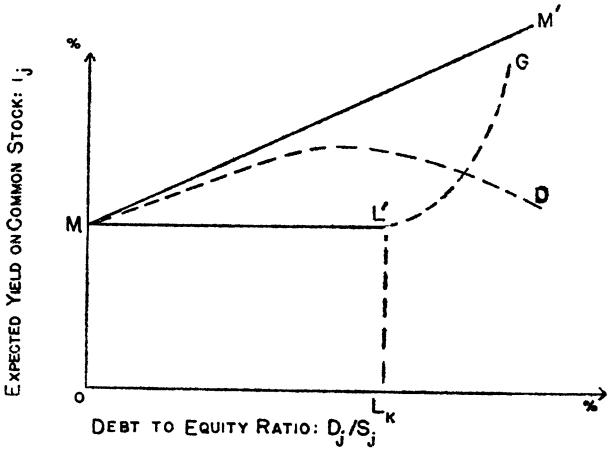

FIGURE 2

in Figure 2, although in practice the curvature would be much less pronounced. By contrast, with a constant rate of interest, the relation would be linear throughout as shown by line MM', Figure 2.

The downward sloping part of the curve MD perhaps requires some

[21] Since new lenders are unlikely to permit this much leverage (*cf.* note 17), this range of the curve is likely to be occupied by companies whose earnings prospects have fallen substantially since the time when their debts were issued.

comment since it may be hard to imagine why investors, other than those who like lotteries, would purchase stocks in this range. Remember, however, that the yield curve of Proposition II is a consequence of the more fundamental Proposition I. Should the demand by the risk-lovers prove insufficient to keep the market to the peculiar yield-curve MD, this demand would be reinforced by the action of arbitrage operators. The latter would find it profitable to own a pro-rata share of the firm as a whole by holding its stock *and* bonds, the lower yield of the shares being thus offset by the higher return on bonds.

D. *The Relation of Propositions I and II to Current Doctrines*

The propositions we have developed with respect to the valuation of firms and shares appear to be substantially at variance with current doctrines in the field of finance. The main differences between our view and the current view are summarized graphically in Figures 1 and 2. Our Proposition I [equation (4)] asserts that the average cost of capital, $\overline{X}_j^\tau/V_j$, is a constant for all firms j in class k, independently of their financial structure. This implies that, if we were to take a sample of firms in a given class, and if for each firm we were to plot the ratio of expected return to market value against some measure of leverage or financial structure, the points would tend to fall on a horizontal straight line with intercept ρ_k^τ, like the solid line mm' in Figure 1.[22] From Proposition I we derived Proposition II [equation (8)] which, taking the simplest version with r constant, asserts that, for all firms in a class, the relation between the yield on common stock and financial structure, measured by D_j/S_j, will approximate a straight line with slope $(\rho_k^\tau - r)$ and intercept ρ_k^τ. This relationship is shown as the solid line MM' in Figure 2, to which reference has been made earlier.[23]

By contrast, the conventional view among finance specialists appears to start from the proposition that, other things equal, the earnings-price ratio (or its reciprocal, the times-earnings multiplier) of a firm's common stock will normally be only slightly affected by "moderate" amounts of debt in the firm's capital structure.[24] Translated into our no-

[22] In Figure 1 the measure of leverage used is D_j/V_j (the ratio of debt to market value) rather than D_j/S_j (the ratio of debt to equity), the concept used in the analytical development. The D_j/V_j measure is introduced at this point because it simplifies comparison and contrast of our view with the traditional position.

[23] The line MM' in Figure 2 has been drawn with a positive slope on the assumption that $\rho_k^\tau > r$, a condition which will normally obtain. Our Proposition II as given in equation (8) would continue to be valid, of course, even in the unlikely event that $\rho_k^\tau < r$, but the slope of MM' would be negative.

[24] See, *e.g.*, Graham and Dodd [6, pp. 464–66]. Without doing violence to this position, we can bring out its implications more sharply by ignoring the qualification and treating the yield as a virtual constant over the relevant range. See in this connection the discussion in Durand [3, esp. pp. 225–37] of what he calls the "net income method" of valuation.

tation, it asserts that for any firm j in the class k,

$$\frac{\overline{X}_j^r - rD_j}{S_j} \equiv \frac{\bar{\pi}_j^r}{S_j} = i_k^*, \text{ a constant for } \frac{D_j}{S_j} \leq L_k \tag{13}$$

or, equivalently,

$$S_j = \bar{\pi}_j^r / i_k^*. \tag{14}$$

Here i_k^* represents the capitalization rate or earnings-price ratio on the common stock and L_k denotes some amount of leverage regarded as the maximum "reasonable" amount for firms of the class k. This assumed relationship between yield and leverage is the horizontal solid line ML' of Figure 2. Beyond L', the yield will presumably rise sharply as the market discounts "excessive" trading on the equity. This possibility of a rising range for high leverages is indicated by the broken-line segment $L'G$ in the figure.[25]

If the value of shares were really given by (14) then the over-all market value of the firm must be:

$$V_j \equiv S_j + D_j = \frac{\overline{X}_j^r - rD_j}{i_k^*} + D_j = \frac{\overline{X}_j^r}{i_k^*} + \frac{(i_k^* - r)D_j}{i_k^*}. \tag{16}$$

That is, for any given level of expected total returns after taxes ($\overline{X}_j^r$) and assuming, as seems natural, that $i_k^* > r$, the value of the firm must tend to *rise* with debt;[26] whereas our Proposition I asserts that the value of the firm is completely independent of the capital structure. Another way of contrasting our position with the traditional one is in terms of the cost of capital. Solving (16) for $\overline{X}_j^r / V_j$ yields:

$$\overline{X}_j^r / V_j = i_k^* - (i_k^* - r)D_j / V_j. \tag{17}$$

According to this equation, the average cost of capital is not independent of capital structure as we have argued, but should tend to *fall* with increasing leverage, at least within the relevant range of moderate debt ratios, as shown by the line ms in Figure 1. Or to put it in more familiar terms, debt-financing should be "cheaper" than equity-financing if not carried too far.

When we also allow for the possibility of a rising range of stock yields for large values of leverage, we obtain a U-shaped curve like mst in

[25] To make it easier to see some of the implications of this hypothesis as well as to prepare the ground for later statistical testing, it will be helpful to assume that the notion of a critical limit on leverage beyond which yields rise rapidly, can be epitomized by a quadratic relation of the form:

$$\bar{\pi}_j^r / S_j = i_k^* + \beta(D_j/S_j) + \alpha(D_j/S_j)^2, \qquad \alpha > 0. \tag{15}$$

[26] For a typical discussion of how a promoter can, supposedly, increase the market value of a firm by recourse to debt issues, see W. J. Eiteman [4, esp. pp. 11–13].

Figure 1.[27] That a yield-curve for stocks of the form $ML'G$ in Figure 2 implies a U-shaped cost-of-capital curve has, of course, been recognized by many writers. A natural further step has been to suggest that the capital structure corresponding to the trough of the U is an "optimal capital structure" towards which management ought to strive in the best interests of the stockholders.[28] According to our model, by contrast, no such optimal structure exists—all structures being equivalent from the point of view of the cost of capital.

Although the falling, or at least U-shaped, cost-of-capital function is in one form or another the dominant view in the literature, the ultimate rationale of that view is by no means clear. The crucial element in the position—that the expected earnings-price ratio of the stock is largely unaffected by leverage up to some conventional limit—is rarely even regarded as something which requires explanation. It is usually simply taken for granted or it is merely asserted that this is the way the market behaves.[29] To the extent that the constant earnings-price ratio has a rationale at all we suspect that it reflects in most cases the feeling that moderate amounts of debt in "sound" corporations do not really add very much to the "riskiness" of the stock. Since the extra risk is slight, it seems natural to suppose that firms will not have to pay noticeably higher yields in order to induce investors to hold the stock.[30]

A more sophisticated line of argument has been advanced by David Durand [3, pp. 231-33]. He suggests that because insurance companies and certain other important institutional investors are restricted to debt securities, nonfinancial corporations are able to borrow from them at interest rates which are lower than would be required to compensate

[27] The U-shaped nature of the cost-of-capital curve can be exhibited explicitly if the yield curve for shares as a function of leverage can be approximated by equation (15) of footnote 25. From that equation, multiplying both sides by S_j we obtain: $\bar{\pi}_j{}^r = \bar{X}_j{}^r - rD_j = i_k{}^* S_j + \beta D_j + \alpha D_j{}^2/S_j$ or, adding and subtracting $i_k{}^* D_k$ from the right-hand side and collecting terms,

$$\bar{X}_j{}^r = i_k{}^*(S_j + D_j) + (\beta + r - i_k{}^*)D_j + \alpha D^2{}_j/S_j. \tag{18}$$

Dividing (18) by V_j gives an expression for the cost of capital:

$$\bar{X}_j{}^r/V_j = i_k{}^* - (i_k{}^* - r - \beta)D_j/V_j + \alpha D_j{}^2/S_jV_j = i_k{}^* - (i_k{}^* - r - \beta)D_j/V_j + \alpha(D_j/V_j)^2/(1 - D_j/V_j) \tag{19}$$

which is clearly U-shaped since α is supposed to be positive.

[28] For a typical statement see S. M. Robbins [16, p. 307]. See also Graham and Dodd [6, pp. 468–74].

[29] See *e.g.*, Graham and Dodd [6, p. 466].

[30] A typical statement is the following by Guthmann and Dougall [7, p. 245]: "Theoretically it might be argued that the increased hazard from using bonds and preferred stocks would counterbalance this additional income and so prevent the common stock from being more attractive than when it had a lower return but fewer prior obligations. In practice, the extra earnings from 'trading on the equity' are often regarded by investors as more than sufficient to serve as a 'premium for risk' when the proportions of the several securities are judiciously mixed."

creditors in a free market. Thus, while he would presumably agree with our conclusions that stockholders could not gain from leverage in an unconstrained market, he concludes that they can gain under present institutional arrangements. This gain would arise by virtue of the "safety superpremium" which lenders are willing to pay corporations for the privilege of lending.[31]

The defective link in both the traditional and the Durand version of the argument lies in the confusion between investors' subjective risk preferences and their objective market opportunities. Our Propositions I and II, as noted earlier, do not depend for their validity on any assumption about individual risk preferences. Nor do they involve any assertion as to what is an adequate compensation to investors for assuming a given degree of risk. They rely merely on the fact that a given commodity cannot consistently sell at more than one price in the market; or more precisely that the price of a commodity representing a "bundle" of two other commodities cannot be consistently different from the weighted average of the prices of the two components (the weights being equal to the proportion of the two commodities in the bundle).

An analogy may he helpful at this point. The relations between $1/\rho_k$, the price per dollar of an unlevered stream in class k; $1/r$, the price per dollar of a sure stream, and $1/i_j$, the price per dollar of a levered stream j, in the kth class, are essentially the same as those between, respectively, the price of whole milk, the price of butter fat, and the price of milk which has been thinned out by skimming off some of the butter fat. Our Proposition I states that a firm cannot reduce the cost of capital—*i.e.*, increase the market value of the stream it generates—by securing part of its capital through the sale of bonds, even though debt money appears to be cheaper. This assertion is equivalent to the proposition that, under perfect markets, a dairy farmer cannot in general earn more for the milk he produces by skimming some of the butter fat and selling it separately, even though butter fat per unit weight, sells for more than whole milk. The advantage from skimming the milk rather than selling whole milk would be purely illusory; for what would be gained from selling the high-priced butter fat would be lost in selling the low-priced residue of thinned milk. Similarly our Proposition II—that the price per dollar of a levered stream falls as leverage increases—is an ex-

[31] Like Durand, Morton [15] contends "that the actual market deviates from [Proposition I] by giving a changing over-all cost of money at different points of the [leverage] scale" (p. 443, note 2, inserts ours), but the basis for this contention is nowhere clearly stated. Judging by the great emphasis given to the lack of mobility of investment funds between stocks and bonds and to the psychological and institutional pressures toward debt portfolios (see pp. 444–51 and especially his discussion of the optimal capital structure on p. 453) he would seem to be taking a position very similar to that of Durand above.

act analogue of the statement that the price per gallon of thinned milk falls continuously as more butter fat is skimmed off.[32]

It is clear that this last assertion is true as long as butter fat is worth more per unit weight than whole milk, and it holds even if, for many consumers, taking a little cream out of the milk (adding a little leverage to the stock) does not detract noticeably from the taste (does not add noticeably to the risk). Furthermore the argument remains valid even in the face of instituional limitations of the type envisaged by Durand. For suppose that a large fraction of the population habitually dines in restaurants which are required by law to serve only cream in lieu of milk (entrust their savings to institutional investors who can only buy bonds). To be sure the price of butter fat will then tend to be higher in relation to that of skimmed milk than in the absence such restrictions (the rate of interest will tend to be lower), and this will benefit people who eat at home and who like skim milk (who manage their own portfolio and are able and willing to take risk). But it will still be the case that a farmer cannot gain by skimming some of the butter fat and selling it separately (firm cannot reduce the cost of capital by recourse to borrowed funds).[33]

Our propositions can be regarded as the extension of the classical theory of markets to the particular case of the capital markets. Those who hold the current view—whether they realize it or not—must as-

[32] Let M denote the quantity of whole milk, B/M the proportion of butter fat in the whole milk, and let p_M, p_B and p_α denote, respectively, the price per unit weight of whole milk, butter fat and thinned milk from which a fraction α of the butter fat has been skimmed off. We then have the fundamental perfect market relation:

(a) $$p_\alpha(M - \alpha B) + p_B \alpha B = p_M M, \qquad 0 \leq \alpha \leq 1,$$

stating that total receipts will be the same amount $p_M M$, independently of the amount αB of butter fat that may have been sold separately. Since p_M corresponds to $1/\rho$, p_B to $1/r$, p_α to $1/i$, M to $\bar{X}$ and αB to rD, (a) is equivalent to Proposition I, $S+D=\bar{X}/\rho$. From (a) we derive:

(b) $$p_\alpha = p_M \frac{M}{M - \alpha B} - p_B \frac{\alpha B}{M - \alpha B}$$

which gives the price of thinned milk as an explicit function of the proportion of butter fat skimmed off; the function decreasing as long as $p_B > p_M$. From (a) also follows:

(c) $$1/p_\alpha = 1/p_M + (1/p_M - 1/p_B) \frac{p_B \alpha B}{p_\alpha(M - \alpha B)}$$

which is the exact analogue of Proposition II, as given by (8).

[33] The reader who likes parables will find that the analogy with interrelated commodity markets can be pushed a good deal farther than we have done in the text. For instance, the effect of changes in the market rate of interest on the over-all cost of capital is the same as the effect of a change in the price of butter on the price of whole milk. Similarly, just as the relation between the prices of skim milk and butter fat influences the kind of cows that will be reared, so the relation between i and r influences the kind of ventures that will be undertaken. If people like butter we shall have Guernseys; if they are willing to pay a high price for safety, this will encourage ventures which promise smaller but less uncertain streams per dollar of physical assets.

sume not merely that there are lags and frictions in the equilibrating process—a feeling we certainly share,[34] claiming for our propositions only that they describe the central tendency around which observations will scatter—but also that there are large and *systematic* imperfections in the market which permanently bias the outcome. This is an assumption that economists, at any rate, will instinctively eye with some skepticism.

In any event, whether such prolonged, systematic departures from equilibrium really exist or whether our propositions are better descriptions of long-run market behavior can be settled only by empirical research. Before going on to the theory of investment it may be helpful, therefore, to look at the evidence.

E. *Some Preliminary Evidence on the Basic Propositions*

Unfortunately the evidence which has been assembled so far is amazingly skimpy. Indeed, we have been able to locate only two recent studies—and these of rather limited scope—which were designed to throw light on the issue. Pending the results of more comprehensive tests which we hope will soon be available, we shall review briefly such evidence as is provided by the two studies in question: (1) an analysis of the relation between security yields and financial structure for some 43 large electric utilities by F. B. Allen [1], and (2) a parallel (unpublished) study by Robert Smith [19], for 42 oil companies designed to test whether Allen's rather striking results would be found in an industry with very different characteristics.[35] The Allen study is based on average figures for the years 1947 and 1948, while the Smith study relates to the single year 1953.

The Effect of Leverage on the Cost of Capital. According to the received view, as shown in equation (17) the average cost of capital, $\overline{X}^r/V$, should decline linearly with leverage as measured by the ratio D/V, at least through most of the relevant range.[36] According to Proposition I, the average cost of capital within a given class k should tend to have the same value $\rho_k{}^r$ independently of the degree of leverage. A simple test

[34] Several specific examples of the failure of the arbitrage mechanism can be found in Graham and Dodd [6, *e.g.*, pp. 646–48]. The price discrepancy described on pp. 646–47 is particularly curious since it persists even today despite the fact that a whole generation of security analysts has been brought up on this book!

[35] We wish to express our thanks to both writers for making available to us some of their original worksheets. In addition to these recent studies there is a frequently cited (but apparently seldom read) study by the Federal Communications Commission in 1938 [22] which purports to show the existence of an optimal capital structure or range of structures (in the sense defined above) for public utilities in the 1930's. By current standards for statistical investigations, however, this study cannot be regarded as having any real evidential value for the problem at hand.

[36] We shall simplify our notation in this section by dropping the subscript j used to denote a particular firm wherever this will not lead to confusion.

of the merits of the two alternative hypotheses can thus be carried out by correlating $\overline{X}^r/V$ with D/V. If the traditional view is correct, the correlation should be significantly negative; if our view represents a better approximation to reality, then the correlation should not be significantly different from zero.

Both studies provide information about the average value of D—the market value of bonds and preferred stock—and of V—the market value of all securities.[37] From these data we can readily compute the ratio D/V and this ratio (expressed as a percentage) is represented by the symbol d in the regression equations below. The measurement of the variable $\overline{X}^r/V$, however, presents serious difficulties. Strictly speaking, the numerator should measure the expected returns net of taxes, but this is a variable on which no direct information is available. As an approximation, we have followed both authors and used (1) the average value of actual net returns in 1947 and 1948 for Allen's utilities; and (2) actual net returns in 1953 for Smith's oil companies. Net return is defined in both cases as the sum of interest, preferred dividends and stockholders' income net of corporate income taxes. Although this approximation to expected returns is undoubtedly very crude, there is no reason to believe that it will systematically bias the test in so far as the sign of the regression coefficient is concerned. The roughness of the approximation, however, will tend to make for a wide scatter. Also contributing to the scatter is the crudeness of the industrial classification, since especially within the sample of oil companies, the assumption that all the firms belong to the same class in our sense, is at best only approximately valid.

Denoting by x our approximation to $\overline{X}^r/V$ (expressed, like d, as a percentage), the results of the tests are as follows:

$$\text{Electric Utilities} \quad x = 5.3 + .006d \quad (\pm .008) \qquad r = .12$$

$$\text{Oil Companies} \quad x = 8.5 + .006d \quad (\pm .024) \qquad r = .04.$$

The data underlying these equations are also shown in scatter diagram form in Figures 3 and 4.

The results of these tests are clearly favorable to our hypothesis.

[37] Note that for purposes of this test preferred stocks, since they represent an *expected* fixed obligation, are properly classified with bonds even though the tax status of preferred dividends is different from that of interest payments and even though preferred dividends are really fixed only as to their maximum in any year. Some difficulty of classification does arise in the case of convertible preferred stocks (and convertible bonds) selling at a substantial premium, but fortunately very few such issues were involved for the companies included in the two studies. Smith included bank loans and certain other short-term obligations (at book values) in his data on oil company debts and this treatment is perhaps open to some question. However, the amounts involved were relatively small and check computations showed that their elimination would lead to only minor differences in the test results.

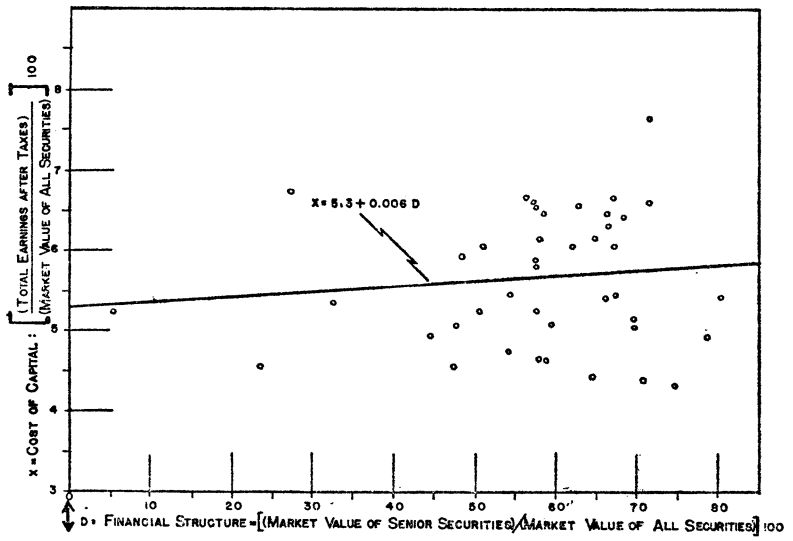

FIGURE 3. COST OF CAPITAL IN RELATION TO FINANCIAL STRUCTURE FOR 43 ELECTRIC UTILITIES, 1947–48

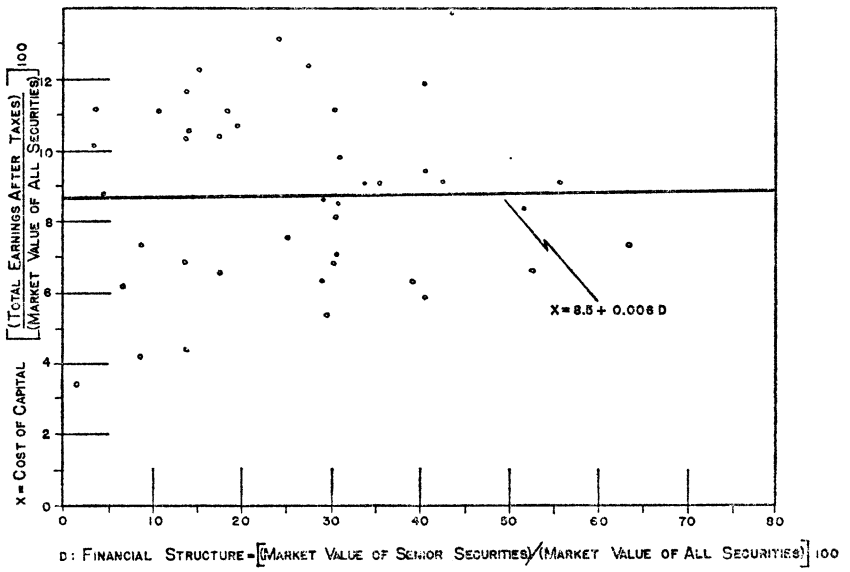

FIGURE 4. COST OF CAPITAL IN RELATION TO FINANCIAL STRUCTURE FOR 42 OIL COMPANIES, 1953

Both correlation coefficients are very close to zero and not statistically significant. Furthermore, the implications of the traditional view fail to be supported even with respect to the sign of the correlation. The data in short provide no evidence of any tendency for the cost of capital to fall as the debt ratio increases.[38]

It should also be apparent from the scatter diagrams that there is no hint of a curvilinear, U-shaped, relation of the kind which is widely believed to hold between the cost of capital and leverage. This graphical impression was confirmed by statistical tests which showed that for both industries the curvature was not significantly different from zero, its sign actually being opposite to that hypothesized.[39]

Note also that according to our model, the constant terms of the regression equations are measures of $\rho_k{}^\tau$, the capitalization rates for unlevered streams and hence the average cost of capital in the classes in question. The estimates of 8.5 per cent for the oil companies as against 5.3 per cent for electric utilities appear to accord well with a priori expectations, both in absolute value and relative spread.

The Effect of Leverage on Common Stock Yields. According to our Proposition II—see equation 12 and Figure 2—the expected yield on common stock, $\bar{\pi}^\tau/S$, in any given class, should tend to increase with leverage as measured by the ratio D/S. The relation should tend to be linear and with positive slope through most of the relevant range (as in the curve MM' of Figure 2), though it might tend to flatten out if we move

[38] It may be argued that a test of the kind used is biased against the traditional view. The fact that both sides of the regression equation are divided by the variable V which may be subject to random variation might tend to impart a positive bias to the correlation. As a check on the results presented in the text, we have, therefore, carried out a supplementary test based on equation (16). This equation shows that, if the traditional view is correct, the market value of a company should, for given $\bar{X}^\tau$, increase with debt through most of the relevant range; according to our model the market value should be uncorrelated with D, given $\bar{X}^\tau$. Because of wide variations in the size of the firms included in our samples, all variables must be divided by a suitable scale factor in order to avoid spurious results in carrying out a test of equation (16). The factor we have used is the book value of the firm denoted by A. The hypothesis tested thus takes the specific form:

$$V/A = a + b(\bar{X}^\tau/A) + c(D/A)$$

and the numerator of the ratio X^τ/A is again approximated by actual net returns. The partial correlation between V/A and D/A should now be positive according to the traditional view and zero according to our model. Although division by A should, if anything, bias the results in favor of the traditional hypothesis, the partial correlation turns out to be only .03 for the oil companies and $-.28$ for the electric utilities. Neither of these coefficients is significantly different from zero and the larger one even has the wrong sign.

[39] The tests consisted of fitting to the data the equation (19) of footnote 27. As shown there, it follows from the U-shaped hypothesis that the coefficient α of the variable $(D/V)^2/(1-D/V)$, denoted hereafter by d^*, should be significant and positive. The following regression equations and partials were obtained:

$$\text{Electric Utilities } x = 5.0 + .017d - .003d^*;\ r_{xd^*.d} = -.15$$

$$\text{Oil Companies } x = 8.0 + .05d - .03d^*;\ r_{xd^*.d} = -.14.$$

far enough to the right (as in the curve MD'), to the extent that high leverage tends to drive up the cost of senior capital. According to the conventional view, the yield curve as a function of leverage should be a horizontal straight line (like ML') through most of the relevant range; far enough to the right, the yield may tend to rise at an increasing rate. Here again, a straight-forward correlation—in this case between $\bar{\pi}^\tau/S$ and D/S—can provide a test of the two positions. If our view is correct, the correlation should be significantly positive; if the traditional view is correct, the correlation should be negligible.

Subject to the same qualifications noted above in connection with $\overline{X}^\tau$, we can approximate $\bar{\pi}^\tau$ by actual stockholder net income.[40] Letting z denote in each case the approximation to $\bar{\pi}^\tau/S$ (expressed as a percentage) and letting h denote the ratio D/S (also in percentage terms) the following results are obtained:

$$\text{Electric Utilities} \quad z = 6.6 + \underset{(+.004)}{.017h} \qquad r = .53$$

$$\text{Oil Companies} \quad z = 8.9 + \underset{(\pm .012)}{.051h} \qquad r = .53.$$

These results are shown in scatter diagram form in Figures 5 and 6.

Here again the implications of our analysis seem to be borne out by the data. Both correlation coefficients are positive and highly significant when account is taken of the substantial sample size. Furthermore, the estimates of the coefficients of the equations seem to accord reasonably well with our hypothesis. According to equation (12) the constant term should be the value of $\rho_k{}^\tau$ for the given class while the slope should be $(\rho_k{}^\tau - r)$. From the test of Proposition I we have seen that for the oil companies the mean value of $\rho_k{}^\tau$ could be estimated at around 8.7. Since the average yield of senior capital during the period covered was in the order of $3\frac{1}{2}$ per cent, we should expect a constant term of about 8.7 per cent and a slope of just over 5 per cent. These values closely approximate the regression estimates of 8.9 per cent and 5.1 per cent respectively. For the electric utilities, the yield of senior capital was also on the order of $3\frac{1}{2}$ per cent during the test years, but since the estimate of the mean value of $\rho_k{}^\tau$ from the test of Proposition I was 5.6 per cent,

[40] As indicated earlier, Smith's data were for the single year 1953. Since the use of a single year's profits as a measure of expected profits might be open to objection we collected profit data for 1952 for the same companies and based the computation of $\bar{\pi}^\tau/S$ on the average of the two years. The value of $\bar{\pi}^\tau/S$ was obtained from the formula:

$$\left(\text{net earnings in 1952} \cdot \frac{\text{assets in '53}}{\text{assets in '52}} + \text{net earnings in '1953}\right)\frac{1}{2}$$
$$\div \text{ (average market value of common stock in '53).}$$

The asset adjustment was introduced as rough allowance for the effects of possible growth in the size of the firm. It might be added that the correlation computed with $\bar{\pi}^\tau/S$ based on net profits in 1953 alone was found to be only slightly smaller, namely .50.

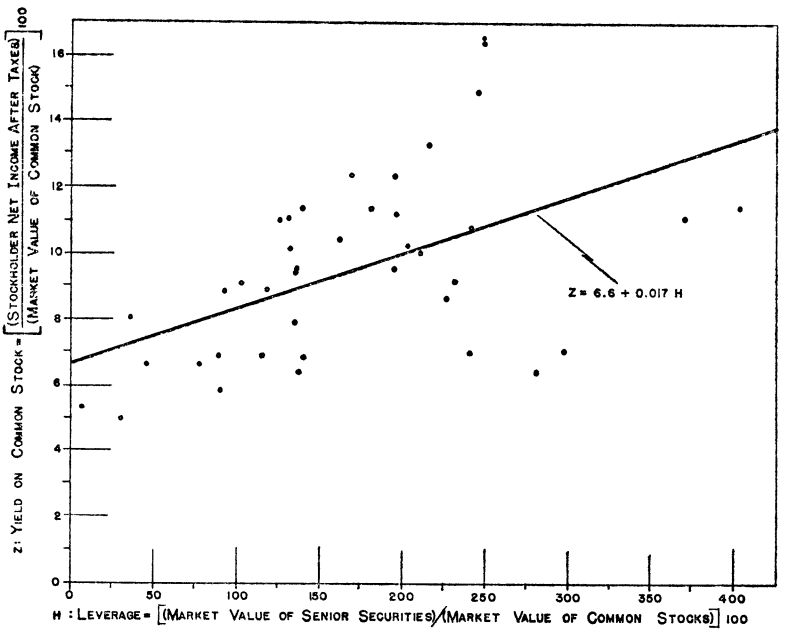

FIGURE 5. YIELD ON COMMON STOCK IN RELATION TO LEVERAGE FOR 43 ELECTRIC UTILITIES, 1947–48

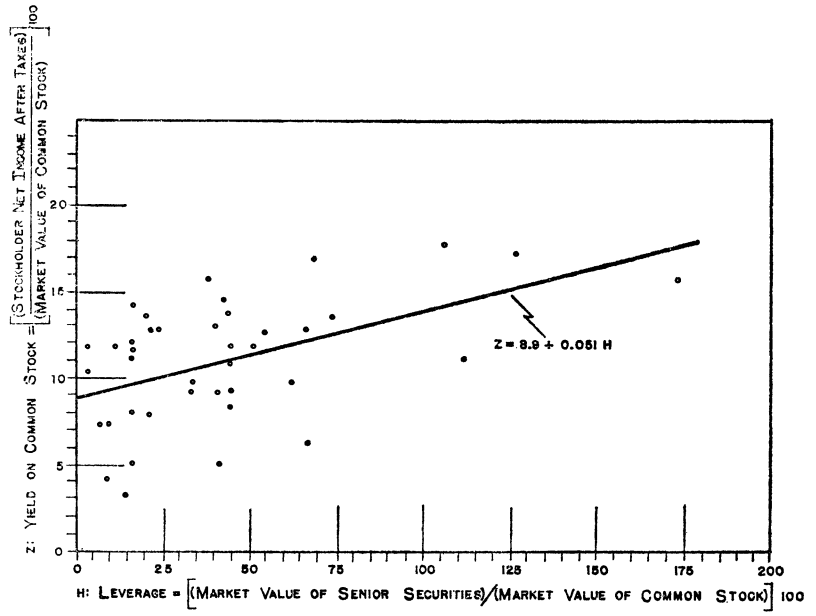

FIGURE 6. YIELD ON COMMON STOCK IN RELATION TO LEVERAGE FOR 42 OIL COMPANIES, 1952–53

the slope should be just above 2 per cent. The actual regression estimate for the slope of 1.7 per cent is thus somewhat low, but still within one standard error of its theoretical value. Because of this underestimate of the slope and because of the large mean value of leverage ($\bar{h}=160$ per cent) the regression estimate of the constant term, 6.6 per cent, is somewhat high, although not significantly different from the value of 5.6 per cent obtained in the test of Proposition I.

When we add a square term to the above equations to test for the presence and direction of curvature we obtain the following estimates:

$$\text{Electric Utilities} \quad z = 4.6 + .004h - .007h^2$$

$$\text{Oil Companies} \quad z = 8.5 + .072h - .016h^2.$$

For both cases the curvature is negative. In fact, for the electric utilities, where the observations cover a wider range of leverage ratios, the negative coefficient of the square term is actually significant at the 5 per cent level. Negative curvature, as we have seen, runs directly counter to the traditional hypothesis, whereas it can be readily accounted for by our model in terms of rising cost of borrowed funds.[41]

In summary, the empirical evidence we have reviewed seems to be broadly consistent with our model and largely inconsistent with traditional views. Needless to say much more extensive testing will be required before we can firmly conclude that our theory describes market behavior. Caution is indicated especially with regard to our test of Proposition II, partly because of possible statistical pitfalls[42] and partly because not all the factors that might have a systematic effect on stock yields have been considered. In particular, no attempt was made to test the possible influence of the dividend pay-out ratio whose role has tended to receive a great deal of attention in current research and thinking. There are two reasons for this omission. First, our main objective has been to assess the prima facie tenability of *our* model, and in this model, based as it is on rational behavior by investors, dividends per se play no role. Second, in a world in which the policy of dividend stabilization is widespread, there is no simple way of disentangling the true effect of dividend payments on stock prices from their apparent effect,

[41] That the yield of senior capital tended to rise for utilities as leverage increased is clearly shown in several of the scatter diagrams presented in the published version of Allen's study. This significant negative curvature between stock yields and leverage for utilities may be partly responsible for the fact, previously noted, that the constant in the linear regression is somewhat higher and the slope somewhat lower than implied by equation (12). Note also in connection with the estimate of $\rho_k{}^\tau$ that the introduction of the quadratic term reduces the constant considerably, pushing it in fact below the a priori expectation of 5.6, though the difference is again not statistically significant.

[42] In our test, *e.g.*, the two variables z and h are both ratios with S appearing in the denominator, which may tend to impart a positive bias to the correlation (*cf.* note 38). Attempts were made to develop alternative tests, but although various possibilities were explored, we have so far been unable to find satisfactory alternatives.

the latter reflecting only the role of dividends as a proxy measure of long-term earning anticipations.[43] The difficulties just mentioned are further compounded by possible interrelations between dividend policy and leverage.[44]

II. *Implications of the Analysis for the Theory of Investment*

A. *Capital Structure and Investment Policy*

On the basis of our propositions with respect to cost of capital and financial structure (and for the moment neglecting taxes), we can derive the following simple rule for optimal investment policy by the firm:

Proposition III. If a firm in class k is acting in the best interest of the stockholders at the time of the decision, it will exploit an investment opportunity if and only if the rate of return on the investment, say ρ^*, is as large as or larger than ρ_k. That is, *the cut-off point for investment in the firm will in all cases be ρ_k and will be completely unaffected by the type of security used to finance the investment.* Equivalently, we may say that regardless of the financing used, the marginal cost of capital to a firm is equal to the average cost of capital, which is in turn equal to the capitalization rate for an unlevered stream in the class to which the firm belongs.[45]

To establish this result we will consider the three major financing alternatives open to the firm—bonds, retained earnings, and common stock issues—and show that in each case an investment is worth undertaking if, and only if, $\rho^* \geqq \rho_k$.[46]

Consider first the case of an investment financed by the sale of bonds. We know from Proposition I that the market value of the firm before the investment was undertaken was:[47]

$$V_0 = \overline{X}_0/\rho_k \tag{20}$$

[43] We suggest that failure to appreciate this difficulty is responsible for many fallacious, or at least unwarranted, conclusions about the role of dividends.

[44] In the sample of electric utilities, there is a substantial negative correlation between yields and pay-out ratios, but also between pay-out ratios and leverage, suggesting that either the association of yields and leverage or of yields and pay-out ratios may be (at least partly) spurious. These difficulties however do not arise in the case of the oil industry sample. A preliminary analysis indicates that there is here no significant relation between leverage and pay-out ratios and also no significant correlation (either gross or partial) between yields and pay-out ratios.

[45] The analysis developed in this paper is essentially a comparative-statics, not a dynamic analysis. This note of caution applies with special force to Proposition III. Such problems as those posed by expected changes in r and in ρ_k over time will not be treated here. Although they are in principle amenable to analysis within the general framework we have laid out, such an undertaking is sufficiently complex to deserve separate treatment. *Cf.* note 17.

[46] The extension of the proof to other types of financing, such as the sale of preferred stock or the issuance of stock rights is straightforward.

[47] Since no confusion is likely to arise, we have again, for simplicity, eliminated the subscripts identifying the firm in the equations to follow. Except for ρ_k, the subscripts now refer to time periods.

and that the value of the common stock was:

$$S_0 = V_0 - D_0. \tag{21}$$

If now the firm borrows I dollars to finance an investment yielding ρ^* its market value will become:

$$V_1 = \frac{\overline{X}_0 + \rho^* I}{\rho_k} = V_0 + \frac{\rho^* I}{\rho_k} \tag{22}$$

and the value of its common stock will be:

$$S_1 = V_1 - (D_0 + I) = V_0 + \frac{\rho^* I}{\rho_k} - D_0 - I \tag{23}$$

or using equation 21,

$$S_1 = S_0 + \frac{\rho^* I}{\rho_k} - I. \tag{24}$$

Hence $S_1 \gtreqless S_0$ as $\rho^* \gtreqless \rho_k$.[48]

To illustrate, suppose the capitalization rate for uncertain streams in the kth class is 10 per cent and the rate of interest is 4 per cent. Then if a given company had an expected income of 1,000 and if it were financed entirely by common stock we know from Proposition I that the market value of its stock would be 10,000. Assume now that the managers of the firm discover an investment opportunity which will require an outlay of 100 and which is expected to yield 8 per cent. At first sight this might appear to be a profitable opportunity since the expected return is double the interest cost. If, however, the management borrows the necessary 100 at 4 per cent, the total expected income of the company rises to 1,008 and the market value of the firm to 10,080. But the firm now will have 100 of bonds in its capital structure so that, paradoxically, the market value of the stock must actually be reduced from 10,000 to 9,980 as a consequence of this apparently profitable investment. Or, to put it another way, the gains from being able to tap cheap, borrowed funds are more than offset for the stockholders by the market's discounting of the stock for the added leverage assumed.

Consider next the case of retained earnings. Suppose that in the course of its operations the firm acquired I dollars of cash (without impairing

[48] In the case of bond-financing the rate of interest on bonds does not enter explicitly into the decision (assuming the firm borrows at the market rate of interest). This is true, moreover, given the conditions outlined in Section I.C, even though interest rates may be an increasing function of debt outstanding. To the extent that the firm borrowed at a rate other than the market rate the two I's in equation (24) would no longer be identical and an additional gain or loss, as the case might be, would accrue to the shareholders. It might also be noted in passing that permitting the two I's in (24) to take on different values provides a simple method for introducing underwriting expenses into the analysis.

the earning power of its assets). If the cash is distributed as a dividend to the stockholders their wealth W_0, after the distribution will be:

$$W_0 = S_0 + I = \frac{\overline{X}_0}{\rho_k} - D_0 + I \tag{25}$$

where $\overline{X}_0$ represents the expected return from the assets exclusive of the amount I in question. If however the funds are retained by the company and used to finance new assets whose expected rate of return is ρ^*, then the stockholders' wealth would become:

$$W_1 = S_1 = \frac{\overline{X}_0 + \rho^* I}{\rho_k} - D_0 = S_0 + \frac{\rho^* I}{\rho_k} \cdot \tag{26}$$

Clearly $W_1 \gtreqless W_0$ as $\rho^* \gtreqless \rho_k$ so that an investment financed by retained earnings raises the net worth of the owners if and only if $\rho^* > \rho_k$.[49]

Consider finally, the case of common-stock financing. Let P_0 denote the current market price per share of stock and assume, for simplicity, that this price reflects currently expected earnings only, that is, it does not reflect any future increase in earnings as a result of the investment under consideration.[50] Then if N is the original number of shares, the price per share is:

$$P_0 = S_0/N \tag{27}$$

and the number of new shares, M, needed to finance an investment of I dollars is given by:

$$M = \frac{I}{P_0} \cdot \tag{28}$$

As a result of the investment the market value of the stock becomes:

$$S_1 = \frac{\overline{X}_0 + \rho^* I}{\rho_k} - D_0 = S_0 + \frac{\rho^* I}{\rho_k} = NP_0 + \frac{\rho^* I}{\rho_k}$$

and the price per share:

$$P_1 = \frac{S_1}{N + M} = \frac{1}{N + M}\left[NP_0 + \frac{\rho^* I}{\rho_k}\right]. \tag{29}$$

[49] The conclusion that ρ_k is the cut-off point for investments financed from internal funds applies not only to undistributed net profits, but to depreciation allowances (and even to the funds represented by the current sale value of any asset or collection of assets). Since the owners can earn ρ_k by investing funds elsewhere in the class, partial or total liquidating distributions should be made whenever the firm cannot achieve a marginal internal rate of return equal to ρ_k.

[50] If we assumed that the market price of the stock did reflect the expected higher future earnings (as would be the case if our original set of assumptions above were strictly followed) the analysis would differ slightly in detail, but not in essentials. The cut-off point for new investment would still be ρ_k, but where $\rho^* > \rho_k$ the gain to the original owners would be larger than if the stock price were based on the pre-investment expectations only.

Since by equation (28), $I = MP_0$, we can add MP_0 and subtract I from the quantity in bracket, obtaining:

$$P_1 = \frac{1}{N+M}\left[(N+M)P_0 + \frac{\rho^* - \rho_k}{\rho_k} I\right] \tag{30}$$
$$= P_0 + \frac{1}{N+M}\,\frac{\rho^* - \rho_k}{\rho_k} I > P_0 \text{ if,}$$

and only if, $\rho^* > \rho_k$.

Thus an investment financed by common stock is advantageous to the current stockholders if and only if its yield exceeds the capitalization rate ρ_k.

Once again a numerical example may help to illustrate the result and make it clear why the relevant cut-off rate is ρ_k and not the current yield on common stock, i. Suppose that ρ_k is 10 per cent, r is 4 per cent, that the original expected income of our company is 1,000 and that management has the opportunity of investing 100 having an expected yield of 12 per cent. If the original capital structure is 50 per cent debt and 50 per cent equity, and 1,000 shares of stock are initially outstanding, then, by Proposition I, the market value of the common stock must be 5,000 or 5 per share. Furthermore, since the interest bill is $.04 \times 5{,}000 = 200$, the yield on common stock is $800/5{,}000 = 16$ per cent. It may then appear that financing the additional investment of 100 by issuing 20 shares to outsiders at 5 per share would dilute the equity of the original owners since the 100 promises to yield 12 per cent whereas the common stock is currently yielding 16 per cent. Actually, however, the income of the company would rise to 1,012; the value of the firm to 10,120; and the value of the common stock to 5,120. Since there are now 1,020 shares, each would be worth 5.02 and the wealth of the original stockholders would thus have been increased. What has happened is that the dilution in expected earnings per share (from .80 to .796) has been more than offset, in its effect upon the market price of the shares, by the decrease in leverage.

Our conclusion is, once again, at variance with conventional views,[51] so much so as to be easily misinterpreted. Read hastily, Proposition III seems to imply that the capital structure of a firm is a matter of indifference; and that, consequently, one of the core problems of corporate finance—the problem of the optimal capital structure for a firm—is no problem at all. It may be helpful, therefore, to clear up such possible misundertandings.

[51] In the matter of investment policy under uncertainty there is no single position which represents "accepted" doctrine. For a sample of current formulations, all very different from ours, see Joel Dean [2, esp. Ch. 3], M. Gordon and E. Shapiro [5], and Harry Roberts [17].

B. *Proposition III and Financial Planning by Firms*

Misinterpretation of the scope of Proposition III can be avoided by remembering that this Proposition tells us only that the type of instrument used to finance an investment is irrelevant to the question of whether or not the investment is worth while. This does not mean that the owners (or the managers) have no grounds whatever for preferring one financing plan to another; or that there are no other policy or technical issues in finance at the level of the firm.

That grounds for preferring one type of financial structure to another will still exist within the framework of our model can readily be seen for the case of common-stock financing. In general, except for something like a widely publicized oil-strike, we would expect the market to place very heavy weight on current and recent past earnings in forming expectations as to future returns. Hence, if the owners of a firm discovered a major investment opportunity which they felt would yield much more than ρ_k, they might well prefer not to finance it via common stock at the then ruling price, because this price may fail to capitalize the new venture. A better course would be a pre-emptive issue of stock (and in this connection it should be remembered that stockholders are free to borrow and buy). Another possibility would be to finance the project initially with debt. Once the project had reflected itself in increased actual earnings, the debt could be retired either with an equity issue at much better prices or through retained earnings. Still another possibility along the same lines might be to combine the two steps by means of a convertible debenture or preferred stock, perhaps with a progressively declining conversion rate. Even such a double-stage financing plan may possibly be regarded as yielding too large a share to outsiders since the new stockholders are, in effect, being given an interest in any similar opportunities the firm may discover in the future. If there is a reasonable prospect that even larger opportunities may arise in the near future and if there is some danger that borrowing now would preclude more borrowing later, the owners might find their interests best protected by splitting off the current opportunity into a separate subsidiary with independent financing. Clearly the problems involved in making the crucial estimates and in planning the optimal financial strategy are by no means trivial, even though they should have no bearing on the basic decision to invest (as long as $\rho^* \geqq \rho_k$).[52]

Another reason why the alternatives in financial plans may not be a matter of indifference arises from the fact that managers are concerned

[52] Nor can we rule out the possibility that the existing owners, if unable to use a financing plan which protects their interest, may actually prefer to pass up an otherwise profitable venture rather than give outsiders an "excessive" share of the business. It is presumably in situations of this kind that we could justifiably speak of a shortage of "equity capital," though this kind of market imperfection is likely to be of significance only for small or new firms.

with more than simply furthering the interest of the owners. Such other objectives of the management—which need not be necessarily in conflict with those of the owners—are much more likely to be served by some types of financing arrangements than others. In many forms of borrowing agreements, for example, creditors are able to stipulate terms which the current management may regard as infringing on its prerogatives or restricting its freedom to maneuver. The creditors might even be able to insist on having a direct voice in the formation of policy.[53] To the extent, therefore, that financial policies have these implications for the management of the firm, something like the utility approach described in the introductory section becomes relevant to financial (as opposed to investment) decision-making. It is, however, the utility functions of the managers per se and not of the owners that are now involved.[54]

In summary, many of the specific considerations which bulk so large in traditional discussions of corporate finance can readily be superimposed on our simple framework without forcing any drastic (and certainly no systematic) alteration of the conclusion which is our principal concern, namely that for investment decisions, the marginal cost of capital is ρ_k.

C. *The Effect of the Corporate Income Tax on Investment Decisions*

In Section I it was shown that when an unintegrated corporate income tax is introduced, the original version of our Proposition I,

$$\overline{X}/V = \rho_k = \text{a constant}$$

must be rewritten as:

$$(11) \qquad \frac{(\overline{X} - rD)(1 - \tau) + rD}{V} \equiv \frac{\overline{X}^\tau}{V} = \rho_k{}^\tau = \text{a constant.}$$

Throughout Section I we found it convenient to refer to $\overline{X}^\tau/V$ as the cost of capital. The appropriate measure of the cost of capital relevant

[53] Similar considerations are involved in the matter of dividend policy. Even though the stockholders may be indifferent as to payout policy as long as investment policy is optimal, the management need not be so. Retained earnings involve far fewer threats to control than any of the alternative sources of funds and, of course, involve no underwriting expense or risk. But against these advantages management must balance the fact that sharp changes in dividend rates, which heavy reliance on retained earnings might imply, may give the impression that a firm's finances are being poorly managed, with consequent threats to the control and professional standing of the management.

[54] In principle, at least, this introduction of management's risk preferences with respect to financing methods would do much to reconcile the apparent conflict between Proposition III and such empirical findings as those of Modigliani and Zeman [14] on the close relation between interest rates and the ratio of new debt to new equity issues; or of John Lintner [12] on the considerable stability in target and actual dividend-payout ratios.

to investment decisions, however, is the ratio of the expected return *before* taxes to the market value, *i.e.*, $\overline{X}/V$. From (11) above we find:

$$\frac{\overline{X}}{V} = \frac{\rho_k^{\tau} - \tau_r(D/V)}{1-\tau} = \frac{\rho_k^{\tau}}{1-\tau}\left[1 - \frac{\tau r D}{\rho_k^{\tau} V}\right], \tag{31}$$

which shows that the cost of capital now depends on the debt ratio, decreasing, as D/V rises, at the constant rate $\tau r/(1-\tau)$.[55] Thus, with a corporate income tax under which interest is a deductible expense, gains can accrue to stockholders from having debt in the capital structure, even when capital markets are perfect. The gains however are small, as can be seen from (31), and as will be shown more explicitly below.

From (31) we can develop the tax-adjusted counterpart of Proposition III by interpreting the term D/V in that equation as the proportion of debt used in any additional financing of V dollars. For example, in the case where the financing is entirely by new common stock, $D=0$ and the required rate of return ρ_k^S on a venture so financed becomes:

$$\rho_k^S = \frac{\rho_k^{\tau}}{1-\tau}. \tag{32}$$

For the other extreme of pure debt financing $D=V$ and the required rate of return, ρ_k^D, becomes:

$$\rho_k^D = \frac{\rho_k^{\tau}}{1-\tau}\left[1 - \tau\frac{r}{\rho_k^{\tau}}\right] = \rho_k^S\left[1 - \tau\frac{r}{\rho_k^{\tau}}\right] = \rho_k^S - \frac{\tau}{1-\tau}r.^{56} \tag{33}$$

For investments financed out of retained earnings, the problem of defining the required rate of return is more difficult since it involves a comparison of the tax consequences to the individual stockholder of receiving a dividend versus having a capital gain. Depending on the time of realization, a capital gain produced by retained earnings may be taxed either at ordinary income tax rates, 50 per cent of these rates, 25 per

[55] Equation (31) is amenable, in principle, to statistical tests similar to those described in Section I.E. However we have not made any systematic attempt to carry out such tests so far, because neither the Allen nor the Smith study provides the required information. Actually, Smith's data included a very crude estimate of tax liability, and, using this estimate, we did in fact obtain a negative relation between $\overline{X}/V$ and D/V. However, the correlation (−.28) turned out to be significant only at about the 10 per cent level. While this result is not conclusive, it should be remembered that, according to our theory, the slope of the regression equation should be in any event quite small. In fact, with a value of τ in the order of .5, and values of ρ_k^{τ} and r in the order of 8.5 and 3.5 per cent respectively (*cf.* Section I.E) an increase in D/V from 0 to 60 per cent (which is, approximately, the range of variation of this variable in the sample) should tend to reduce the average cost of capital only from about 17 to about 15 per cent.

[56] This conclusion does not extend to preferred stocks even though they have been classed with debt issues previously. Since preferred dividends except for a portion of those of public utilities are not in general deductible from the corporate tax, the cut-off point for new financing via preferred stock is exactly the same as that for common stock.

cent, or zero, if held till death. The rate on any dividends received in the event of a distribution will also be a variable depending on the amount of other income received by the stockholder, and with the added complications introduced by the current dividend-credit provisions. If we assume that the managers proceed on the basis of reasonable estimates as to the average values of the relevant tax rates for the owners, then the required return for retained earnings $\rho_k{}^R$ can be shown to be:

$$\rho_k{}^R = \rho_k{}^\tau \frac{1}{1-\tau} \frac{1-\tau_d}{1-\tau_g} = \frac{1-\tau_d}{1-\tau_g} \rho_k{}^s \tag{34}$$

where τ_d is the assumed rate of personal income tax on dividends and τ_g is the assumed rate of tax on capital gains.

A numerical illustration may perhaps be helpful in clarifying the relationship between these required rates of return. If we take the following round numbers as representative order-of-magnitude values under present conditions: an after-tax capitalization rate $\rho_k{}^\tau$ of 10 per cent, a rate of interest on bonds of 4 per cent, a corporate tax rate of 50 per cent, a marginal personal income tax rate on dividends of 40 per cent (corresponding to an income of about $25,000 on a joint return), and a capital gains rate of 20 per cent (one-half the marginal rate on dividends), then the required rates of return would be: (1) 20 per cent for investments financed entirely by issuance of new common shares; (2) 16 per cent for investments financed entirely by new debt; and (3) 15 per cent for investments financed wholly from internal funds.

These results would seem to have considerable significance for current discussions of the effect of the corporate income tax on financial policy and on investment. Although we cannot explore the implications of the results in any detail here, we should at least like to call attention to the remarkably small difference between the "cost" of equity funds and debt funds. With the numerical values assumed, equity money turned out to be only 25 per cent more expensive than debt money, rather than something on the order of 5 times as expensive as is commonly supposed to be the case.[57] The reason for the wide difference is that the traditional

[57] See *e.g.*, D. T. Smith [18]. It should also be pointed out that our tax system acts in other ways to reduce the gains from debt financing. Heavy reliance on debt in the capital structure, for example, commits a company to paying out a substantial proportion of its income in the form of interest payments taxable to the owners under the personal income tax. A debt-free company, by contrast, can reinvest in the business all of its (smaller) net income and to this extent subject the owners only to the low capital gains rate (or possibly no tax at all by virtue of the loophole at death). Thus, we should expect a high degree of leverage to be of value to the owners, even in the case of closely held corporations, primarily in cases where their firm was not expected to have much need for additional funds to expand assets and earnings in the future. To the extent that opportunities for growth were available, as they presumably would be for most successful corporations, the interest of the stockholders would tend to be better served by a structure which permitted maximum use of retained earnings.

view starts from the position that debt funds are several times cheaper than equity funds even in the absence of taxes, with taxes serving simply to magnify the cost ratio in proportion to the corporate rate. By contrast, in our model in which the repercussions of debt financing on the value of shares are taken into account, the *only* difference in cost is that due to the tax effect, and its magnitude is simply the tax on the "grossed up" interest payment. Not only is this magnitude likely to be small but our analysis yields the further paradoxical implication that the stockholders' gain from, and hence incentive to use, debt financing is actually smaller the lower the rate of interest. In the extreme case where the firm could borrow for practically nothing, the advantage of debt financing would also be practically nothing.

III. *Conclusion*

With the development of Proposition III the main objectives we outlined in our introductory discussion have been reached. We have in our Propositions I and II at least the foundations of a theory of the valuation of firms and shares in a world of uncertainty. We have shown, moreover, how this theory can lead to an operational definition of the cost of capital and how that concept can be used in turn as a basis for rational investment decision-making within the firm. Needless to say, however, much remains to be done before the cost of capital can be put away on the shelf among the solved problems. Our approach has been that of static, partial equilibrium analysis. It has assumed among other things a state of atomistic competition in the capital markets and an ease of access to those markets which only a relatively small (though important) group of firms even come close to possessing. These and other drastic simplifications have been necessary in order to come to grips with the problem at all. Having served their purpose they can now be relaxed in the direction of greater realism and relevance, a task in which we hope others interested in this area will wish to share.

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Almost Certain Fed Funds Rate Cut in September

Essentially a promise. After the release of the minutes of the July 30-31 FOMC meeting and Chair Powell's address last week at the annual FRB Kansas City symposium in Jackson Hole, Wyoming, there is almost no doubt that the Federal Reserve will reduce its fed funds rate (FFR) target at the next FOMC meeting on September 17-18. The minutes of the July meeting noted that some FOMC members would have supported a rate cut at that meeting. Furthermore, Chair Powell noted that the upside risks to inflation have diminished, and the downside risks to employment have increased, concluding that "the time has come for policy to adjust. The direction of travel is clear."

Recent reports on the economy have backed up this shift in risks. The inflation news has generally been better (back on a slowing track to the Fed's 2% target after a concerning reacceleration in the first quarter), while the employment news has shown more cooling than expected (especially the July labor report, which showed a much smaller-than-expected increase in jobs and a much larger-than-expected increase in the unemployment rate).

What size cut? As specific as Chair Powell was concerning the likelihood of a rate cut in September, he refrained from using any of the typical central bank buzz words that have usually provided hints about the size of a rate change. Rather, he continued to emphasize that interest-rate decisions remained data dependent: "The timing and pace of rate cuts will depend on incoming data, the evolving outlook, and the balance of risks." So, it would seem that the August jobs report (scheduled for September 6) and the August CPI report (scheduled for September 11) will be important factors influencing the size of the first cut.

Aggressive rate cuts expected. Supported by the Fed's decidedly dovish shift, both the FFR futures market and the Blue Chip Financial Forecasts (BCFF) panel now expect a period of aggressive monetary easing ahead. The FFR futures market now thinks that at least a 25bp rate cut in September is a certainty (that is, 100% probability). Moreover, this market thinks that the September reduction could possibly be larger than 25bps, pricing in a 35% probability of a 50bp cut. After that, FFR futures look for a string of cuts going forward with a 100% probability of at least a 25bp cut at both the November and the December FOMC meetings, putting the FFR target at 4.50% by year-end.

The BCFF consensus outlook is similar to that of the FFR futures market. In answering a special question, every respondent looks for a rate cut at the September FOMC meeting. However, only 15% think that the cut will be 50bps rather than 25bps. For all of this year, the consensus looks for the FFR to decline by 79bps, implying 25bp cuts at both the November and December meetings. For next year, the BCFF outlook is aggressive, but not as aggressive as that of the FFR futures market. FFR futures look for 103bps of rate reductions in just the first half of next year (the June 2025 futures contract is the furthest out that is currently traded). The BCFF panel anticipates another 112bps of rate cuts, but this is for all of 2025.
It appears that the weakness in the labor market since June has surprised the FOMC. In the latest Summary of Economic Projections released in mid-June, the FOMC anticipated only one 25bp rate cut this year and another 100bps of reduction in 2025. That is, a total reduction of 125bps by the end of 2025. By contrast, the BCFF panel currently anticipates a reduction of more than 190bps from the current level by the end of 2025 and the FFR futures market looks for a reduction of 182bps by the middle of next year. The FOMC will release an updated set of projections after the mid-September meeting. It will be interesting to see how the events since June have affected the FOMC's outlook especially as Chair Powell stated at Jackson Hole that "we [the Fed] do not seek or welcome further cooling in labor market conditions."

Still a soft landing expected. Even though the BCFF consensus thinks the current stance of policy is tight, and that the economy is still being restrained by earlier FFR hikes, it is still looking for the elusive soft landing, likely aided by the aggressive Fed easing that is expected. Indeed, in answering a special question, the consensus estimates only a 32% probability of a recession occurring within the next 12 months, though it does anticipate a period of sub-trend growth. More specifically, the consensus expects real GDP growth to slow meaningfully to 1.8% in the current quarter and then to slow further to 1.6% in both this year's fourth quarter and next year's first quarter. Then it looks for growth to pick up slightly over the rest of 2025, ending the year at a slightly above-trend 2.1% in next year's Q4.

In line with the Fed's view, inflation is no longer seen as a meaningful concern by BCFF panelists. The BCFF consensus expects PCE price inflation to slow to 1.9% in the current quarter and then to average 2.1% over the rest of the forecast horizon through the end of 2025, only slightly above the Fed's 2% target. In accordance with the expectation of a period of below-trend growth, the BCFF sees increased risks of even cooler labor market conditions ahead. It looks for the unemployment rate to rise to 4.4% by the end of this year and to edge up further to 4.5% by the middle of next year. That would be the highest unemployment rate since October 2021 and above the BCFF consensus estimate of 4.1% for the long-term natural rate of unemployment, implying even further downward pressure on inflation.

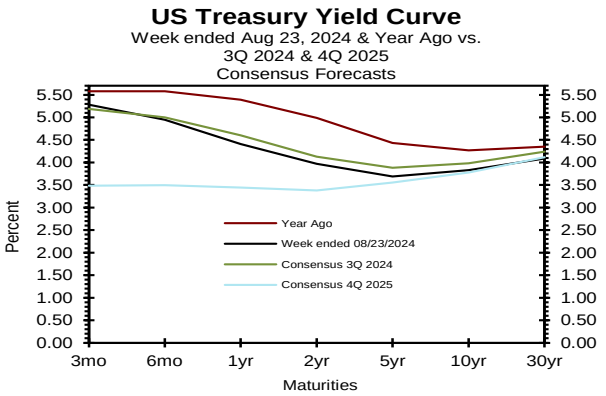
Rates to fall further. With the Fed expected to cut rates aggressively, concern about inflation much reduced, and the economy slowing, market interest rates have fallen meaningfully over the past month. Since the end of July, the yield on the 2-year Treasury note has declined 46bps, the yield on the benchmark 10-Treasury note has fallen 26bps and the effective 30-year mortgage rate has decreased 40bps, offering some hope for improvement in the housing market. Going forward, BCFF panelists look for further significant declines in shorter-term interest rates, in line with expectations of aggressive Fed easing, but smaller declines in longer-term rates. For example, the yield on the 10-year Treasury note is expected to fall by only 5bps by the end of 2025.

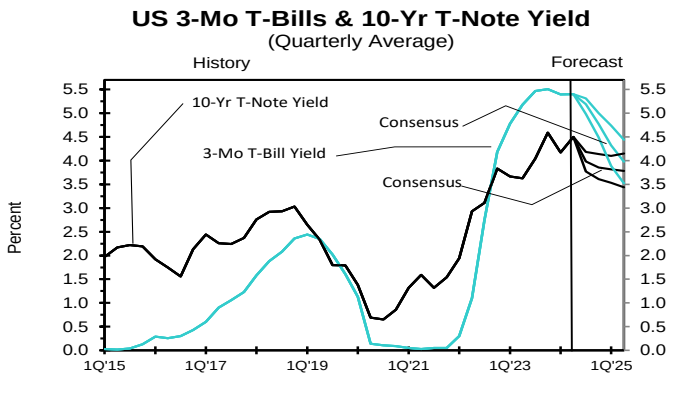
Sandy Batten (Haver Analytics, New York, NY)

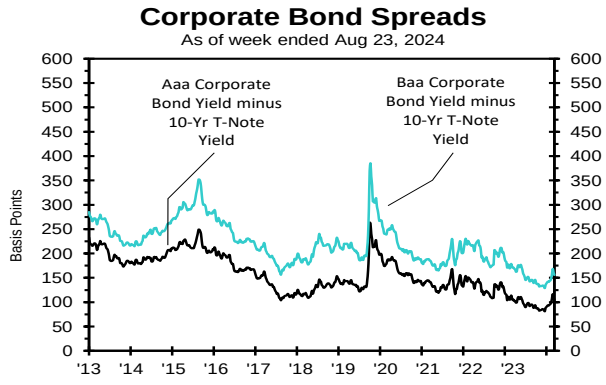
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

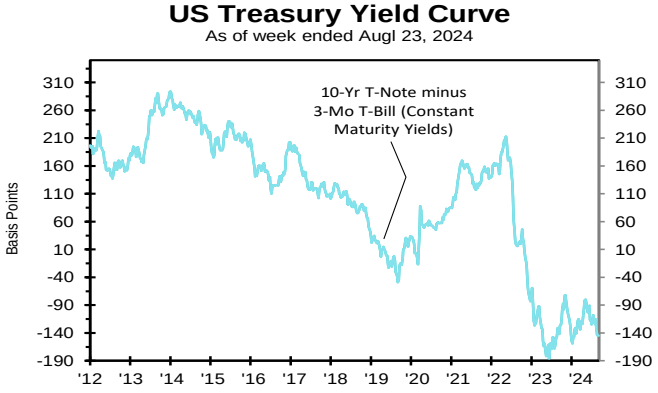
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	3Q	4Q	1Q	2Q	3Q	4Q
Interest Rates	Aug 23	Aug 16	Aug 9	Aug 2	Jul	Jun	May	2Q 2024	2024	2024	2025	2025	2025	2025
Federal Funds Rate	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	**5.2**	**4.8**	**4.4**	**4.0**	**3.8**	**3.6**
Prime Rate	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	**8.4**	**8.0**	**7.5**	**7.2**	**7.0**	**6.7**
SOFR	5.32	5.34	5.33	5.35	5.34	5.33	5.31	5.32	**5.3**	**4.9**	**4.5**	**4.1**	**3.8**	**3.6**
Commercial Paper, 1-mo.	5.27	5.30	5.29	5.30	5.30	5.31	5.32	5.31	**5.2**	**4.8**	**4.3**	**4.0**	**3.7**	**3.5**
Treasury bill, 3-mo.	5.28	5.33	5.34	5.38	5.43	5.51	5.46	5.47	**5.2**	**4.8**	**4.3**	**4.0**	**3.7**	**3.5**
Treasury bill, 6-mo.	4.95	5.01	4.99	5.09	5.25	5.37	5.42	5.39	**5.0**	**4.6**	**4.2**	**3.9**	**3.7**	**3.5**
Treasury bill, 1 yr.	4.41	4.46	4.45	4.65	4.90	5.11	5.16	5.14	**4.6**	**4.3**	**3.9**	**3.8**	**3.6**	**3.4**
Treasury note, 2 yr.	3.97	4.00	3.99	4.21	4.50	4.74	4.86	4.82	**4.1**	**3.9**	**3.7**	**3.5**	**3.5**	**3.4**
Treasury note, 5 yr.	3.69	3.73	3.75	3.90	4.16	4.32	4.50	4.46	**3.9**	**3.7**	**3.6**	**3.6**	**3.6**	**3.6**
Treasury note, 10 yr.	3.83	3.88	3.91	4.04	4.25	4.31	4.48	4.44	**4.0**	**3.9**	**3.8**	**3.8**	**3.8**	**3.8**
Treasury note, 30 yr.	4.09	4.16	4.20	4.31	4.46	4.44	4.62	4.57	**4.2**	**4.2**	**4.1**	**4.1**	**4.1**	**4.1**
Corporate Aaa bond	4.87	4.98	5.08	5.11	5.22	5.21	5.33	5.31	**4.9**	**4.9**	**4.8**	**4.8**	**4.8**	**4.8**
Corporate Baa bond	5.39	5.49	5.60	5.61	5.71	5.70	5.81	5.80	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**
State & Local bonds	4.05	4.07	4.04	4.12	4.19	4.24	4.28	4.27	**4.1**	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**
Home mortgage rate	6.46	6.49	6.47	6.73	6.85	6.92	7.06	6.99	**6.6**	**6.4**	**6.2**	**6.1**	**6.0**	**6.0**
	History								Consensus Forecasts-Quarterly					
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Key Assumptions	2022	2022	2023	2023	2023	2023	2024	2024	2024	2024	2025	2025	2025	2025
Fed's AFE $ Index	118.8	119.8	115.5	114.6	115.0	116.6	115.5	117.3	**116.2**	**115.2**	**114.6**	**114.4**	**114.3**	**114.3**
Real GDP	2.7	2.6	2.2	2.1	4.9	3.4	1.4	3.0	**1.8**	**1.6**	**1.6**	**1.8**	**2.0**	**2.1**
GDP Price Index	4.4	3.9	3.9	1.7	3.3	1.6	3.1	2.5	**2.2**	**2.2**	**2.3**	**2.2**	**2.2**	**2.1**
Consumer Price Index	5.3	4.0	3.8	3.0	3.4	2.7	3.8	2.8	**1.9**	**2.3**	**2.3**	**2.2**	**2.3**	**2.3**
PCE Price Index	4.7	4.1	4.2	2.5	2.6	1.8	3.4	2.5	**1.9**	**2.1**	**2.2**	**2.0**	**2.1**	**2.1**

Forecasts for interest rates and the Federal Reserve's Advanced Foreign Economies Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index, CPI and PCE Price Index are seasonally adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; SOFR from the New York Fed. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP, GDP Price Index and PCE Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index history is from the Department of Labor's Bureau of Labor Statistics (BLS).









----------Policy Rates[1]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	5.38	5.38	5.38	**4.87**	**4.40**	**3.88**
Japan	0.25	0.05	-0.10	**0.29**	**0.44**	**0.71**
U.K.	5.00	5.25	5.25	**4.87**	**4.52**	**3.95**
Switzerland	1.25	1.25	1.75	**1.08**	**0.97**	**0.96**
Canada	4.50	4.50	5.00	**4.26**	**3.94**	**3.33**
Australia	4.35	4.35	4.10	**4.32**	**4.24**	**3.96**
Euro area	4.25	4.25	4.25	**3.75**	**3.39**	**2.87**

----------10-Yr. Government Bond Yields[2]------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	3.81	4.20	4.25	**3.92**	**3.91**	**3.97**
Germany	2.23	2.40	2.56	**2.30**	**2.25**	**2.36**
Japan	0.92	1.07	0.66	**1.07**	**1.18**	**1.28**
U.K.	3.93	4.12	4.50	**3.92**	**3.73**	**3.64**
France	2.94	3.12	3.08	**2.94**	**2.90**	**3.06**
Italy	3.58	3.77	4.23	**3.69**	**3.66**	**3.90**
Switzerland	0.43	0.54	0.98	**0.59**	**0.69**	**0.73**
Canada	3.03	3.32	3.71	**3.22**	**3.32**	**3.44**
Australia	3.92	4.31	4.16	**4.12**	**4.04**	**4.06**
Spain	3.02	3.26	3.50	**3.08**	**3.06**	**3.31**

----------Foreign Exchange Rates[3]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	113.11	116.73	116.34	**117.8**	**115.5**	**114.9**
Japan	144.86	153.86	146.38	**147.9**	**144.6**	**138.0**
U.K.	1.32	1.29	1.26	**1.29**	**1.28**	**1.27**
Switzerland	0.85	0.88	0.89	**0.88**	**0.88**	**0.87**
Canada	1.35	1.38	1.36	**1.37**	**1.36**	**1.33**
Australia	0.68	0.66	0.64	**0.67**	**0.67**	**0.68**
Euro	1.12	1.09	1.08	**1.10**	**1.11**	**1.11**

	Consensus Policy Rates vs. US Rate			Consensus 10-Year Gov't Yields vs. U.S. Yield	
	Now	In 12 Mo.		Now	In 12 Mo.
Japan	-5.13	**-3.17**	Germany	-1.58	**-1.61**
U.K.	-0.38	**0.06**	Japan	-2.89	**-2.69**
Switzerland	-4.13	**-2.93**	U.K.	0.12	**-0.32**
Canada	-0.88	**-0.56**	France	-0.88	**-0.91**
Australia	-1.03	**0.07**	Italy	-0.23	**-0.07**
Euro area	-1.13	**-1.01**	Switzerland	-3.38	**-3.23**
			Canada	-0.78	**-0.53**
			Australia	0.11	**0.09**
			Spain	-0.79	**-0.66**

Forecasts of panel members are on pages 10 and 11. Definitions of variables are as follows: [1]Monetary policy rates. [2]Government bonds are yields to maturity. [3]Foreign exchange rate forecasts for U.K., Australia and the Euro are U.S. dollars per currency unit. For the U.S dollar, forecasts are of the U.S. Federal Reserve Board's AFE Dollar Index.

International. Financial market instability was in the ascendancy during the first few trading days of August as investors shunned risk assets and flocked to safe havens such as government bonds. A key catalyst was July's much weaker-than-expected US employment report, published on August 2, but there were other factors that amplified investor concerns. These included a decision by the BoJ to lift its policy rate on July 31 and the impact of this, via narrowing interest differentials between Japan and other major economies, on the carry trade. Heightened anxiety about the potential profitability of big US technology companies additionally played a role. That said, markets have returned to much calmer waters over the past two to three weeks partly thanks to the release of some reassuring inflation data. Some dovish signals from several central banks have also provided support.

Blue Chip panelists remain mindful, nevertheless, about the impact that Japan's financial flows might play in generating a further bout of volatility in the period ahead. The responses to our special question this month, for example, specifically reveal that 46% of our panelists believe the unwinding of Japan's carry trade will invoke further global financial instability over the next 12 months. Yet, of that number, only 27% have incorporated that potential source of instability in their economic and financial market projections.

Blue Chip forecasters are, in the meantime, still seemingly resolute that interest differentials between Japan and the US will continue to narrow. Japan's key policy rate, for example, is expected to climb by 19 basis points over the next 6 months. That contrasts with US policy rates, which are expected to decline by 98 bps. Our panelists are equally of the view that these narrowing interest differentials will keep the US dollar weak against other major currencies and most notably versus the yen. The USD/JPY exchange rate, for example, is expected to be little changed at ¥144.6 over the next 6 months, which is still low compared to early-July levels. It is noticeably lower than the 6-month ahead projection of ¥150.7 in last month's survey as well.

This narrowing of Japan's rate differentials is also expected to unfold against other major currencies. The ECB, for instance, is expected to cut its key policy rates by a further 86 basis points over the next 6 months with our special question on the specific timing suggesting that 85% of panelists believe the next cut will occur in the current quarter. Having cut its Bank rate by 25bps for the first time in this cycle on August 1, the BoE is now expected to cut this rate by a further 48 basis points over the next 6 months. As for the timing of a next cut, a narrow majority, specifically 56%, are predicting that Q4 will likely feature the next easing installment. This contrasts with 44% expecting an earlier cut in Q3.

The veracity of these views will, as ever, clearly hinge on the evolution of the incoming data. But with central banks arguably now slowly switching their attention away from inflation (which is now much more contained and closer to target in many countries), the prospective dataflow on economic growth is taking on more importance. On that score, it has certainly been notable that much of the incoming global growth data have been disappointing consensus forecasts more frequently in recent weeks. Citigroup's global growth surprise index fell to a four-month low on August 21, for example.

Growth concerns have also remained in vogue in China over the past few weeks as incoming economic data, chiming with that broader global trend, have also remained disappointing. Q2 GDP growth at 4.7% y/y, for example, fell short of expectations, as did July's data for industrial production and fixed asset investment. The latest data additionally suggest that consumer sentiment remains weak, and the property market still stressed. In response, authorities have enacted measures to boost demand, including interest rate cuts and targeted initiatives to address property market excesses. But despite these efforts, there is much uncertainty about whether the government will meet its 5% growth target for this year.

Third Quarter 2024

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Oxford Economics	5.4 H	8.5 H	5.4	na	5.3	5.1	4.6	4.2	4.0	4.1	4.2	4.5 L	na	na	6.8	117.4	1.9	2.3	1.5	1.6
Action Economics	5.3	8.4	5.6 H	5.2	5.2	5.0	4.6	4.1	3.9	4.0	4.3	4.9	5.6	4.2	6.9	117.3	2.6 H	1.9	1.2	1.3
BMO Capital Markets	5.3	8.4	5.3	5.2	5.3	5.1	4.6	4.2	3.9	4.0	4.3	5.0	5.7	4.2	6.6	115.9	1.8	2.0	1.6	1.8
Chmura Economics & Analytics	5.3	8.5 H	5.3	5.3 H	5.3	5.1	4.6	4.2	3.9	4.0	4.3	4.9	na	na	6.6	na	1.6	2.5	2.7	2.6
Comerica Bank	5.3	8.5 H	5.3	na	5.3	5.1	4.8	4.5	4.3 H	4.3 H	4.5 H	5.2	6.0	na	6.7	na	1.5	2.0	2.0	1.8
Daiwa Capital Markets America	5.3	8.4	5.2	na	5.3	na	na	4.3	4.0	4.0	4.2	na	na	na	6.5	116.0	1.4	2.5	1.3	1.9
DePrince & Assoc.	5.3	8.4	5.4	5.3 H	5.3	5.1	4.6	4.1	3.9	4.0	4.3	5.0	5.7	3.7 L	6.6	114.3	1.6	2.4	2.6	2.5
Fannie Mae	5.3	8.4	na	na	5.2	5.0	4.5	4.1	3.8	4.0	4.2	na	na	na	6.6	na	1.9	2.2	1.9	1.8
Georgia State University	5.3	8.4	na	na	5.2	4.9	4.7	4.2	3.9	4.0	4.2	5.0	6.0	na	6.6	na	1.4	2.1	1.4	2.3
J.P. Morgan Chase	5.3	na	na	na	na	na	na	4.1	3.8	4.0	4.2	na	na	na	na	na	1.3 L	2.4	1.3	2.4
KPMG	5.3	8.5 H	5.3	5.2	5.4 H	5.0	4.6	4.1	3.8	4.0	4.2	4.8	5.9	na	6.6	na	1.6	2.2	2.1	1.9
Loomis, Sayles & Company	5.3	8.4	5.2	5.1	5.3	5.0	4.6	4.2	3.8	3.9	4.3	4.7	5.5	3.8	6.5	115.6	1.8	2.3	1.6	1.8
MacroFin Analytics & Rutgers Bus School	5.3	8.4	5.2	5.2	5.1	4.9	4.3	3.8 L	3.7	3.8	4.2	4.8	5.4 L	3.9	6.5	113.1	1.4	2.1	2.0	2.0
MacroPolicy Perspectives	5.3	8.5 H	5.4	5.3 H	5.3	5.0	4.5	4.1	3.8	3.8	4.2	4.8	5.5	na	6.5	113.8	1.9	1.5	1.1	1.1 L
Moody's Analytics	5.3	8.5 H	5.3	5.3 H	5.1	5.0	4.8	4.4	4.1	4.2	4.4	5.1	5.8	3.7 L	6.7	na	1.8	1.9	2.3	1.9
PNC Financial Services Corp.	5.3	8.5 H	5.3	na	5.2	5.0	4.5	4.2	3.9	4.0	4.2	na	5.7	3.9	6.5	116.7	1.9	1.9	2.5	2.2
Regions Financial Corporation	5.3	8.5 H	5.3	5.3 H	5.3	5.1	4.6	4.1	3.8	4.0	4.2	5.0	5.8	4.1	6.4	115.7	1.8	1.8	1.4	1.7
Roberts Capital Advisors	5.3	8.5 H	5.3	5.3 H	5.3	5.1	4.6	4.2	4.1	4.1	4.3	4.9	5.7	4.1	6.5	117.0	1.8	2.4	1.9	2.0
S&P Global Market Intelligence	5.3	8.5 H	5.3	na	5.3	5.0	4.9	4.5	4.2	4.3 H	4.5 H	na	na	na	na	na	1.8	2.2	2.1	2.0
Santander Capital Markets	5.3	8.5 H	5.3	5.2	5.3	5.0	4.6	4.2	3.9	4.0	4.2	4.9	5.7	3.9	6.6	115.0	2.5	2.6	1.4	1.7
Scotiabank Group	5.3	na	5.1	na	5.0	na	na	4.3	4.3 H	4.3 H	4.5 H	na	na	na	na	na	1.8	2.6	2.0	2.4
Societe Generale	5.3	8.5 H	5.3	na	5.3	5.1	4.7	4.2	3.9	4.0	4.3	na	na	na	na	na	1.8	2.3	1.5	1.8
The Lonski Group	5.3	8.5 H	5.3	5.2	5.2	4.9	4.5	4.1	3.8	4.0	4.2	5.0	5.5	3.9	6.5	114.7	1.8	2.2	1.0	1.4
The Northern Trust Company	5.3	8.5 H	5.3	5.3 H	5.3	5.1	4.6	4.1	3.9	4.0	4.2	4.8	5.5	4.1	6.6	113.0 L	1.5	2.4	2.7	2.3
EY-Parthenon	5.2	na	na	na	5.1	na	na	na	na	4.1	na	na	na	na	na	na	1.7	1.8	1.7	1.7
Naroff Economics LLC	5.2	8.2	5.1	5.0	4.5 L	4.8	4.5	3.9	3.8	4.0	4.0	na	na	4.2	6.8	115.4	2.2	2.6	2.8	2.7
Via Nova Investment Mgt.	5.2	8.4	5.1	4.9	5.3	5.0	4.5	4.3	4.0	4.0	4.4	5.0	5.4 L	3.8	6.6	116.9	2.5	2.3	2.4	2.3
Bank of America	5.1	na	na	na	na	na	na	3.9	3.6 L	3.8	4.1	na	na	na	na	na	2.5	2.4	2.6	1.9
Barclays	5.1	na	na	na	na	na	na	4.0	3.9	4.1	4.4	na	na	na	na	na	2.0	1.9	1.1	1.6
Chan Economics	5.1	8.1	5.0	5.0	5.2	4.9	4.4	3.9	3.6 L	3.7 L	3.8 L	4.8	5.8	4.3	6.5	113.0 L	2.3	2.3	2.5	2.2
Economist Intelligence Unit	5.1	8.3	na	na	na	na	na	na	na	3.7 L	na	na	na	na	na	na	2.1	na	2.8	na
GLC Financial Economics	5.1	8.4	5.3	5.2	5.3	5.2 H	4.9	4.6 H	4.2	4.3 H	4.5 H	5.2	5.9	4.2	6.9	116.7	1.4	2.4	2.4	2.2
Nomura Securities, Inc.	5.1	8.3	na	na	na	na	na	4.0	3.7	3.8	na	na	na	na	na	na	1.4	1.7	0.9 L	1.2
TS Lombard	5.0	8.1	5.0	5.0	4.9	5.0	4.4	3.9	3.7	3.8	3.9	4.6	5.5	3.8	5.6 L	130.0 H	2.5	3.5 H	3.5 H	3.5 H
ING	4.9	na	na	na	na	na	na	3.9	3.7	3.8	4.1	na	na	na	na	na	1.7	na	na	na
NatWest Markets	4.8 L	8.0 L	na	4.9	5.1	5.2 H	5.3 H	3.8 L	3.6 L	3.7 L	4.2	5.5 H	6.4 H	5.2 H	7.0 H	na	1.8	1.5	0.9 L	1.2
Wells Fargo	4.8 L	8.0 L	4.9 L	4.8 L	4.6	4.3 L	4.0 L	3.8 L	3.7	3.8	4.1	5.0	6.0	4.4	6.4	na	2.1	1.4 L	1.3	1.4
September Consensus	**5.2**	**8.4**	**5.3**	**5.2**	**5.2**	**5.0**	**4.6**	**4.1**	**3.9**	**4.0**	**4.2**	**4.9**	**5.7**	**4.1**	**6.6**	**116.2**	**1.8**	**2.2**	**1.9**	**1.9**
Top 10 Avg.	5.3	8.5	5.4	5.3	5.3	5.1	4.8	4.4	4.1	4.2	4.4	5.1	5.9	4.3	6.8	118.0	2.3	2.6	2.7	2.5
Bottom 10 Avg.	5.0	8.2	5.1	5.0	5.0	4.9	4.4	3.9	3.7	3.8	4.1	4.8	5.5	3.9	6.4	114.4	1.5	1.7	1.2	1.4
Standard Deviation	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	3.6	0.4	0.4	0.7	0.5
August Consensus	5.3	8.4	5.3	5.2	5.3	5.2	4.9	4.5	4.2	4.3	4.5	5.1	5.9	4.2	6.8	116.7	1.8	2.3	2.3	2.2
Number of Forecasts Changed From A Month Ago:																				
Down	6	4	5	9	16	21	24	32	32	33	28	19	19	13	22	16	9	15	27	23
Same	30	25	18	11	10	5	4	3	3	4	5	3	2	5	3	2	9	16	6	9
Up	1	2	4	1	5	2	0	0	0	0	1	1	1	1	2	1	19	4	3	3
Diffusion Index	43%	47%	48%	31%	32%	16%	7%	4%	4%	5%	10%	11%	9%	18%	13%	11%	64%	34%	17%	21%

Fourth Quarter 2024

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: Short-Term 1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	Long-Term 11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
S&P Global Market Intelligence	5.3 H	8.5 H	5.3	na	5.2 H	4.8	4.6	4.2	3.9	4.0	4.3	na	na	na	na	na	1.4	2.3	2.2	2.1
Action Economics	5.0	8.2	5.5 H	5.0 H	5.0	4.8	4.6	4.0	3.8	3.9	4.1	4.8	5.5	4.1	6.8	115.7	2.0	2.0	2.6	2.0
Daiwa Capital Markets America	5.0	8.1	5.0	na	5.0	na	na	3.8	3.7	3.8	4.1	na	na	na	6.1	115.0	1.3	2.4	2.4	2.3
Fannie Mae	5.0	8.2	na	na	4.5	4.3	3.9	3.7	3.6	3.8	4.1	na	na	na	6.2	na	1.6	2.2	2.5	2.2
MacroPolicy Perspectives	5.0	8.2	4.9	4.9	4.9	4.8	4.0	3.9	3.7	3.8	4.2	4.8	5.5	na	6.4	na	2.4	1.7 L	2.2	1.3 L
Moody's Analytics	5.0	8.2	5.0	5.0 H	4.8	4.7	4.6	4.4 H	4.1	4.2	4.6 H	5.5 H	6.2 H	4.0	6.6	na	1.5	2.1	2.4	2.1
Oxford Economics	5.0	8.2	5.0	na	5.0	4.8	4.4	4.0	3.8	3.9	4.1	4.3 L	na	na	6.7	116.8	1.7	2.4	2.4	2.0
Scotiabank Group	5.0	na	4.8	na	4.6	na	na	4.1	4.2 H	4.4 H	4.4	na	na	na	na	na	1.8	1.7 L	2.6	2.2
Societe Generale	5.0	8.2	5.0	na	4.9	4.8	4.5	3.9	3.9	3.9	4.2	na	na	na	na	na	1.7	2.3	2.5	2.3
Bank of America	4.9	na	na	na	na	na	na	3.6	3.6	3.8	4.1	na	na	na	na	na	2.0	2.6	2.4	2.3
BMO Capital Markets	4.9	8.0	4.8	4.8	4.9	4.7	4.2	3.9	3.7	3.8	4.1	4.9	5.6	4.1	6.4	115.0	1.4	2.1	2.3	2.2
Chan Economics	4.9	7.9	4.8	4.8	5.0	4.7	4.2	3.7	3.4	3.5 L	3.6 L	4.6	5.6	4.1	6.3	112.8	1.8	2.1	2.3	2.0
Chmura Economics & Analytics	4.9	8.0	4.9	4.9	4.9	4.8	4.3	3.9	3.7	3.8	4.2	4.9	na	na	6.4	na	0.8	2.4	2.7	2.4
Comerica Bank	4.9	8.1	4.9	na	4.9	4.7	4.4	4.1	4.2 H	4.3	4.5	5.3	6.1	na	6.5	na	1.6	2.1	2.0	2.2
GLC Financial Economics	4.9	8.1	5.0	5.0 H	5.0	4.9 H	4.8 H	4.4 H	4.1	4.2	4.4	5.1	5.9	4.2	6.6	116.5	2.0	2.4	2.5	2.2
MacroFin Analytics & Rutgers Bus School	4.9	8.0	4.9	4.8	4.7	4.6	4.1	3.7	3.6	3.8	4.1	4.8	5.3	3.9	6.4	112.9	1.6	1.9	2.5	2.5
Naroff Economics LLC	4.9	7.9	4.8	4.9	4.7	4.4	4.4	3.8	3.7	3.9	4.2	na	na	4.1	6.5	115.0	2.5 H	2.5	2.5	2.6
PNC Financial Services Corp.	4.9	8.1	4.9	na	4.5	4.3	4.0	3.8	3.8	3.9	4.2	na	5.6	4.0	6.3	116.3	1.5	1.9	2.5	2.2
Regions Financial Corporation	4.9	8.1	4.9	5.0 H	5.0	4.8	4.3	3.8	3.6	3.8	4.1	4.8	5.6	3.9	6.0	114.7	2.3	2.2	2.4	2.3
Roberts Capital Advisors	4.9	8.1	4.9	4.9	4.9	4.8	4.5	4.1	4.0	4.0	4.1	4.8	5.6	4.0	6.2	117.0	1.8	2.3	2.0	2.1
Santander Capital Markets	4.9	8.1	4.9	4.8	4.7	4.5	4.2	4.0	3.7	3.9	4.2	4.9	5.7	3.7	6.5	113.0	1.3	2.5	2.5	2.1
The Lonski Group	4.9	8.0	4.9	4.8	4.8	4.5	4.2	3.8	3.8	3.8	4.0	4.8	5.3	3.7	6.3	115.2	1.2	2.2	1.3 L	1.7
The Northern Trust Company	4.9	8.1	4.9	5.0 H	5.0	4.8	4.4	4.1	4.0	4.0	4.3	5.0	5.8	4.2	6.5	112.5 L	1.3	2.3	2.4	2.2
Via Nova Investment Mgt.	4.9	8.2	4.9	4.9	4.9	4.6	4.0	4.3	4.1	4.1	4.4	5.2	5.6	3.9	6.7	115.0	2.5 H	2.1	2.1	2.1
DePrince & Assoc.	4.8	7.9	4.9	4.8	4.8	4.5	4.1	3.5	3.4	3.7	4.1	4.8	5.7	3.9	6.2	114.1	1.7	2.4	2.6	2.5
EY-Parthenon	4.8	na	na	na	4.6	na	na	na	na	4.0	na	na	na	na	na	na	1.3	1.9	2.3	2.0
Georgia State University	4.8	7.8	na	na	4.5	4.1	3.9	3.9	3.5	3.7	4.0	4.9	5.8	na	6.1	na	1.0	2.2	1.8	2.1
Loomis, Sayles & Company	4.8	8.0	4.8	4.6	4.8	4.5	4.3	4.0	3.7	3.8	4.1	4.6	5.4	3.8	6.2	115.4	1.4	2.2	2.3	2.0
TS Lombard	4.8	7.9	4.8	4.8	4.7	4.8	4.0	3.3	3.4	3.5 L	3.6 L	4.4	5.2 L	3.5 L	5.3 L	120.0 H	1.0	3.0 H	3.0 H	3.0 H
KPMG	4.7	7.9	4.7	4.5	4.7	4.5	4.2	3.8	3.6	3.7	4.0	4.5	5.7	na	6.2	na	2.0	2.2	2.2	2.1
Barclays	4.6	na	na	na	na	na	na	3.9	3.9	4.2	4.5	na	na	na	na	na	1.5	2.0	1.6	1.7
Economist Intelligence Unit	4.6	7.8	na	na	na	na	na	na	na	3.5 L	na	na	na	na	na	na	1.4	na	2.6	na
J.P. Morgan Chase	4.6	na	na	na	na	na	na	3.4	3.3	3.6	4.0	na	na	na	na	na	1.0	2.3	2.5	2.5
Nomura Securities, Inc.	4.6	7.8	na	na	na	na	na	3.8	3.7	3.8	na	na	na	na	na	na	1.8	1.7 L	1.6	1.8
ING	4.4	na	na	na	na	na	na	3.6	3.5	3.7	4.1	na	na	na	na	na	0.8	na	na	na
Wells Fargo	4.1	7.3	4.1 L	4.1	4.0 L	3.8 L	3.7 L	3.6	3.6	3.7	4.0	4.9	5.9	4.3	6.3	na	1.3	1.9	2.2	1.9
NatWest Markets	3.8 L	7.0 L	na	3.9 L	4.1	4.2	4.3	3.1 L	3.2 L	3.5 L	4.1	5.3	6.2 H	5.1 H	6.9 H	na	0.5 L	1.9	1.9	1.5
September Consensus	**4.8**	**8.0**	**4.9**	**4.8**	**4.8**	**4.6**	**4.3**	**3.9**	**3.7**	**3.9**	**4.2**	**4.9**	**5.7**	**4.0**	**6.4**	**115.2**	**1.6**	**2.2**	**2.3**	**2.1**
Top 10 Avg.	5.0	8.2	5.1	5.0	5.0	4.8	4.5	4.2	4.0	4.1	4.4	5.1	5.9	4.2	6.6	116.3	2.1	2.5	2.6	2.5
Bottom 10 Avg.	4.5	7.7	4.7	4.6	4.5	4.3	4.0	3.5	3.5	3.6	4.0	4.6	5.5	3.8	6.1	114.0	1.0	1.9	1.9	1.8
Standard Deviation	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	1.8	0.5	0.3	0.3	0.3
August Consensus	5.0	8.1	5.0	5.0	5.0	4.9	4.6	4.3	4.1	4.2	4.4	5.1	5.9	4.2	6.6	116.8	1.6	2.3	2.5	2.2
Number of Forecasts Changed From A Month Ago:																				
Down	23	17	15	16	20	21	21	32	31	34	29	19	18	10	21	13	13	19	21	19
Same	13	13	11	3	9	5	7	3	3	3	5	2	3	7	5	4	16	13	8	11
Up	1	1	1	2	2	2	0	0	1	0	0	2	1	2	1	1	8	3	7	5
Diffusion Index	20%	24%	24%	17%	21%	16%	13%	4%	7%	4%	7%	13%	11%	29%	13%	17%	43%	27%	31%	30%

First Quarter 2025

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Adv Fgn Econ $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
	Percent Per Annum -- Average For Quarter															Avg. For ---Qtr.---	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term									
S&P Global Market Intelligence	5.1 H	8.2 H	5.0	na	4.8 H	4.5	4.3	3.9	3.6	3.8	4.1	na	na	na	na	na	1.4	2.4	1.8	1.9
Action Economics	4.8	7.9	5.3 H	4.7	4.8 H	4.6 H	4.3	4.0	3.8	3.8	4.0	4.7	5.4	4.1	6.7	115.2	1.9	2.0	2.7	2.1
Daiwa Capital Markets America	4.8	7.9	4.7	na	4.7	na	na	3.7	3.6	3.8	4.1	na	na	na	6.0	114.5	1.6	2.3	2.3	2.2
Moody's Analytics	4.8	8.0	4.8	4.7	4.6	4.5	4.5 H	4.3	4.1	4.2	4.6	5.6 H	6.4 H	4.1	6.5	na	1.6	2.2	2.6	2.3
Oxford Economics	4.8	8.0	4.8	na	4.8 H	4.6 H	4.2	3.9	3.7	3.9	4.1	4.2 L	na	na	6.7	116.2	1.8	2.7	3.2	2.9
Societe Generale	4.8	8.0	4.8	na	4.7	4.5	4.3	3.7	3.7	4.1	4.4	na	na	na	na	na	2.2	2.3	2.1	1.8
Via Nova Investment Mgt.	4.8	8.0	4.8	4.8 H	4.8 H	4.5	3.9	4.5 H	4.5 H	4.5 H	4.7 H	5.6 H	6.1	4.3 H	7.1 H	112.0	2.5	2.1	2.0	2.1
Bank of America	4.6	na	na	na	na	na	na	3.5	3.5	3.8	4.2	na	na	na	na	na	2.0	2.8	2.1	2.7
Chan Economics	4.6	7.6	4.5	4.5	4.7	4.4	3.9	3.4	3.1	3.2 L	3.3 L	4.3	5.3	3.8	6.0	112.5	1.5	2.0	2.2	1.9
Economist Intelligence Unit	4.6	7.8	na	na	na	na	na	na	na	3.5	na	na	na	na	na	na	1.4	na	2.4	na
GLC Financial Economics	4.6	7.8	4.7	4.7	4.7	4.6 H	4.5 H	4.2	4.1	4.1	4.4	5.1	5.9	4.2	6.5	116.0	1.9	2.5	2.4	2.3
Regions Financial Corporation	4.6	7.8	4.6	4.8 H	4.7	4.6 H	4.1	3.7	3.5	3.8	4.1	4.8	5.6	3.9	5.9	114.5	1.9	2.2	2.5	2.3
Naroff Economics LLC	4.5	7.5	4.4	4.5	4.3	4.3	4.3	3.7	3.7	3.8	4.1	na	na	4.0	6.1	114.5	3.0 H	2.4	2.4	2.3
Roberts Capital Advisors	4.5	7.7	4.6	4.5	4.5	4.4	4.2	3.9	3.9	3.9	4.0	4.7	5.5	3.9	6.1	116.0	1.9	2.3	2.1	2.1
Scotiabank Group	4.5	na	4.3	na	4.1	na	na	3.8	4.2	4.2	4.3	na	na	na	na	na	1.8	3.1 H	3.7 H	3.4 H
Barclays	4.4	na	na	na	na	na	na	3.8	3.9	4.2	4.5	na	na	na	na	na	1.5	2.4	2.5	2.2
Fannie Mae	4.4	7.5	na	na	4.0	3.9	3.6	3.5	3.5	3.8	4.1	na	na	na	6.0	na	1.4	2.3	2.0	1.9
Loomis, Sayles & Company	4.4	7.6	4.4	4.3	4.4	4.2	4.0	3.8	3.7	3.7	4.3	4.5	5.3	3.7	6.0	115.2	1.4	2.5	2.8	2.3
MacroFin Analytics & Rutgers Bus School	4.4	7.5	4.4	4.3	4.1	4.1	3.9	3.6	3.6	3.7	4.1	4.7	5.3	3.8	6.4	112.7	2.0	2.0	2.2	2.2
MacroPolicy Perspectives	4.4	7.6	4.4	4.4	4.3	4.2	3.7	3.4	3.6	3.8	4.2	4.8	5.5	na	6.3	na	2.2	2.2	2.2	1.8
Nomura Securities, Inc.	4.4	7.5	na	na	na	na	na	3.6	3.6	3.8	na	na	na	na	na	na	2.2	1.8	2.3	2.2
PNC Financial Services Corp.	4.4	7.5	4.4	na	4.0	3.8	3.7	3.6	3.7	3.9	4.2	na	5.7	4.1	6.2	116.1	2.1	1.7 L	2.5	2.1
Santander Capital Markets	4.4	7.5	4.4	4.3	4.2	4.1	3.8	3.8	3.6	3.8	4.1	4.9	5.7	3.5 L	6.3	112.0	1.3	2.8	2.7	2.5
The Northern Trust Company	4.4	7.6	4.4	4.5	4.7	4.5	4.3	4.0	4.0	4.0	4.3	5.3	6.0	4.3 H	6.3	111.0 L	1.4	2.3	2.3	2.2
BMO Capital Markets	4.3	7.4	4.4	4.3	4.4	4.2	3.9	3.7	3.6	3.8	4.0	4.4	5.2 L	3.7	6.4	114.8	1.5	2.0	2.2	2.0
Chmura Economics & Analytics	4.3	7.4	4.3	4.3	4.3	4.4	4.0	3.7	3.6	3.8	4.2	4.9	na	na	6.3	na	0.2	2.3	2.6	2.3
Comerica Bank	4.3	7.5	4.4	na	4.3	4.1	3.8	3.5	3.7	3.8	4.2	5.0	5.8	na	5.9	na	1.7	2.1	2.1	2.1
The Lonski Group	4.3	7.4	4.3	4.2	4.2	3.9	3.7	3.5	3.5	3.6	3.7	4.7	5.2 L	3.6	6.2	115.8	1.4	2.2	0.6 L	0.9 L
EY-Parthenon	4.2	na	na	na	4.0	na	na	na	na	3.9	na	na	na	na	na	na	1.7	1.8	2.1	1.9
KPMG	4.2	7.3	4.1	3.9	4.1	4.1	3.9	3.6	3.4	3.6	3.9	4.4	5.6	na	5.8	na	1.5	2.4	1.8	1.9
DePrince & Assoc.	4.1	7.2	4.2	4.1	4.1	3.9	3.5	3.0	3.1	3.6	4.1	4.8	5.6	4.0	5.9	114.3	1.9	2.3	2.5	2.4
J.P. Morgan Chase	4.0	na	na	na	na	na	na	3.0	2.9 L	3.4	3.9	na	na	na	na	na	1.8	2.3	2.2	2.1
Georgia State University	3.9	6.8	na	na	3.7	3.4 L	3.1 L	3.7	3.4	3.6	3.9	4.9	5.8	na	5.9	na	0.7	2.1	1.5	1.8
ING	3.9	na	na	na	na	na	na	3.5	3.7	3.9	4.3	na	na	na	na	na	0.9	na	na	na
TS Lombard	3.8	6.9	3.8	3.8	3.7	3.8	3.6	3.5	3.8	3.9	4.0	4.7	5.6	3.9	5.7 L	120.0 H	0.0	2.5	2.5	2.5
Wells Fargo	3.6	6.8	3.6 L	3.6	3.6 L	3.5	3.5	3.5	3.5	3.7	4.0	4.9	5.9	4.3 H	6.1	na	1.2	2.4	2.6	2.4
NatWest Markets	3.3 L	6.5 L	na	3.4 L	3.6 L	3.7	3.8	2.9 L	3.0	3.4	4.0	5.2	6.1	4.1	6.7	na	-0.2 L	1.8	1.4	1.3
September Consensus	**4.4**	**7.5**	**4.5**	**4.3**	**4.3**	**4.2**	**3.9**	**3.7**	**3.6**	**3.8**	**4.1**	**4.8**	**5.7**	**4.0**	**6.2**	**114.6**	**1.6**	**2.3**	**2.3**	**2.2**
Top 10 Avg.	4.8	7.9	4.8	4.6	4.7	4.5	4.3	4.0	4.0	4.1	4.4	5.1	5.9	4.2	6.6	116.0	2.2	2.6	2.8	2.6
Bottom 10 Avg.	3.9	7.1	4.2	4.0	3.9	3.8	3.6	3.3	3.3	3.5	3.9	4.5	5.4	3.8	5.9	113.3	0.8	1.9	1.7	1.7
Standard Deviation	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.4	0.3	0.2	0.3	2.1	0.6	0.3	0.5	0.4
August Consensus	4.7	7.8	4.7	4.6	4.6	4.5	4.4	4.1	4.0	4.2	4.4	5.1	5.9	4.2	6.5	116.3	1.8	2.3	2.4	2.3
Number of Forecasts Changed From A Month Ago:																				
Down	24	20	14	17	18	19	20	28	29	33	27	19	18	11	20	13	18	13	17	14
Same	11	9	11	3	10	7	7	6	4	3	6	2	2	7	6	4	15	20	12	16
Up	2	2	2	1	3	2	1	1	2	1	1	2	2	1	1	1	4	2	7	5
Diffusion Index	20%	21%	28%	12%	26%	20%	16%	11%	11%	7%	12%	13%	14%	24%	15%	17%	31%	34%	36%	37%

Second Quarter 2025

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: Short-Term 1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	Long-Term 11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
S&P Global Market Intelligence	4.8 H	8.0 H	4.8	na	4.5 H	4.2	4.0	3.6	3.4	3.7	4.0	na	na	na	na	na	1.8	2.4	2.1	2.0
Moody's Analytics	4.6	7.7	4.5	4.4	4.3	4.3	4.3	4.2	4.1	4.2	4.6 H	5.7 H	6.5 H	4.1	6.4	na	1.7	2.3	2.6	2.3
Oxford Economics	4.6	7.7	4.6	na	4.5 H	4.4	4.0	3.9	3.7	3.9	4.0	4.2	na	na	6.5	115.7	2.0	2.2	2.6	2.3
Action Economics	4.5	7.7	5.1 H	4.5	4.5 H	4.3	4.1	3.9	3.8	3.8	4.0	4.7	5.4	4.0	6.7	115.4	2.0	2.3	2.7	2.1
Daiwa Capital Markets America	4.5	7.6	4.5	na	4.5 H	na	na	3.6	3.6	3.7	4.0	na	na	na	5.9	114.0	1.7	2.3	2.2	2.1
Societe Generale	4.5	7.7	4.5	na	4.4	4.3	4.0	3.7	3.7	4.1	4.4	na	na	na	na	na	2.3	2.3	2.2	1.9
Via Nova Investment Mgt.	4.5	7.8	4.5	4.6 H	4.4	4.5 H	4.6 H	4.3 H	4.5 H	4.5 H	4.6 H	5.6	6.1	4.2	7.1 H	112.0	2.5	2.0	2.0	2.1
Bank of America	4.4	na	na	na	na	na	na	3.3	3.5	3.8	4.2	na	na	na	na	na	2.0	2.5	2.4	2.2
Chan Economics	4.4	7.4	4.3	4.3	4.5 H	4.2	3.7	3.2	2.9	3.0 L	3.1 L	4.1 L	5.1 L	3.6	5.8	112.0	1.3	2.0	2.2	1.9
Economist Intelligence Unit	4.4	7.5	na	na	na	na	na	na	na	3.4	na	na	na	na	na	na	1.1	na	2.4	na
Regions Financial Corporation	4.4	7.6	4.4	4.6 H	4.4	4.3	4.0	3.7	3.4	3.9	4.2	4.8	5.6	4.0	5.9	114.3	2.0	2.4	2.5	2.3
GLC Financial Economics	4.3	7.6	4.4	4.4	4.3	4.3	4.2	4.0	3.9	4.1	4.3	5.0	5.9	4.2	6.3	115.7	1.6	2.2	2.3	2.1
Roberts Capital Advisors	4.3	7.5	4.3	4.3	4.3	4.2	4.0	3.7	3.7	3.8	4.0	4.6	5.5	3.9	6.0	116.0	2.0	2.2	2.1	2.0
Fannie Mae	4.2	7.3	na	na	3.7	3.6	3.5	3.4	3.5	3.8	4.1	na	na	na	5.8	na	1.9	2.3	2.2	2.0
Barclays	4.1	na	na	na	na	na	na	3.8	3.9	4.2	4.5	na	na	na	na	na	1.5	2.3	2.0	2.0
Nomura Securities, Inc.	4.1	7.3	na	na	na	na	na	3.5	3.6	3.7	na	na	na	na	na	na	2.4	1.5	1.9	1.8
BMO Capital Markets	4.0	7.2	4.0	4.0	4.0	3.9	3.7	3.5	3.5	3.7	4.0	4.4	5.2	3.7	6.3	114.5	1.6	2.0	2.2	2.1
Chmura Economics & Analytics	4.0	7.1	3.9	4.0	4.0	4.1	3.9	3.7	3.6	3.8	4.2	4.9	na	na	6.2	na	1.7	2.3	2.5	2.2
Comerica Bank	4.0	7.2	4.1	na	4.0	3.8	3.5	3.2	3.4	3.7	4.0	4.8	5.7	na	5.6	na	1.8	2.1	2.2	2.2
Loomis, Sayles & Company	4.0	7.2	4.0	3.9	4.1	3.9	3.8	3.6	3.6	3.7	4.3	4.5	5.3	3.7	5.9	115.0	1.7	2.4	2.6	2.2
MacroPolicy Perspectives	4.0	7.1	3.9	3.9	3.9	3.8	3.5	3.2	3.5	3.8	4.2	4.8	5.5	na	6.2	na	2.2	2.1	1.9	1.7
Naroff Economics LLC	4.0	7.0	3.9	4.0	3.9	4.0	4.0	3.6	3.8	3.8	4.2	na	na	3.9	5.8	114.3	3.2 H	2.4	2.2	2.1
Scotiabank Group	4.0	na	3.8	na	3.7	na	na	3.6	4.1	4.1	4.3	na	na	na	na	na	1.8	0.5 L	2.3	1.2
MacroFin Analytics & Rutgers Bus School	3.9	7.0	3.9	3.9	3.5	3.7	3.7	3.5	3.6	3.7	4.0	4.7	5.2	3.8	6.4	112.5	2.0	2.0	2.1	2.1
PNC Financial Services Corp.	3.9	7.0	3.9	na	3.5	3.5	3.5	3.5	3.7	4.0	4.3	na	5.8	4.3	6.1	115.8	2.6	1.7	2.5	2.1
Santander Capital Markets	3.9	7.0	3.9	3.8	3.7	3.6	3.4	3.6	3.5	3.7	4.0	4.8	5.6	3.4 L	6.2	111.0	1.5	2.5	2.4	2.1
The Northern Trust Company	3.9	7.0	3.8	4.0	4.4	4.2	4.0	3.8	3.9	4.0	4.3	5.3	6.2	4.3	6.3	110.5 L	1.6	2.2	2.3	2.2
TS Lombard	3.8	6.9	3.8	3.8	3.7	3.8	3.8	3.8	4.2	4.3	4.4	5.1	6.0	4.3	6.1	120.0 H	1.5	3.0 H	3.0 H	3.0 H
EY-Parthenon	3.7	na	na	na	3.6	na	na	na	na	3.8	na	na	na	na	na	na	1.7	1.8	2.1	2.1
KPMG	3.7	6.8	3.6	3.4	3.6	3.8	3.6	3.5	3.3	3.4	3.8	4.2	5.6	na	5.5 L	na	2.0	2.4	2.0	2.0
DePrince & Assoc.	3.6	6.7	3.7	3.7	3.6	3.5	3.1 L	2.7	3.0	3.5	4.1	4.7	5.6	4.0	5.7	114.4	2.0	2.2	2.4	2.3
Georgia State University	3.6	6.5 L	na	na	3.4	3.2 L	3.1 L	3.5	3.3	3.6	3.9	4.9	5.9	na	5.6	na	1.0 L	2.2	1.6	2.2
J.P. Morgan Chase	3.5	na	na	na	na	na	na	2.6 L	2.6 L	3.2	3.8	na	na	na	na	na	1.8	2.3	2.1	1.9
The Lonski Group	3.5	6.6	3.4 L	3.3 L	3.3 L	3.2 L	3.2	3.2	3.4	3.5	3.6	4.6	5.3	3.5	6.0	116.4	1.6	2.0	1.3 L	1.0 L
ING	3.4	na	na	na	na	na	na	3.4	3.7	4.0	4.4	na	na	na	na	na	1.7	na	na	na
Wells Fargo	3.4	6.5 L	3.4 L	3.4	3.4	3.4	3.4	3.4	3.5	3.6	3.9	4.8	5.8	4.2	6.0	na	2.1	2.3	2.4	2.3
NatWest Markets	3.3 L	6.5 L	na	3.4	3.6	3.7	3.8	3.0	3.2	3.5	4.1	5.3	6.2	5.1 H	6.9	na	1.2	1.8	1.4	1.3
September Consensus	**4.0**	**7.2**	**4.1**	**4.0**	**4.0**	**3.9**	**3.8**	**3.5**	**3.6**	**3.8**	**4.1**	**4.8**	**5.7**	**4.0**	**6.1**	**114.4**	**1.8**	**2.2**	**2.2**	**2.0**
Top 10 Avg.	4.5	7.7	4.6	4.3	4.4	4.3	4.1	3.9	4.0	4.2	4.4	5.1	6.0	4.3	6.5	115.9	2.3	2.5	2.6	2.3
Bottom 10 Avg.	3.6	6.8	3.7	3.7	3.5	3.5	3.4	3.1	3.2	3.4	3.8	4.5	5.4	3.8	5.8	113.0	1.4	1.7	1.8	1.7
Standard Deviation	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	2.3	0.4	0.4	0.3	0.3
August Consensus	4.4	7.5	4.4	4.3	4.3	4.2	4.1	3.9	3.9	4.1	4.3	5.0	5.9	4.2	6.3	116.1	1.9	2.2	2.3	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	25	20	16	15	18	18	19	27	27	30	26	16	16	13	19	13	13	7	13	15
Same	10	9	10	5	12	7	8	8	7	5	8	4	5	4	7	4	17	23	18	15
Up	2	2	1	1	1	3	1	0	1	2	0	3	1	2	1	1	7	5	5	5
Diffusion Index	19%	21%	22%	17%	23%	23%	18%	11%	13%	12%	12%	22%	16%	21%	17%	17%	42%	47%	39%	36%

Third Quarter 2025

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Economist Intelligence Unit	4.4 H	7.5	na	na	na	na	na	na	na	3.4	na	na	na	na	na	na	1.4	na	2.8	na
Oxford Economics	4.4 H	7.5	4.4	na	4.3 H	4.2	3.8	3.8	3.6	3.9	4.0	4.1	na	na	6.4	115.2	2.0	1.7	2.3	1.9
S&P Global Market Intelligence	4.4 H	7.6 H	4.4	na	4.1	3.8	3.7	3.4	3.2	3.6	3.9	na	na	na	na	na	1.6	2.5	2.7	2.3
Action Economics	4.3	7.4	4.8 H	4.3	4.2	4.1	3.8	3.8	3.7	3.7	3.9	4.6	5.3	4.0	6.6	115.6	2.0	2.0	2.6	2.1
Daiwa Capital Markets America	4.3	7.4	4.2	na	4.2	na	na	3.5	3.6	3.7	4.1	na	na	na	5.8	113.5	1.8	2.2	2.2	2.1
Moody's Analytics	4.3	7.5	4.3	4.2	4.1	4.1	4.1	4.1	4.1	4.1	4.6	5.6	6.6 H	4.1	6.3	na	1.7	2.2	2.4	2.2
Societe Generale	4.3	7.5	4.3	na	4.2	4.0	3.8	3.6	3.7	4.2	4.5	na	na	na	na	na	2.3	2.2	2.2	1.9
Via Nova Investment Mgt.	4.3	7.5	4.3	4.4 H	4.2	4.3 H	4.4 H	4.4 H	4.6	4.6	4.7	5.7 H	6.2	4.3	7.2 H	112.0	2.5	2.0	2.0	2.0
Bank of America	4.1	na	na	na	na	na	na	3.3	3.5	3.8	4.2	na	na	na	na	na	2.0	2.4	2.2	2.0
Chan Economics	4.1	7.1	4.0	4.0	4.2	3.9	3.4	2.9	2.6 L	2.7 L	2.8 L	3.8 L	4.8 L	3.3 L	5.5	111.8	1.5	1.9	2.1	1.8
Regions Financial Corporation	4.1	7.3	4.1	4.3	4.2	4.1	3.9	3.6	3.4	3.9	4.2	4.9	5.7	4.0	5.9	114.4	2.1	2.3	2.4	2.2
Fannie Mae	4.0	7.1	na	na	3.5	3.4	3.4	3.4	3.5	3.8	4.1	na	na	na	5.7	na	2.0	2.3	2.6	2.2
GLC Financial Economics	4.0	7.3	4.1	4.0	4.0	4.0	4.0	3.8	3.8	4.0	4.3	5.0	5.9	4.2	6.2	115.5	3.6 H	2.2	2.3	2.1
Roberts Capital Advisors	4.0	7.2	4.1	4.0	4.0	3.9	3.7	3.4	3.6	3.8	4.0	4.6	5.5	3.9	6.0	116.0	2.0	2.2	2.1	2.0
TS Lombard	4.0	7.1	4.0	4.0	3.9	4.0	4.1	4.3	4.7 H	4.8 H	4.9 H	5.6	6.5	4.8	6.6	120.0 H	2.0	3.5 H	3.5 H	3.5 H
Barclays	3.9	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5	2.2	1.9	1.9
Nomura Securities, Inc.	3.9	7.0	na	na	na	na	na	3.5	3.6	3.7	na	na	na	na	na	na	2.3	1.5 L	2.3	2.0
BMO Capital Markets	3.8	6.9	3.8	3.8	3.8	3.7	3.5	3.3	3.4	3.6	3.9	4.4	5.2	3.6	6.2	114.3	1.9	2.0	2.2	2.0
Comerica Bank	3.8	7.0	3.8	na	3.7	3.6	3.2	2.9	3.1	3.5	3.8	4.6	5.4	na	5.2 L	na	1.8	2.1	2.1	2.0
Loomis, Sayles & Company	3.8	6.9	3.7	3.6	3.8	3.6	3.6	3.5	3.5	3.7	4.5	4.5	5.3	3.7	5.8	114.9	1.8	2.4	2.6	2.2
MacroPolicy Perspectives	3.7	6.9	3.7	3.7	3.6	3.5	3.2	2.9	3.5	3.8	4.2	4.8	5.5	na	6.1	na	2.2	2.2	2.3	1.8
Georgia State University	3.6	6.7	na	na	3.3	3.3	3.3	3.3	3.4	3.7	4.1	5.2	6.1	na	5.8	na	1.7	2.1	1.8	2.3
PNC Financial Services Corp.	3.6	6.8	3.6	na	3.5	3.5	3.5	3.5	3.7	4.0	4.4	na	5.8	4.4	6.0	115.7	2.7	1.7	2.4	2.1
Chmura Economics & Analytics	3.5	6.7	3.5	3.5	3.5	3.6	3.6	3.6	3.6	3.7	4.1	4.8	na	na	6.0	na	2.4	2.1	2.2	2.1
EY-Parthenon	3.5	na	na	na	3.3	na	na	na	na	3.7	na	na	na	na	na	na	1.7	1.9	2.2	2.2
Naroff Economics LLC	3.5	6.5	3.5	3.5	3.2	3.5	3.5	3.6	3.9	4.0	4.3	na	na	4.0	5.7	114.8	2.4	2.3	2.1	2.2
Santander Capital Markets	3.5	6.7	3.5	3.4	3.3	3.2	3.1	3.4	3.4	3.6	3.9	4.7	5.5	3.3 L	6.0	110.5	1.8	2.4	2.5	2.1
Scotiabank Group	3.5	na	3.3	na	3.4	na	na	3.6	4.0	4.1	4.2	na	na	na	na	na	1.8	2.3	0.8 L	1.2 L
ING	3.4	na	na	na	na	na	na	3.4	3.9	4.3	4.6	na	na	na	na	na	2.1	na	na	na
The Northern Trust Company	3.4	6.5	3.3	3.5	3.9	3.8	3.8	3.7	3.9	4.0	4.3	5.3	6.2	4.4	6.3	110.0 L	1.8	2.1	2.3	2.1
Wells Fargo	3.4	6.5	3.4	3.4	3.4	3.4	3.4	3.4	3.5	3.6	3.9	4.8	5.8	4.2	5.9	na	2.8	2.1	2.4	2.1
DePrince & Assoc.	3.3	6.5	3.4	3.4	3.3	3.2	2.8 L	2.5 L	2.9	3.5	4.1	4.7	5.6	4.0	5.6	114.3	2.1	2.2	2.4	2.3
NatWest Markets	3.3	6.5	na	3.4	3.6	3.7	3.8	3.2	3.4	3.8	4.2	5.6	6.5	5.2 H	7.0	na	1.0 L	1.8	1.4	1.3
KPMG	3.2	6.3	3.1	2.9	3.1	3.4	3.3	3.3	3.1	3.3	3.7	4.1	5.5	na	5.3	na	1.9	2.5	2.7	2.3
J.P. Morgan Chase	3.1	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.0	2.2	2.4	2.1
MacroFin Analytics & Rutgers Bus School	2.9 L	6.5	2.9	2.9	2.5 L	2.7 L	3.5	3.4	3.5	3.7	3.9	4.6	5.2	3.7	6.3	112.3	1.8	2.0	2.0	2.0
The Lonski Group	2.9 L	6.0 L	2.8 L	2.8 L	2.9	2.9	3.0	3.1	3.2	3.3	3.4	4.3	5.0	3.3 L	5.5	117.0	1.8	1.9	2.2	1.5
September Consensus	**3.8**	**7.0**	**3.8**	**3.7**	**3.7**	**3.7**	**3.6**	**3.5**	**3.6**	**3.8**	**4.1**	**4.8**	**5.7**	**4.0**	**6.0**	**114.3**	**2.0**	**2.2**	**2.3**	**2.1**
Top 10 Avg.	4.3	7.5	4.3	4.1	4.2	4.1	4.0	3.9	4.0	4.2	4.5	5.3	6.1	4.4	6.5	115.9	2.5	2.5	2.7	2.4
Bottom 10 Avg.	3.2	6.5	3.3	3.3	3.2	3.3	3.2	3.1	3.2	3.4	3.7	4.4	5.3	3.7	5.6	112.8	1.6	1.8	1.8	1.7
Standard Deviation	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	2.4	0.4	0.3	0.4	0.4
August Consensus	4.1	7.2	4.1	4.0	3.9	3.9	3.9	3.7	3.8	4.1	4.3	5.0	5.9	4.2	6.2	115.9	2.0	2.2	2.3	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	25	19	15	14	18	16	19	20	24	26	20	16	15	12	18	13	15	9	13	12
Same	9	10	9	5	12	10	8	11	6	6	10	5	3	5	7	4	15	18	14	17
Up	3	2	3	2	1	2	1	2	3	3	2	2	4	2	2	1	7	8	9	6
Diffusion Index	20%	23%	28%	21%	23%	25%	18%	23%	18%	17%	22%	20%	25%	24%	20%	17%	39%	49%	44%	41%

Fourth Quarter 2025

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter															Avg. For	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term					Qtr.				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A.	B.	C.	D.	E.
	Federal Funds Rate	Prime Bank Rate	SOFR Rate	Com. Paper 1-Mo.	Treas. Bills 3-Mo.	Treas. Bills 6-Mo.	Treas. Bills 1-Yr.	Treas. Notes 2-Yr.	Treas. Notes 5-Yr.	Treas. Notes 10-Yr.	Treas. Bond 30-Yr.	Aaa Corp. Bond	Baa Corp. Bond	State & Local Bonds	Home Mtg. Rate	Fed's Adv Fgn Econ $ Index	Real GDP	GDP Price Index	Cons. Price Index	PCE Price Index
Economist Intelligence Unit	4.1 H	7.3 H	na	na	na	na	na	na	na	3.2	na	na	na	na	na	na	1.8	na	3.2	na
Oxford Economics	4.1 H	7.2	4.1	na	4.0 H	3.9	3.7	3.6	3.6	3.9	4.0	4.1	na	na	6.3	114.8	2.1	1.8	2.1	1.8
Action Economics	4.0	7.2	4.6 H	4.0	4.0 H	3.8	3.6	3.6	3.7	3.7	3.9	4.6	5.3	3.9	6.6	115.8	2.0	1.9	2.6	2.1
Daiwa Capital Markets America	4.0	7.1	4.0	na	4.0 H	na	na	3.4	3.6	3.7	4.1	na	na	na	5.7	113.0	2.1	2.2	2.1	2.0
Moody's Analytics	4.0	7.2	4.0	3.9	3.8	3.8	4.0	4.0	4.1	4.1	4.6	5.6	6.6	4.1	6.2	na	1.7	2.2	2.3	2.2
Societe Generale	4.0	7.2	4.0	na	3.9	3.8	3.6	3.5	3.7	4.2	4.5	na	na	na	na	na	2.2	2.2	2.2	1.9
TS Lombard	4.0	7.1	4.0	4.0	3.9	4.0 H	4.3 H	4.5 H	4.9 H	5.0 H	5.1 H	5.9 H	6.7 H	5.0	6.8	120.0 H	3.0 H	3.5 H	3.5 H	3.5 H
Via Nova Investment Mgt.	4.0	7.3 H	4.0	4.1 H	3.9	4.0 H	4.1	4.4	4.6	4.6	4.7	5.7	6.2	4.4	7.2 H	112.0	2.0	2.0	2.0	2.0
Bank of America	3.9	na	na	na	na	na	na	3.3	3.5	3.8	4.2	na	na	na	na	na	2.0	2.3	2.1	2.0
Barclays	3.9	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5 L	2.3	2.1	2.1
Chan Economics	3.9	6.9	3.8	3.8	4.0 H	3.7	3.2	2.7	2.4 L	2.5 L	2.6 L	3.6 L	4.6 L	3.1 L	5.3	111.9	1.5 L	1.9	2.1	1.8
GLC Financial Economics	3.9	7.0	3.8	3.8	3.8	3.8	3.8	3.8	3.8	4.0	4.3	5.0	5.9	4.2	6.1	115.3	2.7	2.1	2.3	2.2
Regions Financial Corporation	3.9	7.1	3.9	4.1 H	3.9	4.0 H	3.8	3.5	3.4	4.0	4.3	4.9	5.7	4.1	5.9	114.5	2.3	2.2	2.4	2.2
S&P Global Market Intelligence	3.9	7.1	3.9	na	3.6	3.5	3.4	3.2	3.1	3.5	3.8	na	na	na	na	na	1.8	2.4	2.5	2.2
Fannie Mae	3.8	7.0	na	na	3.4	3.4	3.4	3.4	3.6	3.8	4.1	na	na	na	5.6	na	2.1	2.2	2.4	2.1
Roberts Capital Advisors	3.8	6.9	3.8	3.7	3.8	3.7	3.5	3.2	3.4	3.7	3.9	4.5	5.5	3.9	5.9	116.0	2.0	2.1	2.1	2.0
Georgia State University	3.6	6.8	na	na	3.3	3.4	3.6	3.6	3.6	3.9	4.2	5.4	6.3	na	5.9	na	1.9	2.2	1.9	2.2
Nomura Securities, Inc.	3.6	6.8	na	na	na	na	na	3.4	3.5	3.7	na	na	na	na	na	na	2.3	1.4 L	2.0	2.0
PNC Financial Services Corp.	3.6	6.8	3.6	na	3.5	3.5	3.5	3.5	3.7	4.1	4.4	na	5.9	4.5	5.9	116.0	2.5	1.7	2.4	2.2
BMO Capital Markets	3.5	6.7	3.6	3.5	3.5	3.5	3.3	3.1	3.3	3.5	3.8	4.3	5.2	3.6	6.1	114.1	2.0	2.0	2.2	2.0
Comerica Bank	3.5	6.7	3.6	na	3.4	3.2	2.8	2.5	2.7	3.1	3.4	4.2	5.1	na	4.8 L	na	1.8	2.1	2.1	2.0
Loomis, Sayles & Company	3.5	6.7	3.5	3.4	3.5	3.4	3.3	3.3	3.5	3.7	4.5	4.5	5.3	3.7	5.7	114.8	2.0	2.3	2.6	2.2
MacroPolicy Perspectives	3.5	6.6	3.4	3.4	3.4	3.3	2.9	2.7	3.5	3.8	4.2	4.8	5.5	na	6.0	na	2.2	2.8	2.9	2.4
Scotiabank Group	3.5	na	3.3	na	3.3	na	na	3.6	3.8	4.1	4.2	na	na	na	na	na	1.8	1.6	2.0	2.4
ING	3.4	na	na	na	na	na	na	3.4	4.1	4.8	5.1 H	na	na	na	na	na	2.3	na	na	na
Wells Fargo	3.4	6.5	3.4	3.4	3.4	3.4	3.4	3.4	3.5	3.7	4.0	4.9	5.9	4.3	5.8	na	3.0 H	2.1	2.3	2.1
NatWest Markets	3.3	6.5	na	3.4	3.6	3.7	3.8	3.2	3.4	3.8	4.2	5.6	6.5	5.2 H	7.0	na	1.8	1.8	1.4 L	1.3 L
Chmura Economics & Analytics	3.2	6.3	3.2	3.2	3.2	3.3	3.4	3.5	3.6	3.6	4.1	4.7	na	na	5.9	na	2.7	2.2	2.1	2.0
DePrince & Assoc.	3.2	6.3	3.2	3.2	3.1	3.1	2.6 L	2.4 L	2.9	3.5	4.1	4.8	5.5	4.0	5.5	114.3	2.2	2.2	2.4	2.3
EY-Parthenon	3.2	na	na	na	3.0	na	na	na	na	3.6	na	na	na	na	na	na	1.9	2.1	1.9	2.3
Santander Capital Markets	3.2	6.4	3.2	3.2	3.1	3.1	3.2	3.2	3.4	3.6	3.9	4.6	5.4	3.3	5.9	111.0	2.0	2.3	2.5	2.2
MacroFin Analytics & Rutgers Bus School	3.1	6.0 L	3.1	3.1	2.7 L	3.0	3.3	3.3	3.5	3.6	3.9	4.6	5.1	3.7	6.3	112.1	1.8	2.0	2.0	2.0
Naroff Economics LLC	3.1	6.1	3.2	3.3	3.2	3.3	3.5	3.7	4.0	4.1	4.4	na	na	4.1	5.8	115.0	2.0	2.1	2.2	2.0
The Northern Trust Company	3.1	6.3	3.1	3.2	3.2	3.3	3.4	3.5	3.8	4.0	4.3	5.3	6.2	4.4	6.3	109.0 L	2.0	2.1	2.2	2.1
J.P. Morgan Chase	3.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.3	2.2	2.4	2.2
KPMG	2.9 L	6.1	2.9	2.6 L	2.7 L	3.1	3.1	3.1	3.0	3.1	3.6	3.9	5.4	na	5.1	na	2.2	2.3	2.5	2.2
The Lonski Group	2.9 L	6.0 L	2.8 L	2.8	2.9	2.9 L	3.0	3.1	3.1	3.2	3.4	4.2	5.0	3.2	5.3	117.1	2.0	1.9	2.6	1.8
September Consensus	**3.6**	**6.7**	**3.6**	**3.5**	**3.5**	**3.5**	**3.4**	**3.4**	**3.6**	**3.8**	**4.1**	**4.8**	**5.7**	**4.0**	**6.0**	**114.3**	**2.1**	**2.1**	**2.3**	**2.1**
Top 10 Avg.	4.0	7.2	4.0	3.8	3.9	3.9	3.8	3.8	4.1	4.3	4.6	5.3	6.2	4.4	6.5	115.9	2.5	2.5	2.7	2.4
Bottom 10 Avg.	3.1	6.3	3.1	3.1	3.0	3.2	3.1	2.9	3.1	3.3	3.6	4.3	5.2	3.7	5.5	112.7	1.7	1.8	2.0	1.9
Standard Deviation	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.5	0.5	2.5	0.3	0.3	0.4	0.3
August Consensus	3.9	7.0	3.8	3.7	3.7	3.7	3.7	3.7	3.8	4.0	4.3	5.0	5.9	4.2	6.1	115.8	2.1	2.1	2.3	2.2
Number of Forecasts Changed From A Month Ago:																				
Down	22	17	13	12	17	18	19	23	21	25	17	14	13	11	18	13	11	8	15	12
Same	13	12	13	7	12	8	6	8	8	7	11	6	5	5	6	4	15	23	14	19
Up	2	2	1	2	2	2	3	2	4	3	4	3	4	3	3	1	10	3	6	3
Diffusion Index	23%	26%	28%	26%	26%	21%	21%	18%	24%	19%	30%	26%	30%	29%	22%	17%	49%	43%	37%	37%

International Interest Rate And Foreign Exchange Rate Forecasts

United States

Blue Chip Forecasters	Fed Fund Target Rate			10 Yr. Gov't Bond Yield %			Fed's AFE $ Index		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	4.88	4.63	4.13	4.15	4.15	--	--	--	--
BMO Capital Markets	4.63	4.13	3.63	3.79	3.72	3.57	115.0	114.8	114.0
ING Financial Markets	4.68	4.13	3.38	3.80	3.90	4.25	114.3	115.1	114.7
Moody's Analytics	5.34	5.07	4.60	4.20	4.25	4.16	--	--	--
Northern Trust	4.88	4.38	3.38	4.00	4.00	4.00	112.5	111.0	110.0
Oxford Economics	5.35	5.04	4.58	4.07	3.94	3.90	117.4	116.8	115.7
Economist Intelligence Unit	4.88	4.63	4.38	3.60	3.50	3.38	--	--	--
Scotiabank	4.88	4.38	3.38	4.35	4.20	4.10	--	--	--
TS Lombard	4.75	3.75	4.00	3.50	3.75	4.75	130.0	120.0	120.0
Wells Fargo	4.38	3.83	3.38	3.75	3.65	3.60	--	--	--
September Consensus	**4.87**	**4.40**	**3.88**	**3.92**	**3.91**	**3.97**	**117.8**	**115.5**	**114.9**
High	5.35	5.07	4.60	4.35	4.25	4.75	130.0	120.0	120.0
Low	4.38	3.75	3.38	3.50	3.50	3.38	112.5	111.0	110.0
Last Months Avg.	5.14	4.81	4.24	4.27	4.20	4.18	119.5	117.1	116.0

Japan

Blue Chip Forecasters	Policy-Rate Balance Rate			10 Yr. Gov't Bond Yield %			Yen per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.25	0.50	0.75	1.05	1.10	--	160.0	157.3	--
BMO Capital Markets	0.50	0.50	1.00	1.50	1.56	1.75	142.0	141.0	139.0
ING Financial Markets	0.50	0.75	1.00	1.25	1.50	1.75	140.0	140.0	137.0
Moody's Analytics	0.18	0.45	0.75	0.95	1.13	1.30	156.8	152.6	144.4
Nomura Securities	--	--	--	--	--	--	148.0	146.0	--
Northern Trust	0.25	0.50	0.75	0.90	1.00	1.10	145.0	142.0	140.0
Oxford Economics	0.20	0.37	0.63	1.01	1.11	1.27	155.8	153.5	150.2
S&P Global Market Intelligence	--	--	--	--	--	--	141.9	138.8	132.7
Economist Intelligence Unit	0.25	0.40	0.55	1.10	1.20	1.20	142.0	139.9	134.1
Scotiabank	--	--	--	--	--	--	150.0	145.0	140.0
TS Lombard	0.25	0.25	0.25	1.00	1.10	0.75	145.0	135.0	125.0
Wells Fargo	0.25	0.25	0.75	0.90	0.95	1.10	--	--	--
September Consensus	**0.29**	**0.44**	**0.71**	**1.07**	**1.18**	**1.28**	**147.9**	**144.6**	**138.0**
High	0.50	0.75	1.00	1.50	1.56	1.75	160.0	157.3	150.2
Low	0.18	0.25	0.25	0.90	0.95	0.75	140.0	135.0	125.0
Last Months Avg.	0.15	0.25	0.43	1.03	1.10	1.17	153.6	150.7	144.8

United Kingdom

Blue Chip Forecasters	Official Bank Rate			10 Yr. Gilt Yields %			US$ per Pound Sterling		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	4.75	4.25	3.75	4.15	4.10	--	1.30	1.32	--
BMO Capital Markets	4.75	4.50	3.75	3.69	3.60	3.30	1.31	1.32	1.33
ING Financial Markets	5.00	4.50	3.50	3.80	3.50	3.70	1.30	1.26	1.25
Moody's Analytics	5.09	4.85	4.35	3.90	3.86	3.82	1.24	1.25	1.25
Nomura Securities	--	--	--	--	--	--	1.27	1.28	--
Northern Trust	4.75	4.50	4.00	3.90	3.80	3.70	1.30	1.31	1.35
Oxford Economics	5.09	4.85	4.35	3.97	3.94	3.83	1.27	1.28	1.28
S&P Global Market Intelligence	--	--	--	--	--	--	1.27	1.27	1.28
Economist Intelligence Unit	4.75	4.25	3.75	3.90	3.90	3.80	1.26	1.26	1.27
Scotiabank	4.50	4.25	3.50	--	--	--	1.27	1.29	1.31
TS Lombard	5.00	4.50	4.50	4.00	3.00	3.25	1.35	1.25	1.15
Wells Fargo	5.00	4.75	4.00	3.95	3.90	3.75	--	--	--
September Consensus	**4.87**	**4.52**	**3.95**	**3.92**	**3.73**	**3.64**	**1.29**	**1.28**	**1.27**
High	5.09	4.85	4.50	4.15	4.10	3.83	1.35	1.32	1.35
Low	4.50	4.25	3.50	3.69	3.00	3.25	1.24	1.25	1.15
Last Months Avg.	4.97	4.65	4.07	4.04	3.98	3.95	1.27	1.27	1.27

Switzerland

Blue Chip Forecasters	SNB Policy Rate			10 Yr. Gov't Bond Yield %			CHF per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	1.00	0.75	0.50	--	--	--	0.92	0.93	--
BMO Capital Markets	1.25	1.25	1.25	--	--	--	0.84	0.83	0.83
ING Financial Markets	1.00	1.00	1.00	0.70	0.75	1.00	0.83	0.85	0.86
Moody's Analytics	1.00	1.00	1.00	0.56	0.68	0.82	0.90	0.89	0.89
Nomura Securities	--	--	--	--	--	--	0.88	0.89	--
Northern Trust	1.00	1.00	1.00	0.60	0.60	0.60	0.84	0.83	0.81
Oxford Economics	1.23	1.00	1.00	0.49	0.65	0.98	0.88	0.89	0.89
S&P Global Market Intelligence	--	--	--	--	--	--	0.89	0.89	0.89
Economist Intelligence Unit	1.00	0.75	0.75	0.50	0.50	0.50	0.88	0.89	0.88
Scotiabank	--	--	--	--	--	--	0.90	0.91	0.89
TS Lombard	1.20	1.00	1.10	0.70	0.95	0.50	0.90	0.90	0.90
Wells Fargo	1.00	1.00	1.00	--	--	--	--	--	--
September Consensus	**1.08**	**0.97**	**0.96**	**0.59**	**0.69**	**0.73**	**0.88**	**0.88**	**0.87**
High	1.25	1.25	1.25	0.70	0.95	1.00	0.92	0.93	0.90
Low	1.00	0.75	0.50	0.49	0.50	0.50	0.83	0.83	0.81
Last Months Avg.	1.10	1.07	1.00	0.74	0.80	0.81	0.90	0.90	0.89

Canada

Blue Chip Forecasters	O/N MMkt Financing Rate			10 Yr. Gov't Bond Yield %			C$ per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	4.25	3.75	3.25	--	--	--	1.39	1.40	--
BMO Capital Markets	3.75	3.50	3.00	3.05	3.04	3.00	1.40	1.39	1.35
ING Financial Markets	4.25	4.00	3.50	3.00	3.25	3.75	1.34	1.32	1.31
Moody's Analytics	4.56	4.31	3.70	3.40	3.70	3.74	1.36	1.35	1.32
Nomura Securities	--	--	--	--	--	--	1.37	1.36	--
Northern Trust	4.00	3.50	2.75	3.25	3.25	3.25	1.36	1.34	1.30
Oxford Economics	4.47	4.13	3.75	3.30	3.34	3.72	1.38	1.38	1.36
S&P Global Market Intelligence	--	--	--	--	--	--	1.35	1.34	1.30
Economist Intelligence Unit	4.07	3.95	3.81	2.82	2.86	2.51	1.40	1.40	1.35
Scotiabank	4.00	3.75	3.25	3.50	3.60	3.60	1.36	1.34	1.32
TS Lombard	5.00	4.75	3.00	3.60	3.85	4.35	1.35	1.35	1.35
Wells Fargo	4.25	3.75	3.25	3.05	3.00	3.00	--	--	--
September Consensus	**4.26**	**3.94**	**3.33**	**3.22**	**3.32**	**3.44**	**1.37**	**1.36**	**1.33**
High	5.00	4.75	3.81	3.60	3.85	4.35	1.40	1.40	1.36
Low	3.75	3.50	2.75	2.82	2.86	2.51	1.34	1.32	1.30
Last Months Avg.	4.43	4.11	3.48	3.48	3.45	3.46	1.36	1.35	1.32

International Interest Rate And Foreign Exchange Rate Forecasts

Australia

Blue Chip Forecasters	Official Cash Rate			10 Yr. Gov't Bond Yield %			US$ per A$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	4.35	4.10	3.60	--	--	--	0.64	0.64	--
BMO Capital Markets	4.10	4.10	4.10	--	--	--	0.68	0.68	0.69
ING Financial Markets	4.35	4.35	3.85	3.90	3.70	3.90	0.67	0.66	0.66
Moody's Analytics	4.35	4.35	4.02	4.14	4.16	4.14	0.64	0.66	0.69
Nomura Securities	--	--	--	--	--	--	0.68	0.68	--
Northern Trust	4.35	4.10	3.60	4.30	4.30	4.10	0.68	0.67	0.69
Oxford Economics	4.34	4.35	4.23	4.22	4.08	4.02	0.67	0.65	0.66
S&P Global Market Intelligence	--	--	--	--	--	--	0.67	0.68	0.67
Economist Intelligence Unit	4.35	4.35	3.85	3.90	3.70	3.40	0.71	0.70	0.69
Scotiabank	--	--	--	--	--	--	0.68	0.70	0.72
TS Lombard	4.35	4.10	4.50	4.25	4.30	4.80	0.65	0.65	0.65
Wells Fargo	4.35	4.35	3.85	--	--	--	--	--	--
September Consensus	**4.32**	**4.24**	**3.96**	**4.12**	**4.04**	**4.06**	**0.67**	**0.67**	**0.68**
High	4.35	4.35	4.50	4.30	4.30	4.80	0.71	0.70	0.72
Low	4.10	4.10	3.60	3.90	3.70	3.40	0.64	0.64	0.65
Last Months Avg.	4.29	4.17	3.63	4.29	4.19	4.07	0.66	0.67	0.68

Euro area

Blue Chip Forecasters	Main Refinancing Rate			US$ per Euro		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	3.65	3.15	2.65	1.06	1.06	--
BMO Capital Markets	4.00	3.75	3.00	1.11	1.12	1.13
ING Financial Markets	3.50	3.00	2.50	1.12	1.10	1.10
Moody's Analytics	4.17	3.61	3.15	1.08	1.09	1.10
Nomura Securities	--	--	--	1.09	1.10	--
Northern Trust	3.65	3.40	2.90	1.10	1.12	1.15
Oxford Economics	4.13	3.60	2.61	1.08	1.09	1.09
S&P Global Market Intelligence	--	--	--	1.08	1.09	1.10
Economist Intelligence Unit	3.75	3.50	3.00	1.09	1.10	1.11
Scotiabank	3.40	3.15	2.65	1.09	1.11	1.15
TS Lombard	3.75	3.50	3.50	1.15	1.25	1.10
Wells Fargo	3.50	3.25	2.75	--	--	--
September Consensus	**3.75**	**3.39**	**2.87**	**1.10**	**1.11**	**1.11**
High	4.17	3.75	3.50	1.15	1.25	1.15
Low	3.40	3.00	2.50	1.06	1.06	1.09
Last Months Avg.	3.75	3.43	2.92	1.08	1.08	1.10

Blue Chip Forecasters	10 Yr. Gov't Bond Yields %											
	Germany			France			Italy			Spain		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	2.45	2.40	--	--	--	--	--	--	--	--	--	--
BMO Capital Markets	2.09	2.00	1.70	--	--	--	--	--	--	--	--	--
ING Financial Markets	2.20	2.30	2.40	2.85	2.95	3.00	3.65	3.70	3.75	3.00	3.10	3.15
Moody's Analytics	2.33	2.40	2.48	2.92	2.96	2.94	3.68	3.75	3.84	3.19	3.30	3.40
Northern Trust	2.25	2.20	2.10	2.95	2.90	2.80	3.55	3.50	3.40	3.00	2.95	2.85
Oxford Economics	2.35	2.43	2.36	3.10	3.17	3.03	3.78	3.94	4.06	3.20	3.33	3.34
Economist Intelligence Unit	2.50	2.40	2.40	2.80	2.80	2.60	3.80	3.80	3.70	3.10	3.10	3.10
TS Lombard	2.25	1.85	3.25	3.00	2.60	4.00	3.65	3.25	4.65	3.00	2.60	4.00
Wells Fargo	2.25	2.25	2.20	--	--	--	--	--	--	--	--	--
September Consensus	**2.30**	**2.25**	**2.36**	**2.94**	**2.90**	**3.06**	**3.69**	**3.66**	**3.90**	**3.08**	**3.06**	**3.31**
High	2.50	2.43	3.25	3.10	3.17	4.00	3.80	3.94	4.65	3.20	3.33	4.00
Low	2.09	1.85	1.70	2.80	2.60	2.60	3.55	3.25	3.40	3.00	2.60	2.85
Last Months Avg.	2.48	2.47	2.51	3.14	3.12	3.16	3.91	3.93	4.03	3.37	3.36	3.47

Consensus Forecasts
10-year Bond Yields vs U.S. Yield

	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-2.89	-2.85	-2.72	-2.69
United Kingdom	0.12	0.00	-0.17	-0.32
Switzerland	-3.38	-3.33	-3.22	-3.23
Canada	-0.78	-0.70	-0.58	-0.53
Australia	0.11	0.20	0.13	0.09
Germany	-1.58	-1.62	-1.66	-1.61
France	-0.88	-0.98	-1.01	-0.91
Italy	-0.23	-0.24	-0.25	-0.07
Spain	-0.79	-0.84	-0.84	-0.66

Consensus Forecasts
Policy Rates vs U.S. Target Rate

	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-5.13	-4.57	-4.84	-3.17
United Kingdom	-0.38	0.00	0.12	0.06
Switzerland	-4.13	-3.79	-3.42	-2.93
Canada	-0.88	-0.61	-0.46	-0.56
Australia	-1.03	-0.54	-0.16	0.07
Euro area	-1.13	-1.12	-1.01	-1.01

Viewpoints:

A Sampling of Views on the Economy, Financial Markets and Government Policy Excerpted from Recent Reports Issued by our Blue Chip Panel Members and Others

Europe Brief

German recession risks are casting a shadow over the outlook for the Eurozone economy. In the U.K. meanwhile the economic recovery is strengthening. Both ECB and BoE meanwhile have stressed that monetary policy settings have to remain restrictive for the foreseeable future as inflation hasn't reliable been defeated. That doesn't mean rates won't continue to fall, but that central banks will move cautiously.

German Q2 GDP growth was confirmed at -0.1% q/q. The final reading for the second quarter confirmed the -0.1% q/q contraction reported with the preliminary release. The breakdown, which is available for the first time, showed that a 1.0% q/q bounce in government spending helped to prevent an even worse result. Private consumption contracted -0.2% q/q, after a 0.3% q/q rise (was -0.4%) in the first. Even worse, capital investment declined -0.2% q/q, while the first quarter number was revised down to 0.1% q/q from 1.2% q/q reported initially. That reflected a -4.1% decline in machinery and equipment investment and a -2.0% q/q contraction in construction, signalling broad based weakness. Given the recent deterioration in confidence indicators, it suggests that companies are not hoping for a quick rebound.

Not a great sign for the second quarter, and coupled with a -0.2% q/q drop in exports and stagnating imports will back concerns that Germany is experiencing a technical recession over the summer. The Bundesbank is optimistic that a deep and lasting recession can be avoided, and the start of the ECB's easing cycle may go some way to support the recovery. However, given the external environment and the lack of structural reforms, the balance of risks remains tilted to the downside.

German Ifo business confidence also signalled further weakness. The headline held up better than feared, but still eased -0.4 points, to the lowest reading since February. At 86.6 the Ifo fell further below the long term average, but the expectations reading in particular came in higher than anticipated, which offers a glimmer of hope. Nevertheless, the diffusion index fell further into negative territory, and even services providers are now largely pessimistic. Construction sentiment and trade stabilized but at very low levels and the numbers will to little to ease concerns that the Eurozone's largest economy is facing a technical recession through the second and third quarters of the year.

An unexpected decline in German GfK consumer confidence added to signs that the economy is struggling. The advance reading for September dropped to -22.0, while the August reading was revised down to -18.6 from -18.4 reported initially. The breakdown, which is only available for August, showed a marked rise in price expectations, which lifted to -15.9 from -21.6 in the previous month. Business cycle expectations deteriorated and dropped to 2.0 from 9.8 and income expectations plunged to 3.5 from 19.7. The willingness to buy also declined. Not a great report that likely also reflects geopolitical tensions and growing dissatisfaction with a coalition government that seems mainly focused on infighting and not able able to pass necessary legislation and reforms.

The rest of the Eurozone is doing somewhat better though and the Eurozone Composite PMI unexpectedly bounced back in the preliminary reading for August. The Manufacturing PMI still declined to an 8-month low of 45.6 from 45.8, but the manufacturing output index hit a 2-month high at 45.7 - up from 45.6 in the previous month. The Services index outperformed and jumped 1.4 points to a 4-month high of 53.3. That left the Composite PMI at 51.2 - up from 50.2 and pointing to a broad pick up in activity, after the near stagnation in July.

However, HCOB reported that while output growth picked up, "new orders continued to fall, while there was a broad stagnation of staffing levels across the currency bloc amid the lowest business sentiment in the year-to-date." The limited country breakdown that is available, also flagged that the recovery was uneven, with the French services sector in particular bouncing back, while sentiment across Germany deteriorated again. The improvement in France is likely to partly reflect the impact of the Olympics, which is likely to fade quickly. Future confidence levels have dropped to the lowest so far this year and are below the "series average." So the improvement in the headline doesn't necessarily signal a rebound in overall activity and the numbers are unlikely to prevent the doves at the ECB from pushing for another rate cut in September.

What complicates the picture for the ECB, however, is the fact that the survey pointed to a drop in input costs, but also a pick up in output price inflation, with services charges rising at the sharpest pace in three month, while manufacturing output prices increased for the first time since April last year. However, services price inflation will also have been impacted by the big sporting events and Taylor Swifts European tour, which boosted the travel and hospitality sector and are likely to have pushed up prices.

Meanwhile Eurozone inflation expectations have stabilized to some extend. Median expectations for inflation over the next 12 months remained unchanged at 2.8% in July. However, expectations for inflation over the next three years edged up to 2.4% from 2.3% in June and May. The perception of past price increases has come down considerably - to 4.1% in July from 6.0% in June, but it seems medium term inflation expectations are inching higher again, which is not good news for the ECB as it ponders another rate cut. Mean rates, meanwhile remain much higher than the median rate, but the 3-year mean forecast actually inched lower, which complicates the picture for the ECB.

Eurozone wage growth slowed in the second quarter. ECB data showed that negotiated pay rose 3.6% y/y, down from 4.7% y/y in the first quarter of the year. However, a closer look at German numbers flags that this may not tell the full story. The Bundesbank reported that German negotiated wages rose 3.1% y/y in the second quarter, after 6.2% y/y in the first quarter, but flagged that the deceleration was largely due to the impact of significant

one-off payments last year that were designed to compensate for higher energy prices. Without those one-off payments, the annual rate would actually have lifted to 4.2% y/y in the second quarter from 3.0% y/y in the first quarter.

The Bundesbank estimates that across all sectors, negotiated wage growth has recently been in the range of 4-6%. The deals still included some one-off payments and in some cases were applied retroactively, which will mean additional wage payments in coming months that will boost the headline number in the third quarter. And across the sectors that are still facing wage negotiations, unions are demanding increases in the 7-19% range for the next 12 months.

Not surprising then that ECB chief economist Lane warned at Jackson Hole that the return of inflation "to target is not yet secure," adding that "in particular, the monetary stance will have to remain in restrictive territory for as long as is needed to shepherd the disinflation process towards a timely return to the target." Given that rates will remain restrictive even after another 25 bp cut, the comments do not rule out further easing in September. Indeed, Lane, who also stressed that "the return to target needs to be sustainable," and that "a rate path that is too high for too long would deliver chronically below target inflation over the medium term and would be inefficient in terms of minimizing the side effects on output and employment."

So Lane's remarks still leave the ECB on course to cut again at the next meeting. However, the focus on ongoing risks speaks against back-to-back cuts or moves larger than 25 bp. In the central scenario, we see the ECB cutting rates by 25 bp at meetings with updated staff projections, which would suggest a move in September and then again in December this year. Rates are set to fall at a similar pace next year.

Markets seem to agree that the ECB will move at a slower pace than the Fed and EUR-USD briefly hit a 13-month high of 1.12 as Fed Governor Powell paved the way for the start of the easing cycle. The pair is currently trading at 1.116 as EGB yields move higher, although with the Eurozone economy looking weaker, the EUR is on the backfoot versus Sterling.

The U.K. Manufacturing PMI rose to a 26-month high of 52.5 in the flash reading for August, from 52.1 in the previous month. The S&P Global Services PMI rose to a 4-month high of 53.3 from 52.5 in July. That left the Composite at a 4-month high of 53.4, another 1.6 point improvement versus the 52.8 in July. The numbers point to another solid expansion of private sector output.

S&P flagged that "rising business activity and resilient demand conditions contributed to a greater uplift in staff hiring, with the rate of employment growth the fastest since June 2023." At the same time, "inflationary pressures moderated across the private sector in August, with input costs rising at the slowest pace since January 2021", thanks to falling cost pressures across the services industry. However, "higher freight and raw material costs meant that input price inflation across the manufacturing sector remained stronger than seen in the first half of 2024."

S&P Global still suggested that GDP growth is set to weaken through the third quarter.

U.K. GfK consumer confidence, meanwhile, failed to improve. The headline held at -13, unchanged from July, against expectations for a slight improvement in sentiment against the background of decelerating inflation and lower interest rates. Despite this, consumers are more pessimistic about the outlook for their personal finances over the next 12 months and also more pessimistic on the economic outlook. The change in government it seems hasn't boosted sentiment - on the contrary. Despite this, consumers are judging it to be a better climate for major purchases than last month, although savings intentions have also picked up.

Concern about the future income situation may also reflect the prospect of higher taxes as the new government prepares its first budget. Politicians have highlighted the difficult state of U.K. public finances and indeed, U.K. public borrowing exceeded expectations in recent data. The government borrowed GBP 3.1 bln in July, GBP 1.8 bln more than in the same month last year and the highest reading for July since 2021. The Office for Budget Responsibility, the U.K.'s fiscal watchdog had predicted borrowing of just GBP 0.1 bln and consensus expectations had pointed to a much lower number of around GBP 1.5 bln. The data highlights the challenges the new government is facing as the U.K.'s debt to GDP ratio is at levels last seen in the 1960s and signals urgent need for consolidation.

Against that background BoE's Bailey said at Jackson hole that "second round inflation effects appear to be smaller than we expected" and that "we are now seeing a revision in our assessment of that intrinsic persistence". However, that can largely be read as a justification of the rate cut that hinged on Bailey's vote. Indeed, Bailey also stressed that "policy settings will have to remain restrictive for sufficiently long until the risks to inflation remaining sustainably around the 2% target in the medium term have dissipated further. The course will therefore be a steady one."

Looking forward, Bailey stressed that the decelerating trend "is not something we can take for granted" and coupled with the focus on a "steady" rate path, the comments suggest that as in the Eurozone, there won't be unusually large cuts, and that back-to-back moves are not really likely. Rather, the BoE seems more likely to stick to meetings with updated projections and detailed analysis, which would mean the BoE will sit out the next meeting and move again in November.

The cautious stance on additional rate cuts, coupled with robust growth numbers, have benefited the pound. Cable is now trading above 1.32 and at the highest level since March 2022. Sterling has also strengthened against the EUR as growth differentials give the BoE more room to maneuver.

Natascha Gewaltig (Action Economics)

Special Questions:

1. a. At what FOMC meeting will the first fed funds rate (FFR) cut occur?

Sep 2024	Nov 2024	Dec 2024	Later
100%	0%	0%	0%

b. How much will the first cut be? 25 bps 85% 50 bps 15%

c. By how much will the FFR target decline in: 2024 79 bps 2025 112 bps

d. Will the US national elections in November impact the timing of the Fed's rate decisions? Yes 6% No 94%

2. a. What is your estimate of the long-term neutral (nominal) fed funds rate? 2.99%

b. Has this estimate changed since before the pandemic?

Increased	Decreased	No change
93%	0%	7%

3. Changes in monetary policy affect the economy with a lag, possibly long. Is there further meaningful restraint from earlier tightening that the US economy has yet to feel? Yes 72% No 28%

4. What is the probability of a recession occurring in the US over the next 12 months?

Consensus	32%
Top 10	44%
Bot 10	22%
Median	33%

5. What is the probability that inflation readings turn up again in the second half of 2024?

Consensus	28%
Top 10	39%
Bot 10	19%
Median	25%

6. a. What is your estimate of the US "breakeven monthly job growth," that is, the increase in payroll employment needed each month to leave the unemployment rate unchanged? 158 thous

b. What is your estimate of the US unemployment rate in: Dec 2024 4.4% Jun 2025 4.5%

c. What is your estimate of the long-run natural unemployment rate? 4.1%

7. a. When will the next ECB policy rate cut occur?

Q3 2024	Q4 2024	Q1 2025	Later
85%	15%	0%	0%

b. When will the next BoE Bank rate cut occur?

Q3 2024	Q4 2024	Q1 2025	Later
44%	56%	0%	0%

c. When will the Bank of Japan next increase its uncollateralized overnight call rate?

Q3 2024	Q4 2024	Q1 2025	Later	Next move more likely to be a cut
23%	50%	12%	15%	0%

8. a. Do you think a potential narrowing of interest rate differentials between the US and Japan could, via the unwinding of carry trades, invoke further global financial instability over the next 12 months? Yes 46% No 54%

b. If so, does this potential source of instability feature in your economic & financial market projections? Yes 27% No 73%

Databank:

2024 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	-1.1	0.7	0.5	-0.2	0.2	-0.2	1.0	....	....	....	....	....
Auto & Light Truck Sales (b)	14.89	15.60	15.48	15.83	15.99	15.18	15.82	....	....	....	....	....
Personal Income (a, current $)	1.1	0.3	0.5	0.2	0.4	0.2	....	....	....	....	....	....
Personal Consumption (a, current $)	0.1	0.6	0.7	0.2	0.4	0.3	....	....	....	....	....	....
Consumer Credit (e)	3.1	2.8	-0.2	1.9	3.3	2.1	....	....	....	....	....	....
Consumer Sentiment (U. of Mich.)	79.0	76.9	79.4	77.2	69.1	68.2	66.4	67.8	....	....	....	....
Household Employment (c)	-31	-184	498	25	-408	116	67	....	....	....	....	....
Nonfarm Payroll Employment (c)	256	236	310	108	216	179	114	....	....	....	....	....
Unemployment Rate (%)	3.7	3.9	3.8	3.9	4.0	4.1	4.3	....	....	....	....	....
Average Hourly Earnings (All, cur. $)	34.51	34.56	34.69	34.75	34.88	34.99	35.07	....	....	....	....	....
Average Workweek (All, hrs.)	34.2	34.3	34.4	34.3	34.3	34.3	34.2	....	....	....	....	....
Industrial Production (d)	-1.2	-0.1	-0.3	-0.7	0.3	1.1	-0.2	....	....	....	....	....
Capacity Utilization (%)	77.2	78.1	77.8	77.8	78.3	78.4	77.8	....	....	....	....	....
ISM Manufacturing Index (g)	49.1	47.8	50.3	49.2	48.7	48.5	46.8	....	....	....	....	....
ISM Nonmanufacturing Index (g)	53.4	52.6	51.4	49.4	53.8	48.8	51.4	....	....	....	....	....
Housing Starts (b)	1.376	1.546	1.299	1.377	1.315	1.329	1.238	....	....	....	....	....
Housing Permits (b)	1.508	1.563	1.485	1.440	1.399	1.454	1.406	....	....	....	....	....
New Home Sales (1-family, c)	664	643	683	736	666	668	739	....	....	....	....	....
Construction Expenditures (a)	1.0	0.5	0.1	1.3	-0.4	-0.3	....	....	....	....	....	....
Consumer Price Index (nsa, d)	3.1	3.2	3.5	3.4	3.3	3.0	2.9	....	....	....	....	....
CPI ex. Food and Energy (nsa, d)	3.9	3.8	3.8	3.6	3.4	3.3	3.2	....	....	....	....	....
PCE Chain Price Index (d)	2.5	2.5	2.7	2.7	2.6	2.5	....	....	....	....	....	....
Core PCE Chain Price Index (d)	2.9	2.8	2.8	2.8	2.6	2.6	....	....	....	....	....	....
Producer Price Index (nsa, d)	1.0	1.6	2.0	2.3	2.6	2.7	2.2	....	....	....	....	....
Durable Goods Orders (a)	-3.8	1.2	0.8	0.2	0.1	-6.9	9.9	....	....	....	....	....
Leading Economic Indicators (a)	-0.5	0.0	-0.3	-0.6	-0.5	-0.2	-0.6	....	....	....	....	....
Balance of Trade & Services (f)	-66.9	-69.0	-68.6	-74.5	-75.0	-73.1	....	....	....	....	....	....
Federal Funds Rate (%)	5.33	5.33	5.33	5.33	5.33	5.33	5.33	....	....	....	....	....
3-Mo. Treasury Bill Rate (%)	5.45	5.44	5.47	5.44	5.46	5.51	5.43	....	....	....	....	....
10-Year Treasury Note Yield (%)	4.06	4.21	4.21	4.54	4.48	4.31	4.25	....	....	....	....	....

2023 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	4.1	-1.1	-1.1	0.7	0.4	0.3	0.4	0.6	0.8	-0.2	0.1	0.4
Auto & Light Truck Sales (b)	15.11	14.88	14.93	15.68	15.52	16.06	15.94	15.30	15.77	15.47	15.54	16.12
Personal Income (a, current $)	1.0	0.5	0.5	0.2	0.3	0.2	0.3	0.5	0.4	0.1	0.2	0.3
Personal Consumption (a, current $)	1.6	0.4	-0.1	0.4	0.2	0.4	0.6	0.3	0.8	0.2	0.4	0.6
Consumer Credit (e)	5.1	2.8	4.2	3.4	1.3	5.7	3.0	-3.9	2.1	2.3	4.4	1.1
Consumer Sentiment (U. of Mich.)	64.9	66.9	62.0	63.7	59.0	64.2	71.5	69.4	67.8	63.8	61.3	69.7
Household Employment (c)	852	149	523	138	-255	297	205	291	50	-270	586	-683
Nonfarm Payroll Employment (c)	482	287	146	278	303	240	184	210	246	165	182	290
Unemployment Rate (%)	3.4	3.6	3.5	3.4	3.7	3.6	3.5	3.8	3.8	3.8	3.7	3.7
Average Hourly Earnings (All, cur. $)	33.07	33.15	33.31	33.44	33.54	33.70	33.84	33.91	34.01	34.10	34.23	34.34
Average Workweek (All, hrs.)	34.6	34.5	34.4	34.3	34.4	34.4	34.3	34.4	34.4	34.3	34.4	34.4
Industrial Production (d)	1.5	0.9	0.1	0.3	0.0	-0.4	0.0	-0.1	-0.2	-0.8	-0.2	0.8
Capacity Utilization (%)	79.8	79.6	79.4	79.6	79.2	78.6	79.0	78.9	78.9	78.3	78.4	78.1
ISM Manufacturing Index (g)	47.4	47.7	46.5	47.0	46.6	46.4	46.5	47.6	48.6	46.9	46.6	47.1
ISM Nonmanufacturing Index (g)	54.7	55.0	51.2	52.3	51.0	53.6	52.8	54.1	53.4	51.9	52.5	50.5
Housing Starts (b)	1.361	1.404	1.342	1.368	1.583	1.415	1.473	1.305	1.363	1.365	1.510	1.568
Housing Permits (b)	1.443	1.620	1.493	1.470	1.532	1.493	1.501	1.578	1.515	1.534	1.508	1.530
New Home Sales (1-family, c)	639	625	644	687	741	666	700	652	694	673	611	654
Construction Expenditures (a)	0.5	0.7	1.0	1.3	1.1	0.6	0.2	1.0	0.4	0.8	0.9	0.5
Consumer Price Index (nsa, d)	6.4	6.0	5.0	4.9	4.0	3.0	3.2	3.7	3.7	3.2	3.1	3.4
CPI ex. Food and Energy (nsa, d)	5.6	5.5	5.6	5.5	5.3	4.8	4.7	4.3	4.1	4.0	4.0	3.9
PCE Chain Price Index (d)	5.5	5.2	4.4	4.4	4.0	3.2	3.3	3.3	3.4	2.9	2.7	2.6
Core PCE Chain Price Index (d)	4.9	4.8	4.8	4.8	4.7	4.3	4.2	3.7	3.6	3.4	3.2	2.9
Producer Price Index (nsa, d)	5.7	4.7	2.7	2.3	1.1	0.3	1.1	1.9	1.8	1.1	0.8	1.1
Durable Goods Orders (a)	0.8	-2.3	2.3	2.2	0.2	2.6	-3.1	-0.2	2.0	-4.1	7.7	-4.4
Leading Economic Indicators (a)	-0.5	-0.6	-1.2	-0.7	-0.7	-0.7	-0.3	-0.4	-0.8	-0.9	-0.5	-0.2
Balance of Trade & Services (f)	-70.0	-70.5	-60.3	-72.8	-66.1	-64.8	-64.6	-59.6	-62.2	-64.3	-64.8	-64.9
Federal Funds Rate (%)	4.33	4.57	4.65	4.83	5.06	5.08	5.12	5.33	5.33	5.33	5.33	5.33
3-Mo. Treasury Bill Rate (%)	4.69	4.79	4.86	5.07	5.31	5.42	5.49	5.56	5.56	5.60	5.52	5.44
10-Year Treasury Note Yield (%)	3.53	3.75	3.66	3.46	3.57	3.75	3.90	4.17	4.38	4.80	4.50	4.02

(a) month-over-month % change; (b) millions, saar; (c) month-over-month change, thousands; (d) year-over-year % change; (e) annualized % change; (f) $ billions; (g) level. Most series are subject to frequent government revisions. Use with care.

Calendar of Upcoming Economic Data Releases

Monday	Tuesday	Wednesday	Thursday	Friday
September 2 **LABOR DAY** **ALL MARKETS CLOSED**	**3** Construction (Jul) ISM Manufacturing (Aug) S&P Global Mfg PMI (Aug)	**4** International Trade (Jul) Manufacturers' Shipments, Inventories & Orders (Jul) JOLTS (Jul) Mortgage Applications	**5** ADP Employment Report (Aug) Productivity & Costs (Q2) ISM Services PMI (Aug) S&P Global Services PMI (Aug) Challenger Employment Report (Aug) BEA Auto & Truck Sales (Aug) EIA Crude Oil Stocks Weekly Jobless Claims	**6** Employment Situation (Aug) Public Debt (Aug) Interest on Public Debt (Aug) Baker Hughes International Rig Count (Aug)
9 Wholesale Trade (Jul) Consumer Credit (Jul)	**10** ECEC (Q2) QFR (Q2) Treasury Auction (Aug) Manpower Survey (Q4) NFIB (Aug) Kansas City Fed Labor Market Conditions Indicators (Aug) OPEC Crude Oil Spot Prices (Aug)	**11** CPI & Real Earnings (Aug) QSS (Q2) Cleveland Fed Median CPI (Aug) Kansas City Financial Stress Index (Aug) EIA Crude Oil Stocks Mortgage Applications	**12** Producer Prices (Aug) Transportation Services (Jul) Monthly Treasury (Aug) Financial Accounts (Q2) Weekly Jobless Claims	**13** Import & Export Prices (Aug) Housing Affordability (July) Consumer Sentiment (Sep, Preliminary)
16 Empire State Mfg Survey (Sep)	**17** Advance Retail Sales (Aug) IP & Capacity Utilization (Aug) MTIS (Jul) Business Leaders Survey (Sep) Home Builders (Sep) FOMC Meeting	**18** New Residential Construction (Aug) TIC Data (Jul) EIA Crude Oil Stocks Mortgage Applications FOMC Meeting	**19** International Transactions (Q2) Existing Home Sales (Aug) Philadelphia Fed Mfg Business Outlook Survey (Sep) Composite Indexes (Aug) Weekly Jobless Claims	**20**
23 Treasury Auction Allotments (Sep) Chicago Fed National Activity Index (Aug) S&P Global Flash PMIs (Sep)	**24** FHFA HPI (Jul) Case-Shiller HPI (Jul) H.6 Money Stock (Aug) Consumer Confidence (Sep) Philadelphia Fed Nonmfg Business (Sep) Richmond Fed Mfg & Service Sector Surveys (Sep)	**25** Intl Investment Position (Q2) New Residential Sales (Aug) Final Building Permits (Aug) Steel Imports for Consumption (Aug, Preliminary) FRB Philadelphia Coincident Economic Activity Index (Aug) EIA Crude Oil Stocks Mortgage Applications	**26** GDP (Q2, 3rd Estimate & Rev) Advance Durable Goods (Aug) Kansas City Fed Manufacturing Survey (Sep) Pending Home Sales (Aug) Weekly Jobless Claims	**27** Adv Trade & Inventories (Aug) Personal Income (Aug & Rev) Agricultural Prices (Aug) Dallas Fed Trimmed-Mean PCE (Aug) Strike Report (Sep) Underlying NIPA Tables (Q2, 3rd Estimate) Consumer Sentiment (Sep, Final)
30 Chicago PMI (Sep) Texas Manufacturing Outlook Survey (Sep) NABE Outlook (Q3)	**October 1** ISM Manufacturing (Sep) S&P Global Mfg PMI (Sep) JOLTS (Aug) Construction (Aug) Texas Service Sector Outlook Survey (Sep)	**2** ADP Employment Report (Sep) BEA Auto & Truck Sales (Sep) EIA Crude Oil Stocks Mortgage Applications	**3** Manufacturers' Shipments, Inventories & Orders (Aug) ISM Services PMI (Sep) S&P Global Services PMI (Aug) Challenger Employment Report (Sep) Weekly Jobless Claims	**4** Employment Situation (Sep) Public Debt (Sep) Interest on Public Debt (Sep) Baker Hughes International Rig Count (Sep)
7 Dallas Fed Banking Conditions Survey (Sep) Consumer Credit (Aug)	**8** Intl Trade/Supplement (Aug) NFIB (Sep) Kansas City Fed Labor Market Conditions Indicators (Sep)	**9** Wholesale Trade (Aug) Kansas City Financial Stress Index (Sep) EIA Crude Oil Stocks Mortgage Applications	**10** CPI & Real Earnings (Sep) Transportation Services Index (Aug) Cleveland Fed Median CPI (Sep) Monthly Treasury (Sep) Weekly Jobless Claims	**11** Producer Prices (Sep) Consumer Sentiment (Oct, Preliminary)

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Sticky Inflation Points to Sticky Fed Funds Rate

US financial markets are being pulled in two different directions. Inflation surprises, though not as large in April as in this year's first quarter, continue to be elevated, thereby boosting interest rates. Meanwhile, economic growth surprises are falling and turned markedly negative during May, putting downward pressure on yields. GDP growth slowed more than expected in Q1 to a below-trend 1.3% although domestic demand growth was solid at 2.5%. Interest-sensitive housing and business spending on equipment remain under stress while manufacturing activity declined in April on top of a quarterly decline in Q1.

Losing momentum. Furthermore, retail sales were weaker than expected in April with meaningful downward revisions to February and March sales that imply softer consumer spending for the first quarter and less momentum heading into the current quarter. The labor market is showing signs of softening. Job openings fell in March, closing the gap between openings and unemployment to its lowest level since June 2021. Nonfarm payrolls were weaker than expected in April, posting their lowest monthly gain since last October. All in all, it seems that the economy has lost some momentum during 2024.

Even though inflation surprises have slowed, elevated inflation continues to be the major force currently driving interest rate expectations and financial markets more generally. Both the FOMC and the Blue Chip Financial Forecasts (BCFF) panel consider the current monetary policy to be quite tight. So, in more normal times, the economy's loss of momentum accompanied by a tight monetary policy would argue for a reduction in policy interest rates. But inflation has not cooperated. The FOMC left its federal funds rate (FFR) target unchanged at its April 30-May 1 meeting as was widely expected and noted that it would be inappropriate to lower the FFR until the committee was more confident that inflation was on a sustainable path toward the 2% target.

Inflation moving in wrong direction. In the first four months of this year, the headline CPI rose at a 4.4% annual rate, up from 2.5% in the last four months of last year. Particularly alarming has been the acceleration in the Fed's new "supercore" inflation measure (that is, core services prices less rent and owners' equivalent rent) which has risen to 7.4% thus far in 2024 from 4.8% in the four months to December. Consequently, the FOMC stated that it may take longer than previously expected (even months) for the Committee to gain the confidence it needs to lower the FFR target. In fact, according to the minutes from the last meeting, several FOMC members expressed a willingness to tighten policy further, a view apparently not held by Chair Powell, should risks of sustainably above-target inflation arise.

Less QT. The FOMC did make one move toward an easier policy at its last meeting—it slowed the pace at which it is reducing the assets on its balance sheet. To complement its tightening of monetary policy via increases in the FFR, the Fed began in June 2022 to allow its securities holdings to decline by not replacing all maturing issues. Initially, the pace of decline was $60 billion per month for Treasury securities and $35 billion per month for agency debt and agency MBS. At the beginning of this June, the pace of reduction for Treasury debt will be slowed markedly to $25 billion per month while the pace of decline in agency and MBS debt will stay the same.

Rate expectations raised. In response to persistent inflation and the Fed's concern about it, financial markets and BCFF forecasters continue to adjust their interest rate expectations—both the timing of the first FFR cut and the pace of decreases that follow. At the beginning of this year, the FFR futures market had anticipated that the first FFR cut would have already occurred by now and that by the end of the year the FFR would be lowered by 125bps or more. Similarly, in January, the BCFF consensus expected the first cut in May with the FFR expected to fall by 102bps by year-end. By contrast, now the FFR futures market is not looking for the first rate cut until September and places only a 35% probability of one more cut this year—at the December FOMC meeting.

For the BCFF expected pattern of FFR changes, the quarterly average forecast of 5.24% for the third quarter is consistent with a 25bp rate cut at the September FOMC meeting. And the 4.99% Q4 average implies another 25bp reduction in December. After rising in March and April, market interest rates fell through much of May and were lower at the end of May than at the beginning, though they rebounded toward the end of the month. While BCFF forecasters have adjusted up the level of their interest rate forecasts over the past few months to reflect the general increase that has occurred, they continue to think that current levels represent peaks with rates of all maturities expected to fall across the six-quarter forecast horizon.

Long-range outlook. This month's survey also contains the semiannual long-range forecasts—extending out to 2035. In general, the longer-term outlook in the most recent survey is a little stronger than that in the December survey. The BCFF consensus looks for 2.2% growth in real GDP over the 2026-30 period, slowing marginally to 2.1% from 2031 to 2035. Both are slightly higher than the December survey and somewhat above the CBO's estimate of the economy's growth potential. However, growth is expected to be much slower than the 2.5% experienced during the five years prior to the COVID pandemic.

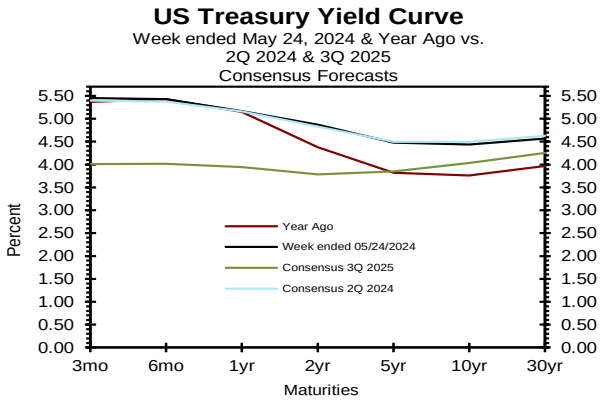
On inflation, the consensus expects the Federal Reserve to essentially achieve its 2% target with the PCE price index inflation rate (the measure that the Fed targets) expected to average 2.1% over the entire 10-year period, the same estimate as the December survey but well above the 1.3% that was experienced in the five years prior to the pandemic. Of particular interest is that even though the economy is expected to grow at around its potential rate and that inflation is expected to stabilize near the Fed's target, these occur at markedly higher expected interest rate levels (both short- and long-term) than in the five years prior to the pandemic and marginally higher than the consensus envisaged last December. This points to a meaningfully higher neutral FFR and higher real interest rates over the longer term than experienced just prior to the pandemic.

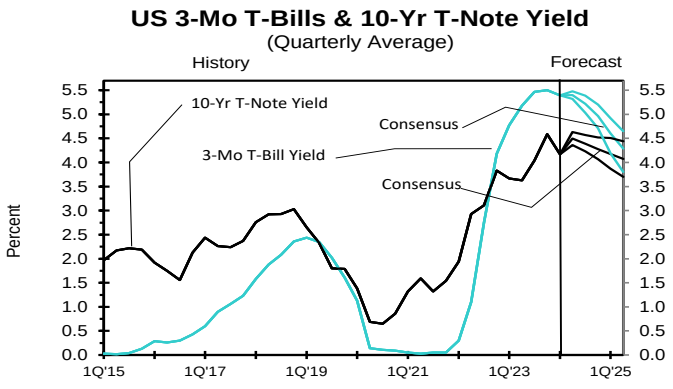
Sandy Batten (Haver Analytics, New York, NY)

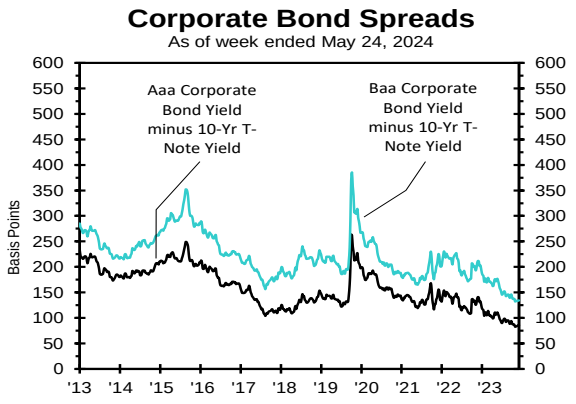
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

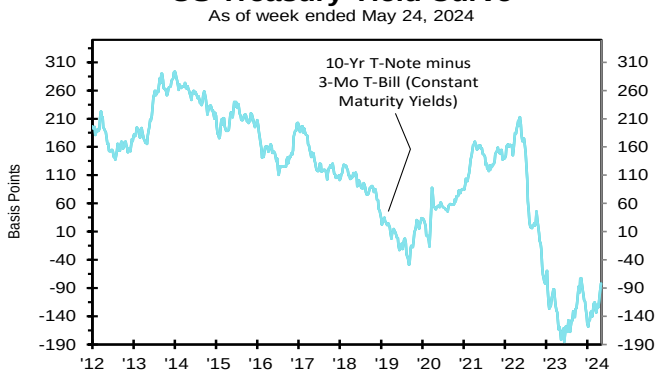
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	May 24	May 17	May 10	May 3	Apr	Mar	Feb	1Q 2024	2024	2024	2024	2025	2025	2025
Federal Funds Rate	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	**5.4**	**5.2**	**5.0**	**4.7**	**4.4**	**4.1**
Prime Rate	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	**8.5**	**8.4**	**8.1**	**7.8**	**7.6**	**7.3**
SOFR	5.31	5.31	5.31	5.32	5.32	5.31	5.31	5.31	**5.3**	**5.3**	**5.0**	**4.7**	**4.4**	**4.1**
Commercial Paper, 1-mo.	5.31	5.33	5.32	5.32	5.31	5.32	5.31	5.32	**5.3**	**5.2**	**5.0**	**4.7**	**4.4**	**4.0**
Treasury bill, 3-mo.	5.45	5.45	5.46	5.46	5.44	5.47	5.44	5.45	**5.4**	**5.2**	**5.0**	**4.6**	**4.3**	**4.0**
Treasury bill, 6-mo.	5.43	5.42	5.42	5.43	5.38	5.36	5.28	5.28	**5.4**	**5.2**	**4.9**	**4.6**	**4.3**	**4.0**
Treasury bill, 1 yr.	5.17	5.14	5.13	5.19	5.14	4.99	4.92	4.90	**5.2**	**5.0**	**4.7**	**4.4**	**4.2**	**3.9**
Treasury note, 2 yr.	4.87	4.80	4.83	4.93	4.87	4.59	4.54	4.48	**4.8**	**4.6**	**4.4**	**4.1**	**3.9**	**3.8**
Treasury note, 5 yr.	4.48	4.43	4.49	4.61	4.56	4.20	4.19	4.12	**4.5**	**4.4**	**4.2**	**4.1**	**3.9**	**3.9**
Treasury note, 10 yr.	4.44	4.42	4.48	4.61	4.54	4.21	4.21	4.16	**4.5**	**4.4**	**4.3**	**4.2**	**4.1**	**4.0**
Treasury note, 30 yr.	4.57	4.56	4.63	4.73	4.66	4.36	4.38	4.33	**4.6**	**4.5**	**4.5**	**4.4**	**4.3**	**4.3**
Corporate Aaa bond	5.28	5.27	5.34	5.45	5.38	5.11	5.13	5.08	**5.3**	**5.2**	**5.1**	**5.1**	**5.0**	**5.0**
Corporate Baa bond	5.76	5.76	5.83	5.94	5.88	5.62	5.65	5.60	**6.1**	**6.0**	**6.0**	**5.9**	**5.9**	**5.9**
State & Local bonds	4.29	4.21	4.23	4.32	4.28	4.12	4.12	4.11	**4.4**	**4.3**	**4.2**	**4.2**	**4.2**	**4.2**
Home mortgage rate	6.94	7.02	7.09	7.22	6.99	6.82	6.78	6.75	**7.0**	**6.9**	**6.7**	**6.5**	**6.4**	**6.3**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2022	2022	2022	2023	2023	2023	2023	2024	2024	2024	2024	2025	2025	2025
Fed's AFE $ Index	113.5	118.8	119.8	115.5	114.6	115.0	116.6	115.5	**117.1**	**117.7**	**116.9**	**116.5**	**116.2**	**116.0**
Real GDP	-0.6	2.7	2.6	2.2	2.1	4.9	3.4	1.3	**2.2**	**1.7**	**1.6**	**1.8**	**1.9**	**2.0**
GDP Price Index	9.1	4.4	3.9	3.9	1.7	3.3	1.6	3.0	**2.8**	**2.5**	**2.3**	**2.3**	**2.3**	**2.2**
Consumer Price Index	10.0	5.3	4.0	3.8	3.0	3.4	2.7	3.8	**3.5**	**2.7**	**2.5**	**2.4**	**2.4**	**2.4**
PCE Price Index	7.2	4.7	4.1	4.2	2.5	2.6	1.8	3.3	**2.9**	**2.3**	**2.2**	**2.3**	**2.2**	**2.2**

Forecasts for interest rates and the Federal Reserve's Advanced Foreign Economies Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index, CPI and PCE Price Index are seasonally adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; SOFR from the New York Fed. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP, GDP Price Index and PCE Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index history is from the Department of Labor's Bureau of Labor Statistics (BLS).









----------Policy Rates[1]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	5.38	5.38	5.13	**5.29**	**5.01**	**4.44**
Japan	0.05	0.05	-0.10	**0.11**	**0.16**	**0.33**
U.K.	5.25	5.25	4.50	**4.91**	**4.64**	**4.12**
Switzerland	1.50	1.50	1.50	**1.23**	**1.09**	**0.94**
Canada	5.00	5.00	4.50	**4.76**	**4.43**	**3.73**
Australia	4.35	4.35	3.85	**4.29**	**4.09**	**3.58**
Euro area	4.50	4.50	3.75	**3.91**	**3.51**	**2.92**

----------10-Yr. Government Bond Yields[2]------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	4.46	4.67	3.80	**4.38**	**4.20**	**4.10**
Germany	2.58	2.58	2.52	**2.40**	**2.35**	**2.34**
Japan	1.02	0.93	0.43	**0.98**	**1.05**	**1.10**
U.K.	4.27	4.34	4.38	**4.03**	**3.94**	**3.86**
France	3.06	3.06	3.12	**2.92**	**2.90**	**2.91**
Italy	3.89	3.89	4.37	**3.84**	**3.86**	**3.91**
Switzerland	0.76	0.73	1.06	**0.76**	**0.80**	**0.81**
Canada	3.61	3.83	3.33	**3.61**	**3.53**	**3.49**
Australia	4.29	4.52	3.73	**4.28**	**4.15**	**4.10**
Spain	3.33	3.37	3.56	**3.22**	**3.25**	**3.29**

----------Foreign Exchange Rates[3]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	116.93	118.11	116.43	**119.8**	**117.3**	**116.3**
Japan	156.90	157.62	140.53	**151.7**	**149.6**	**143.9**
U.K.	1.27	1.25	1.23	**1.25**	**1.25**	**1.25**
Switzerland	0.91	0.91	0.91	**0.91**	**0.92**	**0.89**
Canada	1.37	1.37	1.36	**1.35**	**1.34**	**1.32**
Australia	0.66	0.65	0.65	**0.66**	**0.66**	**0.67**
Euro	1.09	1.07	1.07	**1.08**	**1.08**	**1.09**

	Consensus Policy Rates vs. US Rate			Consensus 10-Year Gov't Yields vs. U.S. Yield	
	Now	In 12 Mo.		Now	In 12 Mo.
Japan	-5.33	**-4.11**	Germany	-1.88	**-1.76**
U.K.	-0.13	**-0.33**	Japan	-3.44	**-3.00**
Switzerland	-3.88	**-3.50**	U.K.	-0.19	**-0.23**
Canada	-0.38	**-0.71**	France	-1.40	**-1.19**
Australia	-1.03	**-0.86**	Italy	-0.57	**-0.19**
Euro area	-0.88	**-1.52**	Switzerland	-3.70	**-3.29**
			Canada	-0.85	**-0.60**
			Australia	-0.18	**0.00**
			Spain	-1.13	**-0.81**

Forecasts of panel members are on pages 10 and 11. Definitions of variables are as follows: [1]Monetary policy rates. [2]Government bonds are yields to maturity. [3]Foreign exchange rate forecasts for U.K., Australia and the Euro are U.S. dollars per currency unit. For the U.S dollar, forecasts are of the U.S. Federal Reserve Board's AFE Dollar Index.

International. Expectations about when central banks will begin an easing cycle have been a dominant driver of financial market trends in recent weeks. Weaker-than-expected US growth and inflation data have reignited a Fed easing narrative and, as a consequence, boosted global bond and equity markets. Disinflationary pressures, in the meantime, have generally persisted in European economies, reinforcing investors' expectations that the ECB and the BoE will shortly reduce their respective policy rates as well. With global (ex US) growth data also showing a slight improvement, albeit from a weak base, soft landing narratives for the world economy have equally been invigorated. In the background to this, heightened enthusiasm for the rollout of Artificial Intelligence infrastructure, reinforced by stellar corporate earnings reports, have additionally contributed to an upbeat mood.

These observations about soft landing narratives and disinflation chime too with recent forward-looking survey data. The composite PMI balances, for example, climbed to a 12-month high in May in both the US and euro area. And although they moderated a little in Japan, the UK and India, that followed respective readings in April which were at multi-month highs. On the inflation front, it was notable too that the output price balances in all of these country-specific surveys, with the exception of India's, moderated.

Those observations about interest rate expectations also square with the latest views from this month's survey. For instance, our panelists now expect reductions of approximately 100 basis points and 60 basis points in the ECB's and BoE's respective policy rates over the next six months. The latest survey additionally suggests this cycle of interest rate reductions could commence a little earlier than previously expected in the euro area. Specifically, 77% of panelists believe the ECB will start cutting rates in Q2 (i.e., in June), while most of the remaining 23% are projecting Q3. Those proportions compare with last month's respective figuring of 71% and 29%. For the BoE, 30% of panelists now anticipate a rate cut in Q2, with a further 67% opting for Q3, and just 3% forecasting Q4. Last month's survey suggested a slightly higher proportion, specifically 38%, anticipating that Q2 would earmark a first rate cut.

Our panelists' views about the timing and pace of interest rate easing in Europe contrast with their views about the US. For example, the Fed is expected to cut its policy rate by only 36 bps over the next six months, considerably less than in Europe. This disparity has also influenced views on the US dollar. A trend toward US dollar appreciation is expected to continue over the next six months, partly due to further gains that are expected against European currencies. However, the expected scale of US dollar appreciation on a trade-weighted basis is modest, partly due to our panelists' views about Japan.

Indeed, the expected trajectory of Japan's policy rates now stands in vivid contrast to the trajectory that's expected in the US (and Europe). For instance, our panelists expect the uncollateralized overnight call rate to increase by 11 basis points over the next six months and by 28 basis points over the next 12 months. When asked more specifically when the Bank of Japan will next increase its uncollateralized overnight call rate, 4% of panelists cited Q2 2024, 54% Q3, and 33% Q4. An additional 8%, meanwhile, suggested 2025 or later, underscoring the uncertainty surrounding the Bank of Japan's intentions.

Dwelling on broader uncertainties, there are several factors that could challenge this global consensus in the coming months. Firstly, disinflationary pressures might slow, or even reverse, in the face of a pick-up in global growth. In addition to this, China's economy is clearly struggling to regain some traction, which may have broader global consequences. In April, many of the routine monthly data releases revealed a decidedly mixed economic landscape—retail sales and fixed asset investment growth slowed to 2.3% year-on-year and 4.2% year-to-date, respectively. Furthermore, the downturn in house prices deepened, with a drop to 3.1% year-on-year from March's 2.2% decline, indicating persistent weakness in the property sector.

Second Quarter 2024

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For ---Qtr.--- A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
J.P. Morgan Chase	5.5 H	na	na	na	na	na	na	4.5	4.1	4.1 L	4.3	na	na	na	na	na	2.3	2.6	3.6	3.2
Scotiabank Group	5.5 H	na	5.3	na	5.3 L	na	na	4.8	4.5	4.5	4.6	na	na	na	na	na	1.6	0.6 L	3.3	2.7
Swiss Re	5.5 H	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.0	na	na	na
TS Lombard	5.5 H	8.6 H	5.5	5.5 H	5.4	5.5	5.2	4.8	4.4	4.5	4.6	5.4	6.2	4.5	6.3 L	120.0 H	3.0	3.5 H	3.5	3.5 H
Bank of America	5.4	na	na	na	na	na	na	4.9	4.5	4.3	4.7	na	na	na	na	na	2.0	3.2	3.9	3.3
Barclays	5.4	na	na	na	na	na	na	4.8	4.6	4.7	4.9 H	na	na	na	na	na	2.5	3.0	3.4	2.9
BMO Capital Markets	5.4	8.5	5.3	5.3	5.5	5.4	5.1	4.8	4.5	4.5	4.6	5.3	6.0	4.3	7.0	117.3	1.7	2.6	3.7	3.3
Daiwa Capital Markets America	5.4	8.5	5.4	na	5.4	na	na	4.9	4.5	4.6	4.7	na	na	na	7.0	118.0	1.8	2.9	4.2 H	2.6
Economist Intelligence Unit	5.4	8.5	na	na	na	na	na	na	na	4.5	na	na	na	na	na	na	2.8	na	3.2	na
Fannie Mae	5.4	8.5	na	na	5.4	5.4	5.1	4.9	4.5	4.5	4.6	na	na	na	7.0	na	2.4	3.0	3.1	2.7
Goldman Sachs & Co.	5.4	na	na	na	5.3 L	na	na	4.0 L	3.7 L	4.3	4.0 L	na	na	na	na	na	3.2 H	3.4	3.8	3.2
ING	5.4	na	na	na	na	na	na	4.9	4.8 H	4.8 H	4.9 H	na	na	na	na	na	2.8	na	na	na
KPMG	5.4	8.6 H	5.4	5.3	5.4	5.4	5.1	4.9	4.6	4.6	4.6	5.4	6.0	na	7.1	na	2.4	3.1	3.9	3.1
MacroPolicy Perspectives	5.4	8.5	5.3	5.3	5.4	5.4	5.1	4.9	4.5	4.5	4.6	5.1	5.9 L	4.3	7.0	117.4	2.1	2.9	3.2	2.5
Nomura Securities, Inc.	5.4	8.5	na	na	na	na	na	4.9	4.4	4.4	na	na	na	na	na	na	1.8	2.4	3.4	3.0
Oxford Economics	5.4	8.5	5.4	na	5.4	5.3	5.1	4.7	4.4	4.5	4.6	4.7 L	na	na	7.1	117.5	2.5	2.8	4.0	3.2
Roberts Capital Advisors	5.4	8.5	5.4	5.4	5.3 L	5.2 L	5.0 L	4.9	4.5	4.5	4.7	5.3	6.1	4.5	7.0	117.0	2.0	2.8	3.5	3.1
The Lonski Group	5.4	8.5	5.3	5.3	5.5	5.4	5.2	4.9	4.6	4.5	4.7	5.4	5.9 L	4.3	7.1	117.1	2.1	2.8	3.5	3.2
The Northern Trust Company	5.4	8.5	5.3	5.3	5.4	5.4	5.2	4.9	4.5	4.5	4.7	5.2	5.9 L	4.3	7.0	117.0	2.4	3.0	3.8	3.4
Wells Fargo	5.4	8.5	5.4	5.4	5.4	5.3	5.1	4.8	4.5	4.4	4.5	5.6 H	6.6 H	5.0	7.1	na	2.7	3.1	4.0	3.1
Action Economics	5.3 L	8.5	5.6 H	5.3	5.4	5.3	5.0 L	4.9	4.7	4.6	4.7	5.3	6.1	4.4	7.6 H	115.5 L	3.1	3.0	3.5	2.9
Chan Economics	5.3 L	8.3 L	5.2 L	5.2 L	5.5	5.6	5.4	4.8	4.4	4.5	4.6	5.6 H	6.6 H	5.1 H	7.3	116.4	3.0	2.4	2.6 L	2.3
Chmura Economics & Analytics	5.3 L	8.5	5.3	5.3	5.4	5.4	5.2	4.9	4.5	4.5	4.6	5.2	na	na	7.1	na	0.3 L	3.4	3.5	2.9
Comerica Bank	5.3 L	8.5	5.3	na	5.4	5.3	5.1	4.9	4.6	4.6	4.7	5.3	6.1	na	7.0	na	1.5	2.7	3.8	3.1
DePrince & Assoc.	5.3 L	8.5	5.2 L	5.3	5.4	5.4	5.1	4.9	4.5	4.5	4.6	5.3	6.0	3.8 L	7.0	116.8	1.8	3.3	3.5	3.2
EY-Parthenon	5.3 L	na	na	na	5.4	na	na	na	na	4.3	na	na	na	na	na	na	2.7	3.0	3.5	3.2
Georgia State University	5.3 L	8.4	na	na	5.5	5.4	5.1	4.8	4.5	4.5	4.6	5.5	6.5	na	7.0	na	1.9	2.5	3.4	2.3
GLC Financial Economics	5.3 L	8.5	5.3	5.2 L	5.3 L	5.3	5.2	4.9	4.5	4.4	4.5	5.2	6.1	4.4	6.9	116.5	1.7	1.6	2.7	1.4 L
Loomis, Sayles & Company	5.3 L	8.5	5.3	5.3	5.5	5.4	5.2	4.9	4.5	4.5	4.6	5.1	5.9 L	4.3	7.0	117.1	2.1	3.3	3.8	3.2
MacroFin Analytics & Rutgers Bus School	5.3 L	8.5	5.3	5.3	5.4	5.4	5.2	4.9	4.5	4.5	4.6	5.3	5.9 L	4.3	7.0	116.8	1.2	2.4	3.0	2.4
Moody's Analytics	5.3 L	8.5	5.3	5.4	5.3 L	5.2 L	5.1	4.8	4.4	4.4	4.6	5.3	6.0	3.9	7.1	na	2.3	2.0	2.7	2.0
Naroff Economics LLC	5.3 L	8.3 L	5.3	5.3	5.3 L	5.4	5.1	4.7	4.5	4.5	4.5	5.4	5.9 L	4.3	7.0	116.4	2.1	2.8	3.4	3.2
NatWest Markets	5.3 L	8.5	na	5.4	5.6 H	5.7 H	5.8 H	4.9	4.7	4.6	4.8	5.2	6.1	4.9	6.7	na	1.7	2.3	3.3	2.8
PNC Financial Services Corp.	5.3 L	8.5	5.3	na	5.3 L	5.3	5.1	4.8	4.5	4.5	4.6	na	6.0	4.0	7.0	117.0	2.2	2.9	3.8	3.1
Regions Financial Corporation	5.3 L	8.5	5.3	5.3	5.4	5.4	5.2	4.9	4.6	4.5	4.7	5.5	6.3	4.6	7.0	117.0	2.7	3.1	4.1	3.2
S&P Global Market Intelligence	5.3 L	8.5	5.3	na	5.3 L	5.2 L	5.1	4.9	4.6	4.5	4.7	na	na	na	7.1	na	2.1	3.1	3.9	3.0
Santander Capital Markets	5.3 L	8.5	5.3	5.3	5.5	5.4	5.2	4.9	4.5	4.5	4.6	5.3	6.0	3.9	7.0	117.1	3.0	2.8	3.4	2.9
Societe Generale	5.3 L	8.5	5.3	na	5.4	5.4	5.2	5.0 H	4.8 H	4.7	4.9 H	na	na	na	na	na	3.2 H	3.1	3.7	3.3
Via Nova Investment Mgt.	5.3 L	8.5	5.3	5.3	5.4	5.4	5.1	4.9	4.5	4.6	4.7	5.5	6.0	4.4	7.2	117.2	2.5	2.5	2.6 L	2.5
June Consensus	**5.4**	**8.5**	**5.3**	**5.3**	**5.4**	**5.4**	**5.2**	**4.8**	**4.5**	**4.5**	**4.6**	**5.3**	**6.1**	**4.4**	**7.0**	**117.1**	**2.2**	**2.8**	**3.5**	**2.9**
Top 10 Avg.	5.4	8.5	5.4	5.4	5.5	5.5	5.3	4.9	4.7	4.6	4.8	5.5	6.3	4.6	7.2	117.6	3.0	3.3	3.9	3.3
Bottom 10 Avg.	5.3	8.5	5.3	5.3	5.3	5.3	5.1	4.7	4.3	4.4	4.5	5.2	5.9	4.1	6.9	116.6	1.5	2.1	3.0	2.3
Standard Deviation	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.9	0.6	0.5	0.4	0.4
May Consensus	5.4	8.5	5.3	5.3	5.4	5.3	5.1	4.8	4.5	4.5	4.6	5.3	6.1	4.4	7.0	117.2	2.0	2.7	3.4	2.9
Number of Forecasts Changed From A Month Ago:																				
Down	1	1	1	4	2	1	3	4	13	10	10	10	11	8	10	8	3	9	15	11
Same	35	26	24	13	23	16	13	21	14	19	18	9	8	7	11	5	17	12	6	11
Up	3	4	2	4	7	11	12	11	9	9	7	5	4	5	7	6	19	15	16	14
Diffusion Index	53%	55%	52%	50%	58%	68%	66%	60%	44%	49%	46%	40%	35%	43%	45%	45%	71%	58%	51%	54%

Third Quarter 2024

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Adv Fgn Econ $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
	Percent Per Annum -- Average For Quarter															Avg. For ---Qtr.---	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term									
Bank of America	5.4 H	na	na	na	na	na	na	4.7	4.5	4.3	4.7	na	na	na	na	na	2.0	2.6	2.3	2.2
Chmura Economics & Analytics	5.4 H	8.5	5.4	5.4 H	5.4	5.4	5.2	4.9 H	4.5	4.5	4.7	5.2	na	na	7.0	na	0.6	3.2	3.2	2.9
J.P. Morgan Chase	5.4 H	na	na	na	na	na	na	4.5	4.1	4.1 L	4.4	na	na	na	na	na	1.0	2.4	2.3	2.0
KPMG	5.4 H	8.6 H	5.4	5.2	5.3	5.2	4.9	4.7	4.4	4.5	4.5	5.2	6.0	na	6.8	na	1.8	2.3	2.5	2.2
Oxford Economics	5.4 H	8.5	5.4	na	5.3	5.2	4.9	4.6	4.1	4.2	4.4	4.4 L	na	na	7.0	118.1	1.8	2.4	2.9	2.0
Action Economics	5.3	8.4	5.7 H	5.2	5.2	5.1	4.8	4.8	4.5	4.5	4.6	5.1	6.0	4.2	7.5 H	117.7	2.3	2.1	2.6	1.9
BMO Capital Markets	5.3	8.4	5.3	5.3	5.4	5.4	5.0	4.5	4.4	4.3	4.4	5.2	5.9	4.2	6.9	117.5	1.4	2.4	3.0	2.4
Comerica Bank	5.3	8.5	5.3	na	5.2	5.1	4.9	4.7	4.6	4.6	4.8	5.5 H	6.3	na	7.0	na	1.5	2.3	2.1	2.2
Daiwa Capital Markets America	5.3	8.4	5.3	na	5.2	na	na	4.7	4.4	4.5	4.6	na	na	na	7.0	117.0	1.0	2.5	2.5	2.3
DePrince & Assoc.	5.3	8.4	5.2	5.3	5.4	5.4	5.1	4.8	4.6	4.5	4.6	5.4	6.2	4.3	6.9	116.4	1.5	3.0	3.2	2.9
Fannie Mae	5.3	8.4	na	na	5.3	5.2	5.0	4.8	4.5	4.4	4.6	na	na	na	6.9	na	1.8	2.2	2.2	2.0
Georgia State University	5.3	8.4	na	na	5.1	5.0	4.8	4.7	4.3	4.3	4.4	5.2	6.2	na	7.0	na	1.3	2.8	2.7	2.5
Loomis, Sayles & Company	5.3	8.5	5.3	5.3	5.4	5.3	5.0	4.5	4.2	4.4	4.5	5.1	5.8	4.2	6.9	116.8	1.9	2.6	2.9	2.5
MacroPolicy Perspectives	5.3	8.5	5.3	5.3	5.2	5.1	4.8	4.4	3.9	4.3	4.6	5.0	5.9	na	6.9	na	2.4	1.5 L	1.7 L	1.1 L
NatWest Markets	5.3	8.5	na	5.4 H	5.6 H	5.7 H	5.8 H	4.8	4.6	4.5	4.7	4.9	5.8	4.6	6.4	na	0.5	1.8	1.7 L	1.6
Regions Financial Corporation	5.3	8.5	5.3	5.3	5.4	5.3	5.1	4.9 H	4.5	4.5	4.7	5.5 H	6.3	4.6	6.9	116.4	2.0	2.8	2.9	2.8
Roberts Capital Advisors	5.3	8.4	5.3	5.3	5.2	5.1	4.9	4.8	4.4	4.4	4.6	5.1	6.0	4.5	6.8	117.0	1.8	2.7	3.2	2.8
S&P Global Market Intelligence	5.3	8.5	5.3	na	5.2	5.0	4.9	4.6	4.3	4.3	4.5	na	na	na	6.7	na	1.9	2.3	2.5	2.5
Santander Capital Markets	5.3	8.5	5.3	5.2	5.3	5.1	4.9	4.8	4.6	4.5	4.6	5.3	6.1	3.7 L	7.0	117.5	1.8	2.7	2.4	2.1
Scotiabank Group	5.3	na	5.1	na	5.0	na	na	4.3	4.4	4.4	4.5	na	na	na	na	na	0.7	3.5 H	3.2	2.9
Societe Generale	5.3	8.5	5.3	na	5.3	5.3	5.2	4.7	4.8 H	4.8 H	5.1 H	na	na	na	na	na	1.8	2.3	2.8	2.8
Swiss Re	5.3	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.1	na	na	na
The Lonski Group	5.3	8.5	5.3	5.4 H	5.4	5.3	5.0	4.7	4.5	4.4	4.5	5.3	6.1	4.3	7.0	117.9	1.4	2.4	2.5	3.1
The Northern Trust Company	5.3	8.5	5.3	5.3	5.2	5.1	4.9	4.7	4.3	4.2	4.5	5.2	5.8	4.1	6.5	117.2	1.7	2.8	3.3	2.5
Naroff Economics LLC	5.2	8.1 L	5.3	5.2	5.1	4.9 L	4.8	4.5	4.2	4.4	4.3	5.1	5.6 L	4.2	6.8	115.7 L	3.6 H	2.7	3.2	3.0
PNC Financial Services Corp.	5.2	8.3	5.2	na	5.0	5.0	4.9	4.7	4.4	4.4	4.5	na	6.0	4.2	6.9	118.0	1.3	2.3	2.6	2.2
Via Nova Investment Mgt.	5.2	8.4	5.2	5.3	5.3	5.3	5.1	4.7	4.3	4.6	4.5	5.5 H	6.0	4.3	7.2	117.0	2.5	2.3	2.4	2.3
Barclays	5.1	na	na	na	na	na	na	4.7	4.5	4.7	4.9	na	na	na	na	na	2.0	2.4	2.2	2.1
Chan Economics	5.1	8.1 L	5.0 L	5.0 L	5.3	5.4	5.2	4.6	4.2	4.3	4.4	5.4	6.4 H	4.9 H	7.1	116.2	2.5	2.3	2.5	2.2
Economist Intelligence Unit	5.1	8.3	na	na	na	na	na	na	na	4.4	na	na	na	na	na	na	1.8	na	2.9	na
EY-Parthenon	5.1	na	na	na	5.1	na	na	na	na	4.2	na	na	na	na	na	na	1.6	2.2	2.2	2.0
GLC Financial Economics	5.1	8.3	5.1	5.0 L	5.0	4.9 L	5.0	4.7	4.2	4.2	4.4	5.1	6.0	4.3	6.7	116.6	2.4	3.3	3.8 H	1.7
Goldman Sachs & Co.	5.1	na	na	na	5.0	na	na	3.8 L	3.7 L	4.3	4.1 L	na	na	na	na	na	2.4	2.1	2.7	2.1
ING	5.1	na	na	na	na	na	na	4.3	4.3	4.3	4.5	na	na	na	na	na	0.3 L	na	na	na
MacroFin Analytics & Rutgers Bus School	5.1	8.3	5.1	5.2	5.2	5.3	5.0	4.6	4.8 H	4.5	4.6	5.3	5.8	4.2	6.8	116.4	1.3	2.1	2.4	2.4
Moody's Analytics	5.1	8.3	5.1	5.1	5.0	4.9 L	4.8	4.6	4.2	4.3	4.6	5.5 H	6.2	4.0	6.9	na	1.9	1.9	2.3	2.0
Nomura Securities, Inc.	5.1	8.3	na	na	na	na	na	4.6	4.3	4.4	na	na	na	na	na	na	1.7	2.0	2.4	2.1
Wells Fargo	5.1	8.3	5.2	5.1	5.1	5.0	4.7 L	4.4	4.2	4.2	4.4	5.4	6.4 H	4.8	6.8	na	1.9	2.0	2.5	2.0
TS Lombard	5.0 L	8.1 L	5.0 L	5.0 L	4.9 L	5.0	4.8	4.5	4.2	4.3	4.4	5.1	6.0	4.3	6.1 L	130.0 H	2.0	3.5 H	3.5	3.5 H
June Consensus	**5.2**	**8.4**	**5.3**	**5.2**	**5.2**	**5.2**	**5.0**	**4.6**	**4.4**	**4.4**	**4.5**	**5.2**	**6.0**	**4.3**	**6.9**	**117.7**	**1.7**	**2.5**	**2.7**	**2.3**
Top 10 Avg.	5.4	8.5	5.4	5.3	5.4	5.4	5.2	4.8	4.6	4.6	4.7	5.4	6.2	4.5	7.1	118.8	2.4	3.0	3.3	2.9
Bottom 10 Avg.	5.1	8.2	5.1	5.1	5.0	5.0	4.8	4.4	4.1	4.2	4.4	5.0	5.9	4.1	6.6	116.6	0.9	2.0	2.1	1.8
Standard Deviation	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.3	3.1	0.6	0.4	0.5	0.5
May Consensus	5.2	8.4	5.2	5.2	5.2	5.1	4.9	4.6	4.3	4.3	4.5	5.2	6.1	4.4	6.8	117.5	1.7	2.4	2.6	2.3
Number of Forecasts Changed From A Month Ago:																				
Down	2	1	1	2	1	1	2	4	7	5	7	7	10	7	6	7	6	12	12	13
Same	27	22	20	11	19	17	13	21	16	20	17	12	7	9	13	4	19	13	11	14
Up	10	8	6	8	12	10	13	11	13	13	11	5	6	3	9	7	14	11	14	9
Diffusion Index	60%	61%	59%	64%	67%	66%	70%	60%	58%	61%	56%	46%	41%	39%	55%	50%	60%	49%	53%	44%

Fourth Quarter 2024

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For ---Qtr.--- A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Chmura Economics & Analytics	5.3 H	8.4	5.3	5.3 H	5.3 H	5.3	5.1	4.8 H	4.4	4.5	4.6	5.2	na	na	6.9	na	1.8	2.9	3.0	2.8
KPMG	5.3 H	8.5 H	5.3	5.0	5.2	4.9	4.6	4.3	4.1	4.3	4.4	5.1	6.2	na	6.6	na	1.3	2.5	1.9	2.0
S&P Global Market Intelligence	5.3 H	8.5 H	5.3	na	5.1	4.7	4.6	4.3	4.0	4.1	4.3	na	na	na	6.4	na	1.5	2.5	2.3	2.5
Societe Generale	5.3 H	8.5 H	5.3	na	5.3 H	5.2	5.0	4.5	4.7 H	4.8 H	5.1 H	na	na	na	na	na	2.0	2.3	2.8	2.7
Bank of America	5.1	na	na	na	na	na	na	4.5	4.4	4.3	4.8	na	na	na	na	na	2.0	2.1	1.8 L	1.6
Barclays	5.1	na	na	na	na	na	na	4.5	4.5	4.6	4.8	na	na	na	na	na	1.5	2.2	2.0	1.9
DePrince & Assoc.	5.1	8.3	5.1	5.1	5.2	5.2	4.9	4.7	4.5	4.5	4.6	5.5	6.4 H	4.6	6.8	116.1	1.6	2.7	2.9	2.6
J.P. Morgan Chase	5.1	na	na	na	na	na	na	4.3	4.0	4.1	4.3	na	na	na	na	na	1.0	2.3	2.6	2.1
MacroPolicy Perspectives	5.1	8.2	5.0	5.0	5.0	4.9	4.6	3.9	3.6 L	4.3	4.6	5.0	5.9	na	6.5	na	2.6 H	2.1	2.3	1.7
NatWest Markets	5.1	8.3	na	5.2	5.3 H	5.4 H	5.5 H	4.4	4.3	4.3	4.6	4.8	5.7	4.5	6.3 L	na	0.5 L	2.1	2.4	1.9
Roberts Capital Advisors	5.1	8.2	5.1	5.2	5.1	5.0	4.8	4.7	4.3	4.2	4.6	5.0	5.9	4.4	6.6	116.0	1.8	2.6	2.9	2.5
Santander Capital Markets	5.1	8.3	5.1	5.0	4.8	4.6	4.5	4.4	4.3	4.2	4.4	5.1	5.9	3.5 L	6.6	117.0	1.1	2.5	2.5	2.1
The Northern Trust Company	5.1	8.2	5.0	5.1	4.9	4.8	4.5	4.4	4.2	4.1	4.4	5.2	5.9	4.1	6.4	118.0	1.3	2.7	2.9	2.4
Action Economics	5.0	8.2	5.6 H	5.0	5.0	4.8	4.6	4.5	4.4	4.3	4.4	5.0	5.8	4.1	7.3 H	118.0	2.1	2.1	2.8	2.1
BMO Capital Markets	5.0	8.2	5.0	5.0	5.2	5.1	4.7	4.3	4.2	4.1	4.2 L	5.0	5.8	4.2	6.7	117.3	1.6	2.1	2.6	2.2
Comerica Bank	5.0	8.2	5.0	na	4.9	4.8	4.6	4.5	4.5	4.6	4.8	5.6 H	6.4 H	na	7.0	na	1.7	2.1	2.2	2.2
Daiwa Capital Markets America	5.0	8.1	5.0	na	5.0	na	na	4.5	4.3	4.4	4.6	na	na	na	6.9	116.0	0.8	2.4	2.4	2.3
Fannie Mae	5.0	8.1	na	na	5.1	5.0	4.8	4.7	4.4	4.4	4.5	na	na	na	6.8	na	1.5	2.4	2.9	2.4
Loomis, Sayles & Company	5.0	8.2	5.0	5.0	5.1	5.1	4.7	4.1	4.0	4.2	4.3	4.9	5.6	4.0	6.6	116.7	1.5	2.4	2.4	2.1
Oxford Economics	5.0	8.2	5.0	na	5.0	4.9	4.6	4.3	4.0	4.2	4.2 L	4.3 L	na	na	6.9	117.6	1.7	2.2	2.3	1.4 L
PNC Financial Services Corp.	5.0	8.1	5.0	na	4.7	4.7	4.6	4.5	4.3	4.3	4.4	na	6.0	4.3	6.7	118.6	1.2	2.1	2.4	2.1
Regions Financial Corporation	5.0	8.2	5.0	5.1	5.2	5.2	4.9	4.6	4.4	4.4	4.6	5.4	6.2	4.5	6.7	116.2	2.3	2.6	2.8	2.6
Scotiabank Group	5.0	na	4.8	na	4.6 L	na	na	4.1	4.2	4.3	4.4	na	na	na	na	na	1.7	2.1	3.3 H	3.1 H
Swiss Re	5.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.0	na	na	na
The Lonski Group	5.0	8.1	4.9	5.2	5.0	5.0	4.7	4.4	4.3	4.2	4.3	5.2	6.0	4.1	6.8	118.6	1.2	2.2	2.4	2.6
Chan Economics	4.9	7.9	4.8	4.8	5.1	5.2	5.0	4.4	4.0	4.1	4.2 L	5.2	6.2	4.7 H	6.9	116.0	1.6	2.1	2.3	2.0
Economist Intelligence Unit	4.9	8.0	na	na	na	na	na	na	na	4.2	na	na	na	na	na	na	1.3	na	2.7	na
EY-Parthenon	4.9	na	na	na	4.9	na	na	na	na	4.0 L	na	na	na	na	na	na	1.3	2.1	2.2	2.0
Goldman Sachs & Co.	4.9	na	na	na	4.8	na	na	3.7 L	3.7	4.3	4.2 L	na	na	na	na	na	2.4	1.8 L	2.6	1.8
Moody's Analytics	4.9	8.0	4.8	4.8	4.7	4.6	4.6	4.4	4.2	4.2	4.6	5.6 H	6.4 H	4.1	6.7	na	1.5	2.1	2.4	2.3
Naroff Economics LLC	4.9	7.9	4.8	4.9	4.7	4.6	4.6	4.4	4.0	4.1	4.2 L	4.9	5.5 L	4.1	6.5	115.0 L	2.2	2.6	3.0	2.9
Nomura Securities, Inc.	4.9	8.0	na	na	na	na	na	4.3	4.3	4.4	na	na	na	na	na	na	1.8	1.9	2.5	2.3
Via Nova Investment Mgt.	4.9	8.2	5.0	5.0	4.9	4.9	4.9	4.3	4.3	4.3	4.4	5.4	5.8	4.1	6.9	115.0 L	2.5	2.1	2.1	2.1
Georgia State University	4.8	7.8 L	na	na	4.6 L	4.3 L	4.2 L	4.4	4.0	4.1	4.3	5.1	6.1	na	6.6	na	0.9	2.8	2.0	2.2
GLC Financial Economics	4.8	7.9	4.7	4.7 L	4.8	4.6	4.6	4.4	4.0	4.1	4.3	4.3 L	6.0	4.2	6.5	115.8	2.5	3.0 H	2.7	2.1
TS Lombard	4.8	7.9	4.8	4.8	4.7	4.8	4.6	4.5	4.4	4.5	4.6	5.4	6.2	4.5	6.3 L	120.0 H	1.0	3.0 H	3.0	3.0
Wells Fargo	4.8	8.0	4.9	4.8	4.9	4.7	4.5	4.1	3.9	4.0 L	4.3	5.2	6.2	4.6	6.5	na	1.5	2.0	2.6	2.0
ING	4.6 L	na	na	na	na	na	na	3.9	4.0	4.0 L	4.3	na	na	na	na	na	0.6	na	na	na
MacroFin Analytics & Rutgers Bus School	4.6 L	7.8 L	4.6 L	4.7 L	4.7	4.8	4.8	4.4	4.4	4.5	4.6	5.2	5.8	4.0	6.7	116.6	1.6	1.9	2.3	2.3
June Consensus	**5.0**	**8.1**	**5.0**	**5.0**	**5.0**	**4.9**	**4.7**	**4.4**	**4.2**	**4.3**	**4.5**	**5.1**	**6.0**	**4.2**	**6.7**	**116.9**	**1.6**	**2.3**	**2.5**	**2.2**
Top 10 Avg.	5.2	8.3	5.2	5.1	5.2	5.2	5.0	4.6	4.5	4.5	4.7	5.4	6.2	4.5	6.9	117.8	2.3	2.7	3.0	2.7
Bottom 10 Avg.	4.8	7.9	4.8	4.9	4.7	4.6	4.5	4.1	3.9	4.1	4.3	4.8	5.8	4.0	6.5	115.9	1.0	2.0	2.1	1.8
Standard Deviation	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	1.3	0.5	0.3	0.3	0.4
May Consensus	4.9	8.1	4.9	4.9	4.9	4.8	4.6	4.3	4.1	4.2	4.4	5.1	6.0	4.2	6.6	116.6	1.6	2.3	2.4	2.2
Number of Forecasts Changed From A Month Ago:																				
Down	3	3	1	1	2	1	3	3	4	4	4	7	9	5	4	6	8	7	7	8
Same	26	20	18	10	19	18	13	25	22	22	21	12	6	10	14	5	26	18	11	17
Up	10	8	8	10	11	9	12	8	10	12	10	5	8	4	10	7	5	11	19	11
Diffusion Index	59%	58%	63%	71%	64%	64%	66%	57%	58%	61%	59%	46%	48%	47%	61%	53%	46%	56%	66%	54%

First Quarter 2025

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Societe Generale	5.3 H	8.5 H	5.3 H	na	5.2 H	5.0	4.8	4.3	3.8	4.4	4.7	na	na	na	na	na	2.5	2.3	2.8	2.7 H
KPMG	5.1	8.3	5.1	4.7	4.9	4.5	4.2	3.9	3.7	4.0	4.2	4.8	5.9	na	6.1 L	na	1.4	2.4	1.4	1.8 L
S&P Global Market Intelligence	5.1	8.2	5.1	na	4.8	4.4	4.3	4.0	3.7	3.9	4.1	na	na	na	6.1 L	na	1.5	2.4	1.3 L	2.4
Chmura Economics & Analytics	5.0	8.2	5.0	5.1 H	5.1	5.1 H	5.0 H	4.7	4.4	4.4	4.5	5.2	na	na	6.7	na	2.8	2.8 H	2.9 H	2.6
Bank of America	4.9	na	na	na	na	na	na	4.3	4.3	4.3	4.8	na	na	na	na	na	2.0	2.5	2.5	2.2
Barclays	4.9	na	na	na	na	na	na	4.4	4.4	4.6	4.8	na	na	na	na	na	1.5	2.4	2.4	2.2
DePrince & Assoc.	4.9	8.1	4.8	4.9	5.0	5.0	4.7	4.6	4.5	4.5	4.6	5.6	6.5	4.7	6.7	116.0	1.9	2.5	2.7	2.5
Fannie Mae	4.9	8.0	na	na	4.8	4.8	4.7	4.5	4.4	4.4	4.5	na	na	na	6.6	na	1.7	2.3	2.5	2.2
Action Economics	4.8	7.9	5.3 H	4.8	4.7	4.6	4.3	4.3	4.2	4.2	4.3	4.8	5.7	3.9	7.2 H	118.2	2.0	2.1	2.8	2.1
BMO Capital Markets	4.8	8.0	4.8	4.8	4.9	4.9	4.6	4.2	4.1	4.0	4.2	4.9	5.7	4.1	6.6	117.0	2.0	2.0	2.3	2.1
Comerica Bank	4.8	8.0	4.8	na	4.7	4.6	4.4	4.2	4.3	4.5	4.8	5.6	6.4	na	6.8	na	1.7	2.1	2.1	2.2
Daiwa Capital Markets America	4.8	7.9	4.8	na	4.7	na	na	4.3	4.2	4.3	4.5	na	na	na	6.7	116.0	1.2	2.3	2.3	2.2
J.P. Morgan Chase	4.8	na	na	na	na	na	na	4.1	3.8	4.0	4.3	na	na	na	na	na	2.0	2.3	2.2	1.9
Loomis, Sayles & Company	4.8	7.9	4.7	4.7	4.8	4.8	4.4	3.7	3.6	3.9	4.0	4.6	5.4 L	3.7	6.2	116.6	1.5	2.4	2.5	2.1
MacroPolicy Perspectives	4.8	8.0	4.8	4.8	4.7	4.6	4.3	3.4 L	3.5 L	4.3	4.6	5.0	5.9	na	6.4	na	2.2	2.0	na	na
Oxford Economics	4.8	8.0	4.8	na	4.8	4.7	4.4	4.2	3.9	4.1	4.1	4.2 L	na	na	6.8	116.8	1.8	2.5	2.3	2.5
Regions Financial Corporation	4.8	8.0	4.8	4.8	4.9	4.9	4.8	4.2	4.2	4.4	4.6	5.4	6.2	4.5	6.5	115.9	2.5	2.5	2.6	2.4
Roberts Capital Advisors	4.8	7.9	4.8	4.9	4.8	4.7	4.5	4.4	4.1	4.2	4.5	4.9	5.8	4.3	6.5	116.0	1.9	2.6	2.8	2.4
Swiss Re	4.8	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.4	na	na	na
The Northern Trust Company	4.8	8.0	4.8	4.9	4.7	4.5	4.3	4.0	4.1	4.1	4.4	5.4	6.1	4.3	6.4	116.5	1.4	2.6	2.6	2.4
Via Nova Investment Mgt.	4.8	8.0	4.8	4.9	4.7	4.8	4.9	4.4	4.6	4.6	4.6	5.7	6.2	4.3	7.2 H	112.0 L	2.5	2.1	2.0	2.1
PNC Financial Services Corp.	4.7	7.8	4.7	na	4.4	4.4	4.4	4.3	4.2	4.2	4.3	na	5.9	4.4	6.5	118.9	1.7	2.1	2.2	1.9
Chan Economics	4.6	7.6	4.5	4.5	4.8	4.9	4.7	4.1	3.7	3.8	3.9 L	4.9	5.9	4.4	6.6	115.8	1.0 L	2.1	2.3	2.0
Economist Intelligence Unit	4.6	7.8	na	na	na	na	na	na	na	3.9	na	na	na	na	na	na	1.4	na	2.4	na
Goldman Sachs & Co.	4.6	na	na	na	4.6	na	na	3.6	3.7	4.2	4.2	na	na	na	na	na	2.0	2.6	2.8	2.5
Moody's Analytics	4.6	7.8	4.6	4.6	4.4	4.4	4.4	4.3	4.2	4.2	4.6	5.7	6.5	4.2	6.6	na	1.7	2.3	2.4	2.3
NatWest Markets	4.6	7.8	na	4.7	4.8	4.9	5.0 H	4.1	4.0	4.2	4.5	4.8	5.7	4.1	6.7	na	1.5	2.2	2.9 H	2.5
Nomura Securities, Inc.	4.6	7.8	na	na	na	na	na	4.1	4.2	4.3	na	na	na	na	na	na	2.2	1.9	2.5	2.3
Santander Capital Markets	4.6	7.8	4.6	4.6	4.2	4.1	4.0	4.1	4.0	3.9	4.1	4.8	5.7	3.3 L	6.2	116.0	1.3	2.8 H	2.7	2.5
Wells Fargo	4.6	7.8	4.7	4.6	4.6	4.5	4.2	3.9	3.8	3.9	4.2	5.1	6.1	4.5	6.3	na	1.8	2.3	2.6	2.3
EY-Parthenon	4.5	na	na	na	4.4	na	na	na	na	3.9	na	na	na	na	na	na	1.8	2.0	2.3	1.9
GLC Financial Economics	4.5	7.6	4.5	4.4	4.3	4.3	4.4	4.2	3.9	4.0	4.2	4.9	5.9	4.2	6.4	115.2	2.6	2.4	2.3	2.2
Scotiabank Group	4.5	na	4.3	na	4.1	na	na	3.8	4.2	4.2	4.3	na	na	na	na	na	1.5	1.5 L	2.7	2.5
Naroff Economics LLC	4.3	7.3	4.3	4.5	4.3	4.3	4.3	4.3	3.9	4.0	4.1	4.9	5.4 L	4.0	6.2	114.5	3.0 H	2.5	2.7	2.7 H
The Lonski Group	4.3	7.4	4.3	4.5	4.3	4.2	4.1	4.1	4.0	3.9	4.0	5.0	5.8	3.9	6.4	119.4	1.5	2.2	1.4	1.9
TS Lombard	4.3	7.4	4.3	4.3	4.2	4.3	4.5	4.8 H	4.8 H	4.9 H	5.0 H	5.8 H	6.6 H	4.9 H	6.7	120.0 H	2.0	2.5	2.5	2.5
ING	4.1	na	na	na	na	na	na	3.9	4.0	4.0	4.3	na	na	na	na	na	1.3	na	na	na
MacroFin Analytics & Rutgers Bus School	4.1	7.3	4.1 L	4.2 L	4.1	4.4	4.6	4.1	4.3	4.4	4.5	5.2	5.7	3.9	6.5	116.2	2.0	2.0	2.2	1.9
Georgia State University	3.9 L	6.8 L	na	na	3.6 L	3.3 L	3.2 L	3.4 L	3.6	3.6 L	3.9 L	4.5	5.6	na	6.2	na	1.0 L	2.6	1.5	1.9
June Consensus	**4.7**	**7.8**	**4.7**	**4.7**	**4.6**	**4.6**	**4.4**	**4.1**	**4.1**	**4.2**	**4.4**	**5.1**	**5.9**	**4.2**	**6.5**	**116.5**	**1.8**	**2.3**	**2.4**	**2.3**
Top 10 Avg.	5.0	8.1	5.0	4.9	4.9	4.9	4.8	4.5	4.4	4.5	4.7	5.5	6.2	4.5	6.8	117.6	2.5	2.6	2.8	2.6
Bottom 10 Avg.	4.3	7.5	4.4	4.5	4.2	4.2	4.1	3.8	3.7	3.9	4.1	4.7	5.7	3.9	6.3	115.4	1.3	2.0	1.9	1.9
Standard Deviation	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3	1.8	0.5	0.3	0.4	0.3
May Consensus	4.6	7.8	4.6	4.6	4.5	4.5	4.4	4.1	4.0	4.1	4.3	5.0	5.9	4.2	6.5	115.8	1.8	2.3	2.4	2.3
Number of Forecasts Changed From A Month Ago:																				
Down	2	3	1	1	2	2	2	4	3	3	3	3	8	7	4	5	7	5	8	9
Same	26	18	18	10	19	14	15	23	23	22	21	13	8	8	13	6	22	21	16	17
Up	11	10	8	10	11	12	11	9	10	13	11	8	7	4	11	7	10	9	12	9
Diffusion Index	62%	61%	63%	71%	64%	68%	66%	57%	60%	63%	61%	60%	48%	42%	63%	56%	54%	56%	56%	50%

Second Quarter 2025

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Adv Fgn Econ $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
	Percent Per Annum -- Average For Quarter															Avg. For ---Qtr.---	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term									
Societe Generale	5.0 H	8.2 H	5.0	na	4.9 H	4.8	4.5	4.1	3.8	4.4	4.7	na	na	na	na	na	2.0	2.3	2.9	2.8
Chmura Economics & Analytics	4.8	7.9	4.8	4.9 H	4.8	4.9 H	4.8 H	4.7	4.4	4.4	4.5	5.2	na	na	6.6	na	3.4 H	2.6	2.7	2.4
Fannie Mae	4.8	7.9	na	na	4.7	4.7	4.6	4.4	4.4	4.4	4.5	na	na	na	6.5	na	1.9	2.3	2.7	2.4
S&P Global Market Intelligence	4.8	8.0	4.8	na	4.5	4.1	4.0	3.7	3.5	3.7	4.0	na	na	na	5.8	na	1.5	2.4	2.0	2.3
DePrince & Assoc.	4.7	7.9	4.7	4.7	4.7	4.8	4.6	4.5	4.5	4.5	4.6	5.7	6.5	4.8	6.6	115.9	2.0	2.5	2.6	2.4
KPMG	4.7	7.8	4.7	4.3	4.4	4.1	3.8	3.4	3.2 L	3.5	3.8	4.3	5.5	na	5.6 L	na	1.6	2.4	2.3	2.2
Bank of America	4.6	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.0	2.4	2.3	2.1
Barclays	4.6	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5	2.6	2.6	2.4
Economist Intelligence Unit	4.6	7.8	na	na	na	na	na	na	na	3.8	na	na	na	na	na	na	1.6	na	2.2	na
MacroPolicy Perspectives	4.6	7.8	4.6	4.6	4.5	4.4	4.0	3.2	3.5	4.1	4.6	5.0	5.9	na	6.1	na	2.2	2.0	na	na
Oxford Economics	4.6	7.7	4.6	na	4.5	4.5	4.2	3.9	3.7	3.9	4.0	4.1 L	na	na	6.5	116.1	1.9	2.2	2.3	2.3
Roberts Capital Advisors	4.6	7.7	4.6	4.7	4.6	4.5	4.3	4.2	4.0	4.2	4.5	4.9	5.8	4.3	6.4	115.0	2.0	2.5	2.7	2.3
Action Economics	4.5	7.7	5.1 H	4.5	4.5	4.3	4.1	4.1	4.0	4.1	4.2	4.7	5.6	3.8	7.1 H	118.3	1.9	2.4	2.9	2.1
BMO Capital Markets	4.5	7.7	4.5	4.5	4.6	4.6	4.4	4.1	4.1	4.0	4.1	4.9	5.8	4.2	6.6	116.8	1.9	2.0	2.2	2.0
Comerica Bank	4.5	7.7	4.6	na	4.4	4.3	4.1	3.9	4.1	4.3	4.6	5.5	6.3	na	6.6	na	1.8	2.1	2.0	2.1
Daiwa Capital Markets America	4.5	7.6	4.5	na	4.5	na	na	4.1	4.0	4.2	4.4	na	na	na	6.5	116.0	1.6	2.3	2.2	2.1
J.P. Morgan Chase	4.5	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.3	2.3	2.0	1.7 L
Loomis, Sayles & Company	4.5	7.7	4.5	4.4	4.5	4.5	4.2	3.5	3.5	3.8	3.9	4.5	5.3 L	3.6	6.0	116.5	1.6	2.3	2.5	2.1
PNC Financial Services Corp.	4.5	7.6	4.4	na	4.2	4.1	4.2	4.1	4.1	4.1	4.2	na	5.9	4.5	6.3	118.9	2.1	2.0	2.2	1.8
Regions Financial Corporation	4.5	7.7	4.6	4.6	4.6	4.6	4.6	3.9	4.0	4.3	4.5	5.2	6.0	4.4	6.4	115.8	2.3	2.3	2.6	2.4
Swiss Re	4.5	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.8	na	na	na
The Northern Trust Company	4.5	7.7	4.5	4.6	4.4	4.2	4.0	3.8	3.9	4.0	4.3	5.3	6.2	4.3	6.3	115.0	1.5	2.4	2.5	2.3
Via Nova Investment Mgt.	4.5	7.8	4.5	4.6	4.4	4.5	4.6	4.3	4.5	4.5	4.6	5.6	6.1	4.2	7.1 H	112.0 L	2.5	2.0	2.0	2.1
Chan Economics	4.4	7.4	4.3	4.3	4.6	4.7	4.5	3.9	3.5	3.6	3.7 L	4.7	5.7	4.2	6.4	115.5	0.8 L	2.1	2.3	2.0
Goldman Sachs & Co.	4.4	na	na	na	4.3	na	na	3.6	3.7	4.2	4.2	na	na	na	na	na	2.1	2.1	2.6	2.1
Moody's Analytics	4.4	7.6	4.3	4.3	4.2	4.2	4.2	4.1	4.1	4.1	4.6	5.6	6.5	4.1	6.5	na	1.7	2.3	2.5	2.4
Nomura Securities, Inc.	4.4	7.5	na	na	na	na	na	3.9	4.1	4.3	na	na	na	na	na	na	2.4	1.5	2.3	2.0
Wells Fargo	4.4	7.5	4.4	4.4	4.4	4.2	4.0	3.7	3.7	3.9	4.1	5.1	6.1	4.5	6.2	na	2.0	2.1	2.2	2.1
GLC Financial Economics	4.2	7.3	4.1	4.1	4.1	4.1	4.1	4.0	3.8	3.9	4.2	4.9	5.9	4.2	6.2	114.6	1.6	3.8 H	2.4	2.6
NatWest Markets	4.1	7.3	na	4.2	4.3	4.4	4.5	3.8	3.8	4.0	4.4	4.8	5.7	4.5	6.3	na	2.0	1.5	1.4 L	1.9
Santander Capital Markets	4.1	7.3	4.1	4.1	3.7	3.6	3.5	3.9	3.8	3.7	3.8	4.6	5.5	3.1 L	6.0	115.0	1.5	2.5	2.4	2.1
EY-Parthenon	4.0	na	na	na	3.9	na	na	na	na	3.8	na	na	na	na	na	na	1.8	2.2	2.1	2.0
Scotiabank Group	4.0	na	3.8	na	3.7	na	na	3.6	4.1	4.1	4.3	na	na	na	na	na	1.4	0.7 L	2.4	2.2
TS Lombard	4.0	7.1	4.0	4.0	3.9	4.0	4.4	4.8 H	4.9 H	5.0 H	5.1 H	5.9 H	6.7 H	5.0 H	6.8	120.0 H	3.0	3.0	3.0 H	3.0 H
ING	3.9	na	na	na	na	na	na	3.9	4.1	4.3	4.6	na	na	na	na	na	1.8	na	na	na
Naroff Economics LLC	3.8	6.8	3.9	4.0	3.9	3.9	4.0	4.1	4.0	4.1	4.2	5.0	5.5	4.0	6.0	114.3	3.2	2.4	2.5	2.4
The Lonski Group	3.8	6.9	3.7	3.9	3.8	3.7	3.7	3.7	3.7	3.8	4.0	4.9	5.7	3.9	6.1	119.8	1.8	2.1	1.9	2.3
Georgia State University	3.6 L	6.7 L	na	na	3.1 L	3.0 L	3.0 L	3.0 L	3.3	3.4 L	3.8	4.5	5.5	na	5.9	na	1.3	2.6	2.2	2.3
MacroFin Analytics & Rutgers Bus School	3.6 L	6.8	3.6 L	3.7 L	3.7	3.9	4.3	3.9	4.1	4.2	4.4	5.1	5.7	3.8	6.4	116.4	2.0	2.0	2.1	2.0
June Consensus	**4.4**	**7.6**	**4.4**	**4.4**	**4.3**	**4.3**	**4.2**	**3.9**	**3.9**	**4.1**	**4.3**	**5.0**	**5.9**	**4.2**	**6.4**	**116.2**	**1.9**	**2.3**	**2.4**	**2.2**
Top 10 Avg.	4.7	7.9	4.8	4.6	4.7	4.7	4.6	4.3	4.3	4.4	4.6	5.4	6.2	4.5	6.7	117.5	2.6	2.7	2.7	2.5
Bottom 10 Avg.	3.9	7.1	4.0	4.1	3.8	3.9	3.8	3.5	3.5	3.7	3.9	4.6	5.6	3.9	6.0	114.9	1.4	1.8	2.0	2.0
Standard Deviation	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.5	0.4	0.4	0.3	2.0	0.5	0.5	0.3	0.3
May Consensus	4.3	7.4	4.3	4.2	4.2	4.2	4.1	3.9	3.9	4.0	4.2	5.0	5.9	4.2	6.3	115.0	1.9	2.2	2.4	2.2
Number of Forecasts Changed From A Month Ago:																				
Down	1	1	0	0	0	2	3	5	6	3	3	3	8	5	2	4	9	3	11	7
Same	24	20	18	11	21	16	15	19	18	23	20	16	10	12	17	7	23	23	16	16
Up	14	10	9	10	11	10	10	9	9	9	9	5	5	2	9	7	7	9	9	12
Diffusion Index	67%	65%	67%	74%	67%	64%	63%	56%	55%	59%	59%	54%	43%	42%	63%	58%	47%	59%	47%	57%

Third Quarter 2025

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 SOFR Rate	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Fannie Mae	4.8 H	7.9	na	na	4.6	4.6 H	4.6 H	4.4	4.3	4.4	4.5	na	na	na	6.4	na	2.1	2.4	2.7	2.3
Societe Generale	4.8 H	8.0 H	4.8 H	na	4.7 H	4.5	4.3	3.9	3.7	4.3	4.6	na	na	na	na	na	2.4	2.2	2.9	2.6
Chmura Economics & Analytics	4.5	7.6	4.4	4.5 H	4.5	4.5	4.5	4.5	4.3	4.4	4.4	5.1	na	na	6.5	na	2.9	2.5	2.7	2.3
DePrince & Assoc.	4.5	7.7	4.5	4.5 H	4.5	4.6 H	4.4	4.4	4.4	4.5	4.6	5.7	6.5	4.8	6.5	115.9	2.2	2.4	2.5	2.3
Bank of America	4.4	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5 L	2.3	1.7	2.0
Barclays	4.4	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5 L	2.4	2.2	2.1
BMO Capital Markets	4.4	7.5	4.3	4.3	4.4	4.4	4.2	4.0	4.0	4.0	4.1	5.0	5.8	4.2	6.6	116.6	2.0	2.0	2.2	2.0
Economist Intelligence Unit	4.4	7.5	na	na	na	na	na	na	na	3.6	na	na	na	na	na	na	2.0	na	2.3	na
KPMG	4.4	7.5	4.3	4.0	4.1	3.9	3.6	3.3	3.1 L	3.4	3.7	4.1	5.4	na	5.4 L	na	2.4	2.5	3.1	2.5
Roberts Capital Advisors	4.4	7.5	4.4	4.5 H	4.4	4.3	4.1	4.0	4.0	4.1	4.4	4.9	5.8	4.3	6.4	115.0	2.0	2.4	2.6	2.3
S&P Global Market Intelligence	4.4	7.6	4.4	na	4.1	3.8	3.7	3.4	3.3	3.6	3.9	na	na	na	5.6	na	1.6	2.5	2.9	2.2
Action Economics	4.3	7.4	4.8 H	4.3	4.2	4.1	3.8	3.9	3.9	4.0	4.1	4.7	5.5	3.7	7.0	118.5	na	na	na	na
Comerica Bank	4.3	7.5	4.3	na	4.2	4.1	3.7	3.5	3.7	4.0	4.4	5.2	6.0	na	6.2	na	1.7	2.0	2.1	2.1
Daiwa Capital Markets America	4.3	7.4	4.3	na	4.2	na	na	3.9	3.9	4.1	4.3	na	na	na	6.3	116.0	1.9	2.2	2.2	2.1
J.P. Morgan Chase	4.3	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.8	2.2	2.3	2.0
MacroPolicy Perspectives	4.3	7.5	4.3	4.3	4.2	4.1	3.7	2.9 L	3.5	4.1	4.6	5.0	5.9	na	6.0	na	2.2	2.0	na	na
Oxford Economics	4.3	7.5	4.4	na	4.3	4.2	4.0	3.7	3.5	3.8	3.9	4.0 L	na	na	6.3	115.5	1.9	1.9	2.3	2.0
Regions Financial Corporation	4.3	7.5	4.3	4.4	4.4	4.5	4.4	3.8	3.8	4.3	4.5	5.1	5.9	4.4	6.3	115.6	2.4	2.2	2.5	2.4
Swiss Re	4.3	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.9	na	na	na
Via Nova Investment Mgt.	4.3	7.5	4.3	4.4	4.2	4.3	4.4	4.4	4.6	4.6	4.7	5.7	6.2	4.3	7.2	112.0 L	2.5	2.0	2.0	2.0
Loomis, Sayles & Company	4.2	7.4	4.2	4.1	4.2	4.2	4.0	3.5	3.3	3.8	3.9	4.5	5.3 L	3.6	5.9	116.5	1.8	2.3	2.5	2.1
PNC Financial Services Corp.	4.2	7.3	4.2	na	4.0	4.0	4.0	4.0	4.0	4.1	4.2	na	5.9	4.6	6.1	118.8	2.2	2.0	2.2	1.8
Chan Economics	4.1	7.1	4.0	4.0	4.3	4.4	4.2	3.6	3.2	3.3 L	3.4 L	4.4	5.4	3.9	6.1	115.0	1.5 L	2.0	2.2	1.9
Goldman Sachs & Co.	4.1	na	na	na	4.0	na	na	3.6	3.7	4.1	4.2	na	na	na	na	na	2.0	1.8	2.5	1.9
Moody's Analytics	4.1	7.3	4.1	4.1	3.9	3.9	4.0	4.0	4.0	4.1	4.6	5.6	6.5	4.1	6.4	na	1.7	2.3	2.3	2.2
Nomura Securities, Inc.	4.1	7.3	na	na	na	na	na	3.8	4.0	4.2	na	na	na	na	na	na	2.3	1.6	2.6	2.2
The Northern Trust Company	4.1	7.3	4.1	4.2	3.9	3.8	3.8	3.7	3.9	4.0	4.3	5.3	6.2	4.4	6.3	114.0	1.5 L	2.3	2.4	2.2
Wells Fargo	4.1	7.3	4.2	4.1	4.1	4.0	3.7	3.6	3.7	3.8	4.1	5.0	6.0	4.4	6.0	na	2.4	2.0	2.2	2.0
TS Lombard	4.0	7.1	4.0	4.0	3.9	4.0	4.4	4.8 H	5.4 H	5.5 H	5.6 H	6.4 H	7.2 H	5.5 H	7.3 H	120.0 H	3.0 H	3.5 H	3.5 H	3.5 H
GLC Financial Economics	3.9	7.2	3.9	3.9	3.8	3.9	3.8	3.7	3.7	3.8	4.1	4.8	5.8	4.0	6.1	114.5	2.3	2.2	2.4	2.6
ING	3.9	na	na	na	na	na	na	3.9	4.2	4.5	4.8	na	na	na	na	na	2.2	na	na	na
EY-Parthenon	3.7	na	na	na	3.7	na	na	na	na	3.7	na	na	na	na	na	na	1.8	2.3	2.2	2.1
Georgia State University	3.6	6.7	na	na	2.9 L	2.9 L	2.8 L	3.0	3.1 L	3.4	3.7	4.6	5.6	na	5.8	na	1.6	2.6	2.7	2.6
NatWest Markets	3.6	6.8	na	3.7	3.8	3.9	4.0	3.5	3.7	3.9	4.3	4.8	5.7	4.5	6.3	na	2.0	1.5 L	1.5 L	1.9
Santander Capital Markets	3.6	6.8	3.6	3.6	3.3	3.2	3.2	3.6	3.6	3.6	3.7	4.6	5.5	3.0 L	5.8	114.0	1.8	2.4	2.5	2.1
The Lonski Group	3.6	6.7	3.5	3.6	3.7	3.7	3.6	3.5	3.6	3.7	3.8	4.7	5.5	3.7	5.8	119.0	2.0	2.0	2.1	1.7 L
Scotiabank Group	3.5	na	3.3	na	3.4	na	na	3.6	4.0	4.1	4.2	na	na	na	na	na	1.8	3.4	2.2	2.0
MacroFin Analytics & Rutgers Bus School	3.1 L	6.3	3.1 L	3.2 L	3.3	3.4	4.1	3.7	4.0	4.1	4.3	5.1	5.6	3.8	6.5	116.0	1.8	2.0	2.0	2.0
Naroff Economics LLC	3.1 L	6.1 L	3.2	3.3	3.2	3.3	3.5	3.7	4.0	4.2	4.3	5.2	5.7	4.1	6.1	114.8	2.4	2.3	2.3	2.3
June Consensus	**4.1**	**7.3**	**4.1**	**4.0**	**4.0**	**4.0**	**3.9**	**3.8**	**3.9**	**4.0**	**4.3**	**5.0**	**5.9**	**4.2**	**6.3**	**116.0**	**2.0**	**2.2**	**2.4**	**2.2**
Top 10 Avg.	4.5	7.6	4.5	4.4	4.4	4.4	4.4	4.2	4.3	4.5	4.7	5.4	6.2	4.5	6.7	117.3	2.5	2.7	2.8	2.5
Bottom 10 Avg.	3.6	6.8	3.7	3.7	3.5	3.6	3.5	3.4	3.4	3.6	3.8	4.5	5.5	3.8	5.9	114.6	1.6	1.9	2.0	1.9
Standard Deviation	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.5	0.4	2.0	0.4	0.4	0.4	0.3
May Consensus	4.0	7.1	4.0	3.9	3.9	3.9	3.8	3.7	3.8	3.9	4.2	4.9	5.8	4.1	6.2	114.8	2.0	2.2	2.4	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	1	1	0	0	2	2	3	3	5	4	5	4	7	3	3	4	9	6	7	6
Same	26	20	20	12	20	16	16	21	21	22	17	15	11	14	16	7	21	17	21	17
Up	12	10	7	9	10	10	9	9	7	9	10	5	5	2	9	7	8	11	7	11
Diffusion Index	64%	65%	63%	71%	63%	64%	61%	59%	53%	57%	58%	52%	46%	47%	61%	58%	49%	57%	50%	57%

International Interest Rate And Foreign Exchange Rate Forecasts

United States

Blue Chip Forecasters	Fed Fund Target Rate			10 Yr. Gov't Bond Yield %			Fed's AFE $ Index		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	5.38	5.13	4.88	--	--	--	--	--	--
BMO Capital Markets	5.38	5.13	4.63	4.35	4.14	3.98	117.5	117.3	116.8
ING Financial Markets	5.38	5.13	4.13	4.50	4.00	4.00	116.1	113.8	113.7
Moody's Analytics	5.37	5.17	4.67	4.40	4.28	4.17	--	--	--
Northern Trust	5.38	4.88	4.38	4.10	4.10	4.00	117.2	118.0	115.0
Oxford Economics	5.35	5.04	4.58	4.23	4.15	3.94	118.1	117.6	116.1
Economist Intelligence Unit	5.13	4.88	4.63	4.40	4.10	3.80	--	--	--
Scotiabank	5.13	4.88	3.88	4.40	4.30	4.10	--	--	--
TS Lombard	5.00	4.75	4.00	4.25	4.50	5.00	130.0	120.0	120.0
Wells Fargo	5.38	5.13	4.63	4.80	4.20	3.90	--	--	--
June Consensus	**5.29**	**5.01**	**4.44**	**4.38**	**4.20**	**4.10**	**119.8**	**117.3**	**116.3**
High	5.38	5.17	4.88	4.80	4.50	5.00	130.0	120.0	120.0
Low	5.00	4.75	3.88	4.10	4.00	3.80	116.1	113.8	113.7
Last Months Avg.	5.34	5.09	4.36	4.39	4.25	3.83	119.3	118.5	111.8

Japan

Blue Chip Forecasters	Policy-Rate Balance Rate			10 Yr. Gov't Bond Yield %			Yen per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.25	0.25	0.25	1.00	1.05	1.05	--	--	--
BMO Capital Markets	0.09	0.13	0.15	0.90	0.96	0.96	153.0	151.0	148.0
ING Financial Markets	0.10	0.25	0.75	1.00	1.25	1.50	150.0	145.0	140.0
Moody's Analytics	0.05	0.08	0.50	0.88	0.89	1.03	151.0	148.0	138.1
Nomura Securities	--	--	--	--	--	--	145.0	143.0	--
Northern Trust	0.00	0.10	0.25	1.00	1.10	1.20	155.0	153.0	145.0
Oxford Economics	0.25	0.25	0.50	0.91	0.97	1.06	155.0	152.4	147.4
S&P Global Market Intelligence	--	--	--	--	--	--	154.9	152.3	138.5
Economist Intelligence Unit	0.14	0.19	0.29	1.10	1.10	1.30	143.1	136.0	128.1
Scotiabank	--	--	--	--	--	--	150.0	150.0	145.0
TS Lombard	0.00	0.10	0.10	1.00	1.10	0.75	160.0	165.0	165.0
Wells Fargo	0.10	0.10	0.20	1.05	1.05	1.05	--	--	--
June Consensus	**0.11**	**0.16**	**0.33**	**0.98**	**1.05**	**1.10**	**151.7**	**149.6**	**143.9**
High	0.25	0.25	0.75	1.10	1.25	1.50	160.0	165.0	165.0
Low	0.00	0.08	0.10	0.88	0.89	0.75	143.1	136.0	128.1
Last Months Avg.	0.04	0.11	0.22	0.89	0.97	1.06	149.3	146.3	136.7

United Kingdom

Blue Chip Forecasters	Official Bank Rate			10 Yr. Gilt Yields %			US$ per Pound Sterling		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	4.50	4.25	4.00	3.90	3.90	3.90	--	--	--
BMO Capital Markets	4.75	4.75	4.25	4.03	3.86	3.67	1.27	1.28	1.29
ING Financial Markets	5.00	4.75	4.00	4.00	3.75	3.50	1.26	1.25	1.25
Moody's Analytics	5.25	5.06	4.07	4.05	3.86	3.87	1.23	1.23	1.25
Nomura Securities	--	--	--	--	--	--	1.26	1.26	--
Northern Trust	5.25	4.75	4.00	4.25	4.00	3.80	1.25	1.24	1.29
Oxford Economics	4.84	4.60	4.08	4.05	3.96	3.79	1.25	1.26	1.26
S&P Global Market Intelligence	--	--	--	--	--	--	1.25	1.25	1.26
Economist Intelligence Unit	4.75	4.50	4.50	3.60	3.60	3.60	1.25	1.24	1.25
Scotiabank	4.50	4.00	3.50	--	--	--	1.25	1.27	1.29
TS Lombard	5.25	5.00	4.75	4.20	4.45	4.95	1.27	1.20	1.15
Wells Fargo	5.00	4.75	4.00	4.20	4.05	3.70	--	--	--
June Consensus	**4.91**	**4.64**	**4.12**	**4.03**	**3.94**	**3.86**	**1.25**	**1.25**	**1.25**
High	5.25	5.06	4.75	4.25	4.45	4.95	1.27	1.28	1.29
Low	4.50	4.00	3.50	3.60	3.60	3.50	1.23	1.20	1.15
Last Months Avg.	5.03	4.69	4.14	4.01	3.93	3.67	1.26	1.26	1.26

Switzerland

Blue Chip Forecasters	SNB Policy Rate			10 Yr. Gov't Bond Yield %			CHF per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	1.00	0.75	0.50	--	--	--	--	--	--
BMO Capital Markets	1.50	1.50	1.50	--	--	--	0.89	0.88	0.86
ING Financial Markets	1.00	1.00	1.00	0.80	0.70	1.00	0.90	0.86	0.91
Moody's Analytics	1.25	1.00	1.00	0.76	0.88	0.98	0.87	0.88	0.87
Nomura Securities	--	--	--	--	--	--	0.93	0.94	--
Northern Trust	1.25	1.00	1.00	0.75	0.70	0.70	0.93	0.92	0.88
Oxford Economics	1.38	1.13	0.75	0.83	0.95	1.08	0.91	0.90	0.90
S&P Global Market Intelligence	--	--	--	--	--	--	0.93	0.94	0.93
Economist Intelligence Unit	1.00	1.00	0.75	0.70	0.60	0.60	0.91	1.06	0.89
Scotiabank	--	--	--	--	--	--	0.92	0.90	0.91
TS Lombard	1.40	1.40	1.00	0.70	0.95	0.50	0.90	0.90	0.90
Wells Fargo	1.25	1.00	1.00	--	--	--	--	--	--
June Consensus	**1.23**	**1.09**	**0.94**	**0.76**	**0.80**	**0.81**	**0.91**	**0.92**	**0.89**
High	1.50	1.50	1.50	0.83	0.95	1.08	0.93	1.06	0.93
Low	1.00	0.75	0.50	0.70	0.60	0.50	0.87	0.86	0.86
Last Months Avg.	1.25	1.10	0.94	0.77	0.84	0.77	0.91	0.91	0.89

Canada

Blue Chip Forecasters	O/N MMkt Financing Rate			10 Yr. Gov't Bond Yield %			C$ per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	4.50	4.25	4.00	--	--	--	--	--	--
BMO Capital Markets	4.75	4.50	4.00	3.55	3.37	3.23	1.35	1.34	1.32
ING Financial Markets	4.75	4.50	3.50	3.70	3.40	3.50	1.34	1.34	1.32
Moody's Analytics	4.93	4.68	4.19	3.89	3.98	4.00	1.33	1.31	1.29
Nomura Securities	--	--	--	--	--	--	1.37	1.37	--
Northern Trust	4.75	4.25	3.50	3.60	3.35	3.10	1.37	1.38	1.33
Oxford Economics	4.63	4.38	3.88	3.69	3.65	3.57	1.39	1.38	1.36
S&P Global Market Intelligence	--	--	--	--	--	--	1.30	1.31	1.34
Economist Intelligence Unit	4.75	4.50	4.00	3.30	3.10	2.70	1.31	1.31	1.29
Scotiabank	4.75	4.25	3.50	3.60	3.60	3.60	1.36	1.33	1.32
TS Lombard	5.00	4.75	3.00	3.60	3.85	4.35	1.35	1.35	1.35
Wells Fargo	4.75	4.25	3.75	3.60	3.50	3.40	--	--	--
June Consensus	**4.76**	**4.43**	**3.73**	**3.61**	**3.53**	**3.49**	**1.35**	**1.34**	**1.32**
High	5.00	4.75	4.19	3.89	3.98	4.35	1.39	1.38	1.36
Low	4.50	4.25	3.00	3.30	3.10	2.70	1.30	1.31	1.29
Last Months Avg.	4.76	4.43	3.68	3.65	3.57	3.30	1.35	1.34	1.33

International Interest Rate And Foreign Exchange Rate Forecasts

Australia

Blue Chip Forecasters	Official Cash Rate			10 Yr. Gov't Bond Yield %			US$ per A$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	3.85	3.60	3.35	--	--	--	--	--	--
BMO Capital Markets	4.35	4.10	3.85	--	--	--	0.66	0.66	0.67
ING Financial Markets	4.35	4.10	3.85	4.30	4.10	4.00	0.67	0.66	0.66
Moody's Analytics	4.35	4.35	4.02	4.30	4.16	4.08	0.64	0.66	0.70
Nomura Securities	--	--	--	--	--	--	0.66	0.68	--
Northern Trust	4.35	3.85	3.35	4.30	4.05	3.80	0.65	0.65	0.67
Oxford Economics	4.35	4.23	3.73	4.23	4.15	3.83	0.65	0.66	0.67
S&P Global Market Intelligence	--	--	--	--	--	--	0.67	0.68	0.69
Economist Intelligence Unit	4.35	4.10	3.60	--	--	--	0.66	0.66	0.66
Scotiabank	--	--	--	--	--	--	0.68	0.68	0.70
TS Lombard	4.35	4.10	2.60	4.25	4.30	4.80	0.65	0.65	0.65
Wells Fargo	4.35	4.35	3.85	--	--	--	--	--	--
June Consensus	**4.29**	**4.09**	**3.58**	**4.28**	**4.15**	**4.10**	**0.66**	**0.66**	**0.67**
High	4.35	4.35	4.02	4.30	4.30	4.80	0.68	0.68	0.70
Low	3.85	3.60	2.60	4.23	4.05	3.80	0.64	0.65	0.65
Last Months Avg.	4.29	4.08	3.42	4.07	4.08	3.71	0.66	0.66	0.68

Euro area

Blue Chip Forecasters	Main Refinancing Rate			US$ per Euro		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	3.40	3.15	2.90	--	--	--
BMO Capital Markets	4.25	4.00	3.50	1.08	1.09	1.10
ING Financial Markets	4.00	3.75	3.25	1.10	1.10	1.10
Moody's Analytics	4.45	3.99	2.86	1.07	1.06	1.07
Nomura Securities	--	--	--	1.07	1.07	--
Northern Trust	4.25	3.15	2.40	1.06	1.05	1.09
Oxford Economics	4.13	3.39	2.36	1.07	1.07	1.08
S&P Global Market Intelligence	--	--	--	1.06	1.06	1.09
Economist Intelligence Unit	3.75	3.50	3.00	1.10	1.11	1.13
Scotiabank	3.40	3.15	2.65	1.07	1.09	1.11
TS Lombard	3.75	3.50	3.50	1.10	1.05	1.00
Wells Fargo	3.75	3.50	2.75	--	--	--
June Consensus	**3.91**	**3.51**	**2.92**	**1.08**	**1.08**	**1.09**
High	4.45	4.00	3.50	1.10	1.11	1.13
Low	3.40	3.15	2.36	1.06	1.05	1.00
Last Months Avg.	3.97	3.61	2.84	1.08	1.08	1.10

Blue Chip Forecasters	10 Yr. Gov't Bond Yields %											
	Germany			France			Italy			Spain		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	1.95	1.75	1.75	--	--	--	--	--	--	--	--	--
BMO Capital Markets	2.41	2.32	2.24	--	--	--	--	--	--	--	--	--
ING Financial Markets	2.30	2.30	2.30	2.85	2.85	2.85	3.90	3.95	3.95	3.25	3.25	3.25
Moody's Analytics	2.48	2.47	2.46	3.00	2.98	2.90	3.94	3.91	3.90	3.30	3.34	3.39
Northern Trust	2.45	2.35	2.15	3.00	2.90	2.70	3.80	3.70	3.50	3.30	3.20	3.00
Oxford Economics	2.43	2.32	2.20	2.91	2.78	2.61	3.78	3.77	3.87	3.24	3.20	3.22
Economist Intelligence Unit	2.50	2.50	2.40	2.90	2.80	2.80	3.80	3.80	3.70	3.00	3.00	2.90
TS Lombard	2.50	2.75	3.25	2.85	3.10	3.60	3.80	4.05	4.55	3.25	3.50	4.00
Wells Fargo	2.55	2.40	2.30	--	--	--	--	--	--	--	--	--
June Consensus	**2.40**	**2.35**	**2.34**	**2.92**	**2.90**	**2.91**	**3.84**	**3.86**	**3.91**	**3.22**	**3.25**	**3.29**
High	2.55	2.75	3.25	3.00	3.10	3.60	3.94	4.05	4.55	3.30	3.50	4.00
Low	1.95	1.75	1.75	2.85	2.78	2.61	3.78	3.70	3.50	3.00	3.00	2.90
Last Months Avg.	2.37	2.35	2.19	2.94	2.94	2.62	3.83	3.88	3.63	3.25	3.29	3.02

	Consensus Forecasts 10-year Bond Yields vs U.S. Yield			
	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-3.44	-3.40	-3.14	-3.00
United Kingdom	-0.19	-0.35	-0.26	-0.23
Switzerland	-3.70	-3.62	-3.40	-3.29
Canada	-0.85	-0.77	-0.66	-0.60
Australia	-0.18	-0.11	-0.04	0.00
Germany	-1.88	-1.98	-1.85	-1.76
France	-1.40	-1.46	-1.30	-1.19
Italy	-0.57	-0.54	-0.33	-0.19
Spain	-1.13	-1.16	-0.95	-0.81

	Consensus Forecasts Policy Rates vs U.S. Target Rate			
	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-5.33	-5.18	-5.17	-4.11
United Kingdom	-0.13	-0.38	-0.37	-0.33
Switzerland	-3.88	-4.06	-3.93	-3.50
Canada	-0.38	-0.53	-0.58	-0.71
Australia	-1.03	-0.99	-0.93	-0.86
Euro area	-0.88	-1.38	-1.50	-1.52

Special Questions:

1. What is your estimate of the long-term neutral fed funds rate?

Consensus	2.89%
Top 10	3.34%
Bot 10	2.47%
Median	2.80%

2. Changes in monetary policy affect the economy with a lag, possibly long. Is there further meaningful restraint from earlier tightening that the US economy has yet to feel? Yes 73% No 27%

3. a. What is your estimate of the "breakeven monthly job growth," that is, the increase in nonfarm payroll jobs needed each month to leave the unemployment rate unchanged?

Consensus	160 thous
Top 10	196 thous
Bot 10	120 thous
Median	175 thous

b. Has this increased with the marked increase in immigration that has occurred recently? Yes 78% No 22%

4. a. When will the ECB begin cutting its policy rates?

Q2 2024	Q3 2024	Q4 2024	Later
77%	19%	4%	0%

b. When will the BoE begin cutting its Bank rate?

Q2 2024	Q3 2024	Q4 2024	Later
30%	67%	3%	0%

c. When will the Bank of Japan next increase its uncollateralized overnight call rate?

Q2 2024	Q3 2024	Q4 2024	In 2025 or later	Next move more likely to be a cut
4%	54%	33%	8%	0%

Viewpoints:

A Sampling of Views on the Economy, Financial Markets and Government Policy Excerpted from Recent Reports Issued by our Blue Chip Panel Members and Others

US Economic Outlook: Getting Back to Normal

Cooling economy sets the stage for easing policy in 2H24

The US economy's ongoing normalization has progressed further through the second quarter. Amid healthy consumer fundamentals, we have revised up our GDP forecast for 2024 by 30 basis points (bp) to 2.5%, and for 2025 by 20 bp to 2.1%. CPI inflation remains stubborn, prompting a 40 bp upward revision to 3.1% to our headline CPI forecast for 2024, and a 20 bp gain to 2.5% for 2025. Stronger inflation and growth reaffirm our view of a cautious easing cycle from the Fed. Hence, we now expect just two interest rate cuts in 2024 before four further cuts next year. We see a policy rate of 3.875% by year-end 2025. The combination of a higher policy rate and further economic resilience prompts us to lift our 2024 year-end 10-year Treasury yield forecast by 20 bp to 4.4%.

Some turbulence on the disinflation front won't deter policymakers

Stickiness in 1Q24 CPI readings has prompted a 40 bp upward revision to our 2024 CPI forecast to 3.1%. However, after several upside surprises in the first quarter, the April CPI report showed an encouraging softening of both headline and core inflation. Despite stubbornness in most core services, disinflation in shelter continues to progress gradually. Further, we estimate that the surge in motor vehicle insurance inflation may be overestimated in the CPI prints. In our view, a turbulent disinflation process will not deter the FOMC's commitment to easing policy later this year, especially since the Fed's preferred inflation gauge - core PCE inflation – moderated to a more encouraging three-year low of 2.8% in March.

Rules-based monetary policy argues for cuts in the near future

The May FOMC meeting featured dovish commentary from policymakers and their patience to not begin the easing cycle. Chairman Powell reiterated that "greater confidence" was needed to begin rate cuts after inflation showed a "lack of further progress" towards the committee's long-run 2% inflation objective. Our outlook of cooling inflation and more moderate sequential GDP growth in 2H24 aligns well with the Taylor Rule, which prescribes that rate cuts will be appropriate later in 2024. However, recent data and Fed communications prompt us to revise our prior expectation of three rate cuts in 2024 to just two beginning in 3Q24, bringing the year-end policy rate to a range of 4.75-5.0%. We also expect a more resilient growth outlook and sticky inflation backdrop in 2025 to limit policy easing next year, and now expect just 100 bp of rate cuts rather than 150 bp.

We anticipate further cooling in the labor market in 2H24

The April nonfarm payrolls report illustrated a continued healthy rebalancing in labor market conditions. The economy added a moderate 175 000 jobs, bringing down the three-month average of job gains to 242 000 from 269 000 in March. The unemployment rate rose by 0.1 percentage points (ppt) to 3.9%, while a just 0.2% increase in average hourly earnings supported a moderation in annual wage growth to 3.8%, its slowest pace in three years. Additional labor market data corroborates the view of broad-based rebalancing with job openings cooling to 8.5 million, the lowest number since February 2021. The US quits rate also eased further to 2.1%, indicative of lower churn and more employees staying put. That's a positive sign for more modest wage growth in the future. Layoffs also declined in March, to 1.4 million, still well below the pre-pandemic average of 1.8 million. Finally, hiring activity continues to normalize, with March's 5.5 million hires the slowest post COVID-19 pace since January 2018.

Despite shaky confidence, US consumers have kept their wallets open

While the consumer confidence index reading fell from 103.1 in March to 97 in April, broader measures of economic activity point to ongoing divergence in sentiment versus realized spending behavior. The US savings rate declined to 3.2% in March – its lowest level since October 2022 - as real consumer spending growth of 0.8% outstripped a softer 0.2% gain in real income growth. Core retail sales rose a robust 0.95% in March. While gross labor income growth has moderated from double-digits in early 2022, it remains firm at 5.8% in annual terms, pointing to steady income growth and continued consumption momentum. The healthy backdrop for consumers has translated into optimistic earnings expectations, with the S&P 500's 12-month forward earnings-per-share growth at a strong 9.3%, up from 0.9% in April 2023. Despite the optimistic outlook for consumers, however, purchasing manager surveys remain depressed. The ISM manufacturing survey fell back into contraction in April, declining by 2.3 ppt to 49.1. The ISM services index also fell under 50, for the first time since December 2022. We expect survey data from consumers and corporates to remain downbeat in the months ahead amid uncertainty regarding the policy path and a gradually loosening labor market.

Mahir Rasheed, Thomas Holzheu & Jerome Jean Haegeli (Swiss Re Institute)

Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2025 through 2030 and averages for the five-year periods 2026-2030 and 2031-2035. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year						Five-Year Averages	
		2025	2026	2027	2028	2029	2030	2026-2030	2031-2035
1. Federal Funds Rate	**CONSENSUS**	**4.1**	**3.4**	**3.2**	**3.2**	**3.3**	**3.3**	**3.3**	**3.2**
	Top 10 Average	4.5	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	Bottom 10 Average	3.6	3.0	2.7	2.7	2.7	2.7	2.8	2.7
2. Prime Rate	**CONSENSUS**	**7.1**	**6.5**	**6.4**	**6.4**	**6.4**	**6.3**	**6.4**	**6.3**
	Top 10 Average	7.5	6.9	6.9	6.9	6.9	6.9	6.9	6.8
	Bottom 10 Average	6.8	6.1	5.9	5.8	5.8	5.7	5.9	5.7
3. SOFR	**CONSENSUS**	**4.0**	**3.4**	**3.3**	**3.3**	**3.2**	**3.2**	**3.3**	**3.2**
	Top 10 Average	4.3	3.7	3.7	3.6	3.6	3.6	3.6	3.6
	Bottom 10 Average	3.8	3.1	2.9	2.8	2.8	2.7	2.8	2.7
4. Commercial Paper, 1-Mo	**CONSENSUS**	**4.0**	**3.4**	**3.4**	**3.3**	**3.3**	**3.3**	**3.4**	**3.3**
	Top 10 Average	4.2	3.6	3.6	3.6	3.5	3.5	3.6	3.6
	Bottom 10 Average	3.8	3.2	3.0	3.0	3.0	2.9	3.0	2.9
5. Treasury Bill Yield, 3-Mo	**CONSENSUS**	**4.0**	**3.4**	**3.3**	**3.2**	**3.2**	**3.2**	**3.2**	**3.2**
	Top 10 Average	4.4	3.7	3.7	3.7	3.7	3.7	3.7	3.7
	Bottom 10 Average	3.6	3.0	2.8	2.7	2.7	2.7	2.8	2.6
6. Treasury Bill Yield, 6-Mo	**CONSENSUS**	**4.0**	**3.5**	**3.4**	**3.4**	**3.4**	**3.3**	**3.4**	**3.3**
	Top 10 Average	4.3	3.8	3.8	3.7	3.7	3.7	3.8	3.7
	Bottom 10 Average	3.7	3.2	3.0	2.9	2.9	2.8	3.0	2.8
7. Treasury Bill Yield, 1-Yr	**CONSENSUS**	**4.0**	**3.6**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.4**
	Top 10 Average	4.3	3.9	3.9	3.9	3.9	3.9	3.9	3.8
	Bottom 10 Average	3.8	3.4	3.2	3.1	3.0	3.0	3.1	3.0
8. Treasury Note Yield, 2-Yr	**CONSENSUS**	**3.8**	**3.7**	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**
	Top 10 Average	4.1	4.0	4.1	4.1	4.1	4.1	4.1	4.1
	Bottom 10 Average	3.5	3.3	3.2	3.1	3.1	3.1	3.2	3.0
9. Treasury Note Yield, 5-Yr	**CONSENSUS**	**3.9**	**3.8**	**3.8**	**3.9**	**3.9**	**3.9**	**3.9**	**3.9**
	Top 10 Average	4.2	4.2	4.3	4.3	4.5	4.4	4.3	4.5
	Bottom 10 Average	3.6	3.5	3.4	3.3	3.4	3.4	3.4	3.3
10. Treasury Note Yield, 10-Yr	**CONSENSUS**	**4.0**	**4.0**	**4.0**	**4.0**	**4.2**	**4.2**	**4.1**	**4.2**
	Top 10 Average	4.4	4.5	4.5	4.6	4.7	4.7	4.6	4.8
	Bottom 10 Average	3.7	3.6	3.5	3.5	3.6	3.6	3.5	3.6
11. Treasury Bond Yield, 30-Yr	**CONSENSUS**	**4.2**	**4.2**	**4.2**	**4.3**	**4.4**	**4.4**	**4.3**	**4.4**
	Top 10 Average	4.5	4.6	4.7	4.8	4.9	4.9	4.7	4.9
	Bottom 10 Average	3.9	3.9	3.8	3.8	3.8	3.9	3.8	3.8
12. Corporate Aaa Bond Yield	**CONSENSUS**	**5.1**	**5.1**	**5.1**	**5.2**	**5.3**	**5.3**	**5.2**	**5.2**
	Top 10 Average	5.4	5.4	5.6	5.7	5.8	5.8	5.7	5.8
	Bottom 10 Average	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.0**	**6.0**	**6.1**	**6.1**	**6.2**	**6.2**	**6.1**	**6.2**
	Top 10 Average	6.3	6.3	6.5	6.6	6.7	6.7	6.5	6.7
	Bottom 10 Average	5.7	5.7	5.6	5.6	5.6	5.7	5.6	5.7
14. State & Local Bonds Yield	**CONSENSUS**	**4.1**	**4.1**	**4.2**	**4.2**	**4.3**	**4.4**	**4.2**	**4.3**
	Top 10 Average	4.4	4.5	4.5	4.6	4.7	4.7	4.6	4.8
	Bottom 10 Average	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.7
15. Home Mortgage Rate	**CONSENSUS**	**6.3**	**6.1**	**6.1**	**6.1**	**6.1**	**6.2**	**6.1**	**6.1**
	Top 10 Average	6.7	6.5	6.5	6.5	6.6	6.6	6.6	6.6
	Bottom 10 Average	6.0	5.7	5.7	5.6	5.6	5.6	5.6	5.5
A. Fed's AFE Nominal $ Index	**CONSENSUS**	**115.6**	**114.6**	**114.3**	**113.9**	**113.4**	**112.8**	**113.8**	**112.3**
	Top 10 Average	116.9	116.3	115.8	115.7	115.3	115.1	115.6	114.8
	Bottom 10 Average	114.2	113.0	112.7	112.1	111.5	110.9	112.0	110.1
		Year-Over-Year, % Change						Five-Year Averages	
		2025	2026	2027	2028	2029	2030	2026-2030	2031-2035
B. Real GDP	**CONSENSUS**	**1.9**	**2.0**	**2.1**	**2.1**	**2.0**	**2.0**	**2.1**	**2.0**
	Top 10 Average	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2
	Bottom 10 Average	1.6	1.8	1.9	1.8	1.8	1.8	1.8	1.8
C. GDP Chained Price Index	**CONSENSUS**	**2.3**	**2.2**	**2.2**	**2.1**	**2.2**	**2.1**	**2.2**	**2.1**
	Top 10 Average	2.6	2.4	2.4	2.3	2.3	2.3	2.4	2.3
	Bottom 10 Average	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
D. Consumer Price Index	**CONSENSUS**	**2.4**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
	Top 10 Average	2.7	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Bottom 10 Average	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0
E. PCE Price Index	**CONSENSUS**	**2.2**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2
	Bottom 10 Average	2.0	1.9	1.9	1.9	2.0	2.0	1.9	2.0

Databank:

2024 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	-1.1	0.7	0.6	0.0	....	....	....	....	....	....	....	....
Auto & Light Truck Sales (b)	14.89	15.71	15.56	15.74	....	....	....	....	....	....	....	....
Personal Income (a, current $)	1.0	0.3	0.5	....	....	....	....	....	....	....	....	....
Personal Consumption (a, current $)	0.1	0.8	0.8	....	....	....	....	....	....	....	....	....
Consumer Credit (e)	4.4	3.6	1.5	....	....	....	....	....	....	....	....	....
Consumer Sentiment (U. of Mich.)	79.0	76.9	79.4	77.2	69.1	....	....	....	....	....	....	....
Household Employment (c)	-31	-184	498	25	....	....	....	....	....	....	....	....
Nonfarm Payroll Employment (c)	256	236	315	175	....	....	....	....	....	....	....	....
Unemployment Rate (%)	3.7	3.9	3.8	3.9	....	....	....	....	....	....	....	....
Average Hourly Earnings (All, cur. $)	34.51	34.56	34.68	34.75	....	....	....	....	....	....	....	....
Average Workweek (All, hrs.)	34.2	34.3	34.4	34.3	....	....	....	....	....	....	....	....
Industrial Production (d)	-0.7	0.1	0.1	-0.4	....	....	....	....	....	....	....	....
Capacity Utilization (%)	77.9	78.5	78.5	78.4	....	....	....	....	....	....	....	....
ISM Manufacturing Index (g)	49.1	47.8	50.3	49.2	....	....	....	....	....	....	....	....
ISM Nonmanufacturing Index (g)	53.4	52.6	51.4	49.4	....	....	....	....	....	....	....	....
Housing Starts (b)	1.376	1.546	1.287	1.360	....	....	....	....	....	....	....	....
Housing Permits (b)	1.508	1.563	1.485	1.440	....	....	....	....	....	....	....	....
New Home Sales (1-family, c)	664	631	665	634	....	....	....	....	....	....	....	....
Construction Expenditures (a)	-0.6	0.0	-0.2	....	....	....	....	....	....	....	....	....
Consumer Price Index (nsa, d)	3.1	3.2	3.5	3.4	....	....	....	....	....	....	....	....
CPI ex. Food and Energy (nsa, d)	3.9	3.8	3.8	3.6	....	....	....	....	....	....	....	....
PCE Chain Price Index (d)	2.5	2.5	2.7	....	....	....	....	....	....	....	....	....
Core PCE Chain Price Index (d)	2.9	2.8	2.8	....	....	....	....	....	....	....	....	....
Producer Price Index (nsa, d)	1.0	1.6	1.8	2.2	....	....	....	....	....	....	....	....
Durable Goods Orders (a)	-3.8	1.2	0.8	0.7	....	....	....	....	....	....	....	....
Leading Economic Indicators (a)	-0.5	0.2	-0.3	-0.6	....	....	....	....	....	....	....	....
Balance of Trade & Services (f)	-67.6	-69.5	-69.4	....	....	....	....	....	....	....	....	....
Federal Funds Rate (%)	5.33	5.33	5.33	5.33	....	....	....	....	....	....	....	....
3-Mo. Treasury Bill Rate (%)	5.45	5.44	5.47	5.44	....	....	....	....	....	....	....	....
10-Year Treasury Note Yield (%)	4.06	4.21	4.21	4.54	....	....	....	....	....	....	....	....

2023 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	4.1	-1.1	-1.1	0.8	0.2	0.1	0.5	0.7	0.8	-0.2	0.1	0.4
Auto & Light Truck Sales (b)	15.11	14.88	14.93	15.68	15.52	16.06	15.94	15.30	15.77	15.47	15.54	16.12
Personal Income (a, current $)	1.0	0.5	0.5	0.2	0.3	0.2	0.3	0.5	0.4	0.2	0.4	0.3
Personal Consumption (a, current $)	1.6	0.4	-0.1	0.4	0.2	0.4	0.6	0.3	0.8	0.2	0.4	0.6
Consumer Credit (e)	5.1	2.8	4.2	3.2	1.3	5.8	2.9	-4.0	2.0	2.2	4.3	0.8
Consumer Sentiment (U. of Mich.)	64.9	66.9	62.0	63.7	59.0	64.2	71.5	69.4	67.8	63.8	61.3	69.7
Household Employment (c)	852	149	523	138	-255	297	205	291	50	-270	586	-683
Nonfarm Payroll Employment (c)	482	287	146	278	303	240	184	210	246	165	182	290
Unemployment Rate (%)	3.4	3.6	3.5	3.4	3.7	3.6	3.5	3.8	3.8	3.8	3.7	3.7
Average Hourly Earnings (All, cur. $)	33.07	33.15	33.31	33.44	33.54	33.70	33.84	33.91	34.01	34.10	34.23	34.34
Average Workweek (All, hrs.)	34.6	34.5	34.4	34.3	34.4	34.4	34.3	34.4	34.4	34.3	34.4	34.4
Industrial Production (d)	1.5	0.9	0.2	0.3	0.1	-0.4	0.1	-0.1	-0.2	-0.8	-0.2	1.1
Capacity Utilization (%)	79.6	79.5	79.5	79.8	79.5	78.9	79.5	79.4	79.4	78.8	79.0	78.6
ISM Manufacturing Index (g)	47.4	47.7	46.5	47.0	46.6	46.4	46.5	47.6	48.6	46.9	46.6	47.1
ISM Nonmanufacturing Index (g)	54.7	55.0	51.2	52.3	51.0	53.6	52.8	54.1	53.4	51.9	52.5	50.5
Housing Starts (b)	1.361	1.404	1.342	1.368	1.583	1.415	1.473	1.305	1.363	1.365	1.510	1.568
Housing Permits (b)	1.443	1.620	1.493	1.470	1.532	1.493	1.501	1.578	1.515	1.534	1.508	1.530
New Home Sales (1-family, c)	639	625	644	687	741	666	700	652	694	673	611	654
Construction Expenditures (a)	2.2	0.4	0.6	0.3	2.0	0.5	0.7	2.1	0.4	2.1	1.2	0.9
Consumer Price Index (nsa, d)	6.4	6.0	5.0	4.9	4.0	3.0	3.2	3.7	3.7	3.2	3.1	3.4
CPI ex. Food and Energy (nsa, d)	5.6	5.5	5.6	5.5	5.3	4.8	4.7	4.3	4.1	4.0	4.0	3.9
PCE Chain Price Index (d)	5.5	5.2	4.4	4.4	4.0	3.2	3.3	3.3	3.4	2.9	2.7	2.6
Core PCE Chain Price Index (d)	4.9	4.8	4.8	4.8	4.7	4.3	4.2	3.7	3.6	3.4	3.2	2.9
Producer Price Index (nsa, d)	5.7	4.7	2.7	2.3	1.1	0.3	1.1	1.9	1.8	1.1	0.8	1.1
Durable Goods Orders (a)	0.8	-2.3	2.3	2.2	0.2	2.6	-3.1	-0.2	2.0	-4.1	7.7	-4.4
Leading Economic Indicators (a)	-0.5	-0.6	-1.2	-0.7	-0.7	-0.7	-0.3	-0.4	-0.8	-0.9	-0.5	-0.3
Balance of Trade & Services (f)	-70.3	-70.1	-59.6	-72.2	-66.2	-63.5	-65.0	-58.9	-61.9	-65.2	-62.7	-64.2
Federal Funds Rate (%)	4.33	4.57	4.65	4.83	5.06	5.08	5.12	5.33	5.33	5.33	5.33	5.33
3-Mo. Treasury Bill Rate (%)	4.69	4.79	4.86	5.07	5.31	5.42	5.49	5.56	5.56	5.60	5.52	5.44
10-Year Treasury Note Yield (%)	3.53	3.75	3.66	3.46	3.57	3.75	3.90	4.17	4.38	4.80	4.50	4.02

(a) month-over-month % change; (b) millions, saar; (c) month-over-month change, thousands; (d) year-over-year % change; (e) annualized % change; (f) $ billions; (g) level. Most series are subject to frequent government revisions. Use with care.

Calendar of Upcoming Economic Data Releases

Monday	Tuesday	Wednesday	Thursday	Friday
June 3 Construction (Apr) ISM Manufacturing (May) S&P Global Mfg PMI (May)	**4** JOLTS (Apr) Manufacturers' Shipments, Inventories & Orders (Apr) BEA Auto & Truck Sales (Apr)	**5** ADP Employment Report (May) ISM Services PMI (May) S&P Global Services PMI (May) EIA Crude Oil Stocks Mortgage Applications	**6** Productivity & Costs (Q1) International Trade (Apr) Challenger Employment Report (May) Public Debt (May) Interest on Public Debt (May) Weekly Jobless Claims	**7** Employment Situation (May) Wholesale Trade (Apr) Consumer Credit (Apr) Treasury Auction Allotments (May) Financial Accounts (Q1) Baker Hughes International Rig Count (May)
10 QFR (Q1)	**11** QSS (Q1) Manpower Survey (Q3) NFIB (May) Kansas City Fed Labor Market Conditions Indicators (May) OPEC Crude Oil Spot Prices (May) FOMC Meeting	**12** CPI & Real Earnings (May) Transportation Services (Apr) Cleveland Fed Median CPI(May) Monthly Treasury (May) Kansas City Financial Stress Index (May) FOMC Meeting EIA Crude Oil Stocks Mortgage Applications	**13** Producer Prices (May) Weekly Jobless Claims	**14** Import & Export Prices (May) Consumer Sentiment (Jun, Preliminary) Livingston Survey (Jun) Housing Affordability (Apr)
17 Empire State Mfg Survey (Jun)	**18** Advance Retail Sales (May) IP & Capacity Utilization (May) ECEC (Q1) MTIS (Apr) Business Leaders Survey (Jun) TIC Data (Apr)	**19** Home Builders (Jun) Mortgage Applications **JUNETEENTH** **ALL MARKETS CLOSED**	**20** New Residential Construction (May) International Transactions (Q1 & Revisions) Philadelphia Fed Mfg Business Outlook Survey (Jun) EIA Crude Oil Stocks Weekly Jobless Claims	**21** Existing Home Sales (May) Composite Indexes (May) S&P Global Flash PMIs (Jun)
24 Texas Manufacturing Outlook Survey (Jun)	**25** FHFA & Case-Shiller HPI (Apr) Consumer Confidence (Jun) H.6 Money Stock (May) Treasury Auction (Jun) Chicago Fed National Activity Index (May) Philadelphia Fed Nonmfg (Jun) Richmond Fed Mfg & Service Sector Surveys (Jun) Texas Service Sector (Jun)	**26** Final Building Permits (May) IIP (Q1 & Revisions) New Residential Sales (May) Steel Imports (May) EIA Crude Oil Stocks Mortgage Applications	**27** GDP (Q1, 3rd Estimate) Adv Trade & Inventories (May) Advance Durable Goods (May) Kansas City Fed Manufacturing Survey (Jun) Pending Home Sales (May) Weekly Jobless Claims	**28** Personal Income (May) Underlying NIPA Tables(Q1,3rd) IP Revisions Consumer Sentiment(Jun, Final) Chicago PMI (Jun) Agricultural Prices (May) Strike Report (Jun) Dallas Fed Trimmed-Mean PCE (May) Philly Fed Coincident Indic(May)
July 1 Construction (May) ISM Manufacturing (Jun) S&P Global Mfg PMI (Jun) Dallas Fed Banking Conditions Survey (Jun)	**2** JOLTS (May) BEA Auto & Truck Sales (May)	**3** ADP Employment Report (Jun) International Trade (May) ISM Services PMI (Jun) S&P Global Services PMI (Jun) MSIO (May) Challenger Employment (Jun) EIA Crude Oil Stocks Mortgage Applications Weekly Jobless Claims	**4** **INDEPENDENCE DAY** **ALL MARKETS CLOSED**	**5** Employment Situation (Jun) Interest on Public Debt (Jun) Baker Hughes International Rig Count (Jun)
8 Consumer Credit (May)	**9** NFIB (Jun) Kansas City Fed Labor Market Conditions Indicators (Jun)	**10** Wholesale Trade (May) Kansas City Financial Stress Index (Jun) EIA Crude Oil Stocks Mortgage Applications	**11** CPI (Jun) Real Earnings (Jun) Transportation Services Index (May) Cleveland Fed Median CPI (Jun) Monthly Treasury (Jun) Weekly Jobless Claims	**12** Producer Prices (Jun) Consumer Sentiment (Jul, Preliminary)

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The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks

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THE EFFECT OF THE FIRM'S CAPITAL STRUCTURE ON THE SYSTEMATIC RISK OF COMMON STOCKS

ROBERT S. HAMADA*

I. INTRODUCTION

ONLY RECENTLY has there been an interest in relating the issues historically associated with corporation finance to those historically associated with investment and portfolio analyses. In fact, rigorous theoretical attempts in this direction were made only since the capital asset pricing model of Sharpe [13], Lintner [6], and Mossin [11], itself an extension of the Markowitz [7] portfolio theory. This study is one of the first empirical works consciously attempting to show and test the relationships between the two fields. In addition, differences in the observed systematic or nondiversifiable risk of common stocks, β, have never really been analyzed before by investigating some of the underlying differences in the firms.

In the capital asset pricing model, it was demonstrated that the efficient set of portfolios to any individual investor will always be some combination of lending at the risk-free rate and the "market portfolio," or borrowing at the risk-free rate and the "market portfolio." At the same time, the Modigliani and Miller (MM) propositions [9, 10] on the effect of corporate leverage are well known to the students of corporation finance. In order for their propositions to hold, personal leverage is required to be a perfect substitute for corporate leverage. If this is true, then corporate borrowing could substitute for personal borrowing in the capital asset pricing model as well.

Both in the pricing model and the MM theory, borrowing, from whatever source, while maintaining a fixed amount of equity, increases the risk to the investor. Therefore, in the mean-standard deviation version of the capital asset pricing model, the covariance of the asset's rate of return with the market portfolio's rate of return (which measures the nondiversifiable risk of the asset—the proxy β will be used to measure this) should be greater for the stock of a firm with a higher debt-equity ratio than for the stock of another firm in the same risk-class with a lower debt-equity ratio.[1]

This study, then, has a number of purposes. First, we shall attempt to link empirically corporation finance issues with portfolio and security analyses through the effect of a firm's leverage on the systematic risk of its common

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1. This very quick summary of the theoretical relationship between what is known as corporation finance and the modern investment and portfolio analyses centered around the capital asset pricing model is more thoroughly presented in [5], along with the necessary assumptions required for this relationship.

stock. Then, we shall attempt to test the MM theory, or at least provide another piece of evidence on this long-standing controversial issue. This test will not rely on an explicit valuation model, such as the MM study of the electric utility industry [8] and the Brown study of the railroad industry [2]. A procedure using systematic risk measures (β s) has been worked out in this paper for this purpose.

If the MM theory is validated by this procedure, then the final purpose of this study is to demonstrate a method for estimating the cost of capital of individual firms to be used by them for scale-changing or nondiversifying investment projects. The primary component of any firm's cost of capital is the capitalization rate for the firm if the firm had no debt and preferred stock in its capital structure. Since most firms do have fixed commitment obligations, this capitalization rate (we shall call it $E(R_A)$; MM denote it $\rho\tau$) is unobservable. But if the MM theory and the capital asset pricing model are correct, then it is possible to estimate $E(R_A)$ from the systematic risk approach for individual firms, even if these firms are members of a one-firm risk-class.[2]

With this statement of the purposes for this study, we shall, in Section II, discuss the alternative general procedures that are possible for estimating the effect of leverage on systematic risk and select the most feasible ones. The results are presented in Section III. And finally, tests of the MM versus the traditional theories of corporation finance are presented in Section IV.

II. Some Possible Procedures and the Selected Estimating Relationships

There are at least four general procedures that can be used to estimate the effect of the firm's capital structure on the systematic risk of common stocks. The first is the MM valuation model approach. By estimating ρ^τ with an explicit valuation model as they have for the electric utility industry, it is possible to relate this ρ^τ with the use of the capital asset pricing model to a nonleveraged systematic risk measure, ${}_A\beta$. Then the difference between the observed common stock's systematic risk (which we shall denote ${}_B\beta$) and ${}_A\beta$ would be due solely to leverage. But the difficulties of this approach for all firms are many.

The MM valuation model approach requires the specification, in advance, of risk-classes. All firms in a risk-class are then assumed to have the same ρ^τ—the capitalization rate for an all-common equity firm. Unfortunately, there must be enough firms in a risk-class so that a cross-section analysis will yield statistically significant coefficients. There may not be many more risk-classes (with enough observations) now that the electric utility and railroad industries have been studied. In addition, the MM approach requires estimating expected asset earnings and estimating the capitalized growth potential implicit in stock prices. If it is possible to consider growth and expected earnings without having

2. It is, in fact, this last purpose of making applicable and practical some of the implications of the capital asset pricing model for corporation finance issues that provided the initial motivation for this paper. In this context, if one is familiar with the fair rate of return literature for regulated utilities, for example, an industry where debt is so prevalent, adjusting correctly for leverage is not frequently done and can be very critical.

to specify their exact magnitude at a specific point in time, considerable difficulty and possible measurement errors will be avoided.

The second approach is to run a regression between the observed systematic risk of a stock and a number of accounting and leverage variables in an attempt to explain this observed systematic risk. Unfortunately, without a theory, we do not know which variables to include and which variables to exclude and whether the relationship is linear, multiplicative, exponential, curvilinear, etc. Therefore, this method will also not be used.

A third approach is to measure the systematic risk before and after a new debt issue. The difference can then be attributed to the debt issue directly. An attractive feature of this procedure is that a good estimate of the market value of the incremental debt issue can be obtained. A number of disadvantages, unfortunately, are associated with this direct approach. The difference in the systematic risk may be due not only to the additional debt, but also to the reason the debt was issued. It may be used to finance a new investment project, in which case the project's characteristics will also be reflected in the new systematic risk measure. In addition, the new debt issue may have been anticipated by the market if the firm had some long-run target leverage ratio which this issue will help maintain; conversely, the market may not fully consider the new debt issue if it believes the increase in leverage is only temporary. For these reasons, this seemingly attractive procedure will not be employed.

The last approach, which will be used in this study, is to assume the validity of the MM theory from the outset. Then the observed rate of return of a stock can be adjusted to what *it would have been* over the same time period had the firm no debt and preferred stock in its capital structure. The difference between the observed systematic risk, ${}_B\beta$, and the systematic risk for this adjusted rate of return time series, ${}_A\beta$, can be attributed to leverage, if the MM theory is correct. The final step, then, is to test the MM theory.

To discuss this more specifically, consider the following relationship for the dollar return to the common shareholder from period t — 1 to t:

$$(X - I)_t(1 - \tau)_t - p_t + \Delta G_t = d_t + cg_t \qquad (1)$$

where X_t represents earnings before taxes, interest, and preferred dividends and is assumed to be unaffected by fixed commitment obligations; I_t represents interest and other fixed charges paid during the period; τ is the corporation income tax rate; p_t is the preferred dividends paid; ΔG_t represents the change in capitalized growth over the period; and d_t and cg_t are common shareholder dividends and capital gains during the period, respectively.

Equation (1) relates the corporation finance types of variables with the market holding period return important to the investors. The first term on the left-hand-side of (1) is profits after taxes and after interest which is the earnings the common and preferred shareholders receive on their investment for the period. Subtracting out p_t leaves us with the earnings the common shareholder would receive from currently-held assets.

To this must be added any change in capitalized growth since we are trying to explain the common shareholder's market holding period dollar return. ΔG_t

must be added for growth firms to the current period's profits from existing assets since capitalized growth opportunities of the firm—future earnings from new assets over and above the firm's cost of capital which are already reflected in the stock price at $(t-1)$—should change over the period and would accrue to the common shareholder. Assuming shareholders at the start of the period estimated these growth opportunities on average correctly, the expected value of ΔG_t would not be zero, but should be positive. For example, consider growth opportunities five years from now which yield more than the going rate of return and are reflected in today's stock price. These growth opportunities will become one year closer to fruition at time t than at time $t-1$ so that their present value would become larger. ΔG_t then represents this increase in the present value of these future opportunities simply because it is now four years away rather than five.[3]

Since the systematic risk of a common stock is:

$$_B\beta = \frac{\text{cov}\,(R_{B_t}, R_{M_t})}{\sigma^2(R_{M_t})} \tag{2}$$

where R_{B_t} is the common shareholder's rate of return and R_{M_t} is the rate of return on the market portfolio, then substitution of (1) into (2) yields:

$$_B\beta = \frac{\text{cov}\left[\dfrac{(X-I)(1-\tau)_t - p_t + \Delta G_t}{S_{B_{t-1}}}, R_{M_t}\right]}{\sigma^2(R_{M_t})} \tag{2a}$$

where $S_{B_{t-1}}$ denotes the market value of the common stock at the beginning of the period.

The systematic risk for the same firm over the same period *if* there were no debt and preferred stock in its capital structure is:

$$_A\beta = \frac{\text{cov}(R_{A_t}, R_{M_t})}{\sigma^2(R_{M_t})}$$

$$= \frac{\text{cov}\left[\dfrac{X(1-\tau)_t + \Delta G_t}{S_{A_{t-1}}}, R_{M_t}\right]}{\sigma^2(R_{M_t})} \tag{3}$$

where R_{A_t} and $S_{A_{t-1}}$ represent the rate of return and the market value, respectively, to the common shareholder if the firm had no debt and preferred stock. From (3), we can obtain:

$$_A\beta S_{A_{t-1}} = \frac{\text{cov}\,[X(1-\tau)_t + \Delta G_t, R_{M_t}]}{\sigma^2(R_{M_t})} \tag{3a}$$

3. Continual awareness of the difficulties of estimating capitalized growth, or changes in growth, especially in conjunction with leverage considerations, for purposes such as valuation or cost of capital is a characteristic common to students of corporation finance. This is the reason for the emphasis on growth in this paper and for presenting a method to neutralize for differences in growth when comparing rates of return.

Next, by expanding and rearranging (2a), we have:

$$ {}_{B}\beta S_{B_{t-1}} = \frac{\operatorname{cov}\,[X(1-\tau)_t + \Delta G_t, R_{M_t}]}{\sigma^2(R_{M_t})} - \frac{\operatorname{cov}\,[I(1-\tau)_t, R_{M_t}]}{\sigma^2(R_{M_t})} - \frac{\operatorname{cov}\,(p_t, R_{M_t})}{\sigma^2(R_{M_t})} \tag{2b} $$

If we assume as an empirical approximation that interest and preferred dividends have negligible covariance with the market, at least relative to the (pure equity) common stock's covariance, then substitution of the LHS of (3a) into the RHS of (2b) yields:[4]

$$ {}_{B}\beta S_{B_{t-1}} = {}_{A}\beta S_{A_{t-1}} \tag{4} $$

or

$$ {}_{A}\beta = \left(\frac{S_B}{S_A}\right)_{t-1} {}_{B}\beta \tag{4a} $$

Because S_{At-1}, the market value of common stock *if* the firm had no debt and preferred stock, is not observable since most firms do have debt and/or preferred stock, a theory is required in order to measure what this quantity *would have been* at $t-1$. The MM theory [10] will be employed for this purpose, that is:

$$ S_{A_{t-1}} = (V - \tau D)_{t-1}. \tag{5} $$

Equation (5) indicates that if the Federal government tax subsidy for debt financing, τD, where D is the market value of debt, is subtracted from the observed market value of the firm, V_{t-1} (where V_{t-1} is the sum of S_B, D and the observed market value of preferred), then the market value of an unleveraged firm is obtained. Underlying (5) is the assumption that the firm is near its target leverage ratio so that no more or no less debt subsidy is capitalized already into the observed stock price. The conditions under which this MM relationship hold are discussed carefully in [4].

It is at this point that problems in obtaining satisfactory estimates of ${}_{A}\beta$ develop, since (4) theoretically holds only for the next period. As a practical matter, the accepted, and seemingly acceptable, method of obtaining estimates of a stock's systematic risk, ${}_{B}\beta$, is to run a least squares regression between a stock's and market portfolio's *historical* rates of return. Using past data for ${}_{B}\beta$, it is not clear which *period's* ratio of market values to apply in (4a) to estimate the firm's systematic risk, ${}_{A}\beta$. There would be no problem if the market value ratios of debt to equity and preferred stock to equity remained relatively stable over the past for each firm, but a cursory look at these data reveals that this is not true for the large majority of firms in our sample. Should we use the market value ratio required in (4a) that was observed at the start of our regression period, at the end of our regression period, or some kind of average over the period? In addition, since these different observed ratios will give us different estimates for ${}_{A}\beta$, it is not clear, without some criterion, how we should select from among the various estimates.

4. This general method of arriving at (4) was suggested by the comments of William Sharpe, one of the discussants of this paper at the annual meeting. A much more cumbersome and less general derivation of (4) was in the earlier version.

It is for this purpose—to obtain a standard—that a more cumbersome and more data demanding approach to obtain estimates of ${}_A\beta$ is suggested. Given the large fluctuations in market leverage ratios, intuitively it would appear that the firm's risk is more stable than the common stock's risk. In that event, a leverage-free rate of return time series for each firm should be derived and the market model applied to this time series directly. In this manner, the beta coefficient would give us a *direct* estimate of ${}_A\beta$ which can then be used as a criterion to determine if any of the market value ratios discussed above can be applied to (4a) successfully.

For this purpose, the "would-have-been" rate of return for the common stock if the firm had no debt and preferred is:

$$R_{A_t} = \frac{X_t(1-\tau)_t + \Delta G_t}{S_{A_{t-1}}}. \tag{6}$$

The numerator of (6) can be rearranged to be:

$$X_t(1-\tau)_t + \Delta G_t \equiv [(X-I)_t(1-\tau)_t - p_t + \Delta G_t] + p_t + I_t(1-\tau)_t.$$

Substituting (1):

$$X_t(1-\tau)_t + \Delta G_t = [d_t + cg_t] + p_t + I_t(1-\tau)_t.$$

Therefore, (6) can be written as:

$$R_{A_t} = \frac{d_t + cg_t + p_t + I_t(1-\tau)_t}{S_{A_{t-1}}}. \tag{7}$$

Since $S_{A_{t-1}}$ is unobservable for the firms with leverage, the MM theory, equation (5), will be employed; then:

$$R_{A_t} = \frac{d_t + cg_t + p_t + I_t(1-\tau)_t}{(V-\tau D)_{t-1}}. \tag{8}$$

The observed rate of return on the common stock is, of course:

$$R_{B_t} = \frac{(X-I)_t(1-\tau)_t - p_t + \Delta G_t}{S_{B_{t-1}}} = \frac{d_t + cg_t}{S_{B_{t-1}}}. \tag{9}$$

Equation (8) is the rate of return to the common shareholder of the same firm and over the same period of time as (9). However, in (8) there are the underlying assumptions that the firm never had any debt and preferred stock and that the MM theory is correct; (9) incorporates the exact amount of debt and preferred stock that the firm actually did have over this time period and no leverage assumption is being made. Both (8) and (9) are now in forms where they can be measured with available data. One can note that it is unnecessary to estimate the change in growth, or earnings from current assets, since these should be captured in the market holding period return, $d_t + cg_t$.

Using CRSP data for (9) and both CRSP and Compustat data for the components of (8), a time series of yearly R_{At} and R_{Bt} for $t = 1948$-1967 were derived for 304 different firms. These 304 firms represent an exhaustive sample of the firms with complete data on both tapes for all the years.

A number of "market model" [1, 12] variants were then applied to these data. For each of the 304 firms, the following regressions were run:

$$R_{Ait} = {}_A\alpha_i + {}_A\beta_i R_{M_t} + {}_A\epsilon_{it} \tag{10a}$$

$$R_{Bit} = {}_B\alpha_i + {}_B\beta_i R_{M_t} + {}_B\epsilon_{it} \tag{10b}$$

$$\ln(1 + R_{Ait}) = {}_{AC}\alpha_i + {}_{AC}\beta_i \ln(1 + R_{M_t}) + {}_{AC}\epsilon_{it} \tag{10c}$$

$$\ln(1 + R_{Bit}) = {}_{BC}\alpha_i + {}_{BC}\beta_i \ln(1 + R_{M_t}) + {}_{BC}\epsilon_{it} \tag{10d}$$

$$i = 1, 2, \ldots, 304$$
$$t = 1948\text{-}1967$$

where R_{M_t} is the observed NYSE arithmetic stock market rate of return with dividends reinvested, α_i and β_i are constants for each firm-regression, and the usual conditions are assumed for the properties of the disturbance terms, ϵ_{it}. Equations (10c) and (10d) are the continuously-compounded rate of return versions of (10a) and (10b), respectively.[5]

III. The Results

An abbreviated table of the regression results for each of the four variants, equations (10a)-(10d), summarized across the 304 firms is shown in Table 1.

The first column designated "mean" is the average of the statistic (indicated by the rows) over all 304 firms. Therefore, the mean ${}_A\hat{\alpha}$ of 0.0221 is the intercept term of equation (10a) averaged over 304 different firm-regressions. The second and third columns give the deviation measures indicated, of the 304 point estimates of, say, ${}_A\hat{\alpha}$. The mean standard error of estimate in the last column is the average over 304 firms of the individual standard errors of estimate.

The major conclusion drawn from Table 1 is the following mean β comparisons:

$${}_B\hat{\beta} > {}_A\hat{\beta}, \text{ i.e., } 0.9190 > 0.7030$$
$${}_{BC}\hat{\beta} > {}_{AC}\hat{\beta}, \text{ i.e., } 0.9183 > 0.7263.$$

The directional results of these betas, assuming the validity of the MM theory, are not imperceptible and clearly are not negligible differences from the investor's point of view. This is obtained in spite of all the measurement and data problems associated with estimating a time series of the RHS of (8) for

5. Because the R_{M_t} used in equations (10) is defined as the observed stock market return, and since adjusting for capital structure is the major purpose of this exercise, it was decided that the same four regressions should be replicated on a leverage-adjusted stock market rate of return. The major reason for this additional adjustment is the belief that the rates of return over time and their relationship with the market are more stable when we can abstract from all changes in leverage and get at the underlying risk of all firms.

For the 221 firms (out of the total 304) whose fiscal years coincide with the calendar year, average values for the components of the RHS of (8) were obtained for each year so that R_{M_t} could be adjusted in the same way as for the individual firms—a yearly time series of stock market rates of return, if all the firms on the NYSE had no debt and no preferred in their capital structure, was derived. The results, when using this adjusted market portfolio rate of return time series, were not very different from the results of equations (10), and so will not be reported here separately.

TABLE 1
SUMMARY RESULTS OVER 304 FIRMS OF EQUATIONS (10a)-(10d)

	Mean	Mean Absolute Deviation*	Standard Deviation	Mean Standard Error of Estimate
${}_{A}\hat{\alpha}$	0.0221	0.0431	0.0537	0.0558
${}_{A}\hat{\beta}$	0.7030	0.2660	0.3485	0.2130
${}_{A}\hat{R}^2$	0.3799	0.1577	0.1896	
${}_{A}\hat{\rho}$	0.0314			
${}_{B}\hat{\alpha}$	0.0187	0.0571	0.0714	0.0720
${}_{B}\hat{\beta}$	0.9190	0.3550	0.4478	0.2746
${}_{B}\hat{R}^2$	0.3864	0.1578	0.1905	
${}_{B}\hat{\rho}$	0.0281			
${}_{AC}\hat{\alpha}$	0.0058	0.0427	0.0535	0.0461
${}_{AC}\hat{\beta}$	0.7263	0.2700	0.3442	0.2081
${}_{AC}\hat{R}^2$	0.3933	0.1586	0.1909	
${}_{AC}\hat{\rho}$	0.0268			
${}_{BC}\hat{\alpha}$	−0.0052	0.0580	0.0729	0.0574
${}_{BC}\hat{\beta}$	0.9183	0.3426	0.4216	0.2591
${}_{BC}\hat{R}^2$	0.4012	0.1602	0.1922	
${}_{BC}\hat{\rho}$	0.0262			

* Defined as: $\dfrac{\sum_{i=1}^{N} |x_i - \bar{x}|}{N}$, where N = 304. $\hat{\rho}$ = first order serial correlation coefficient.

each firm. One of the reasons for the "traditional" theory position on leverage is precisely this point—that small and reasonable amounts of leverage cannot be discerned by the market. In fact, if the MM theory is correct, leverage has explained as much as, roughly, 21 to 24 per cent of the value of the mean β.

We can also note that if the covariance between the asset and market rates of return, as well as the market variance, was constant over time, then the systematic risk from the market model is related to the expected rate of return by the capital asset pricing model. That is:

$$E(R_{A_t}) = R_{F_t} + {}_{A}\beta[E(R_{M_t}) - R_{F_t}] \tag{11a}$$

$$E(R_{B_t}) = R_{F_t} + {}_{B}\beta[E(R_{M_t}) - R_{F_t}] \tag{11b}$$

Equation (11a) indicates the relationship between the expected rate of return for the common stock shareholder of a debt-free and preferred-free firm, to the systematic risk, ${}_{A}\beta$, as obtained in regressions (10a) or (10c). The LHS of (11a) is the important $\rho\tau$ for the MM cost of capital. The MM theory [9, 10] also predicts that shareholder expected yield must be higher (for the same real firm) when the firm has debt than when it does not. Financial risk is greater, therefore, shareholders require more expected return. Thus, $E(R_{B_t})$ must be greater than $E(R_{A_t})$. In order for this MM prediction to be true, from (11a) and (11b) it can be observed that ${}_{B}\beta$ must be greater than ${}_{A}\beta$, which is what we obtained.

Using the results underlying Table 1, namely the firm and stock betas, as the

criterion for selecting among the possible observed market value ratios that can be used, if any, for (4), the following cross-section regressions were run:

$$({}_B\beta)_i = a_1 + b_1 \left(\frac{S_A}{S_B} {}_A\beta \right)_i + u_{1i} \qquad i = 1, 2, \ldots, 102 \qquad (12a)$$

$$({}_{BC}\beta)_i = a_2 + b_2 \left(\frac{S_A}{S_B} {}_{AC}\beta \right)_i + u_{2i} \qquad i = 1, 2, \ldots, 102 \qquad (12b)$$

$$({}_A\beta)_i = a_3 + b_3 \left(\frac{S_B}{S_A} {}_B\beta \right)_i + u_{3i} \qquad i = 1, 2, \ldots, 102 \qquad (13a)$$

$$({}_{AC}\beta)_i = a_4 + b_4 \left(\frac{S_B}{S_A} {}_{BC}\beta \right)_i + u_{4i} \qquad i = 1, 2, \ldots, 102 \qquad (13b)$$

Because the preferred stock market values were not as reliable as debt, only the 102 firms (out of 304) that did not have preferred in any of the years were used. The test for the adequacy of this alternative approach, equation (4), to adjust the systematic risk of common stocks for the underlying firm's capital structure, is whether the intercept term, a, is equal to zero, and the slope coefficient, b, is equal to one in the above regressions (as well as, of course, a high R^2)—these requirements are implied by (4). The results of this test would also indicate whether future "market model" studies that only use common stock rates of return without adjusting, or even noting, for the firm's debt-equity ratio will be adequate. The total firm's systematic risk may be stable (as long as the firm stays in the same risk-class), whereas the common stock's systematic risk may not be stable merely because of unanticipated capital structure changes—the data underlying Table 3 indicate that there were very few firms which did not have major changes in their capital structure over the twenty years studied.

The results of these regressions, when using the average S_A and average S_B over the twenty years for each firm, are shown in the first column panel of Table 2. These regressions were then replicated twice, first using the December 31, 1947 values of S_{A_i} and S_{B_i} instead of the twenty-year average for each firm, and then substituting the December 31, 1966 values of S_{A_i} and S_{B_i} for the 1947 values. These results are in the second and third panels of Table 2.[6]

From the first panel of Table 2, it appears that this alternative approach via (4a) for adjusting the systematic risk for the firm's leverage is quite

6. The point should be made that we are not merely regressing a variable on itself in (12) and (13). (12a) and (12b) can be interpreted as correlating the ${}_B\beta_i$ obtained from (10b) and (10d)—the LHS variable in (12a) and (12b)—against the ${}_B\beta_i$ obtained from rearranging (4)—the RHS variable in (12a) and (12b)—to determine whether the use of (4) is as good a means of obtaining ${}_B\beta_i$ as the direct way via the equations (10). We would be regressing a variable on itself only if the ${}_A\beta_i$ were calculated using (4a), and then the ${}_A\beta_i$ thus obtained, inserted into (12a) and (12b).

Instead, we are obtaining ${}_A\beta_i$ using the MM model in *each* of the twenty years so that a leverage-adjusted 20 year time series of R_{A_i} is derived. Of course, if there were no data nor measurement problems, and if the debt-to-equity ratio were perfectly stable over this twenty year period for each firm, then we should obtain perfect correlation in (12a) and (12b), with $a = 0$ and $b = 1$, as (4) would be an identity.

TABLE 2

RESULTS FOR THE EQUATIONS (12a), (12b), (13a), AND (13b)*

	Using 20-Year Average for $\left(\frac{S_A}{S_B}\right)_i$			Using 1947 Value for $\left(\frac{S_A}{S_B}\right)_i$			Using 1966 Value for $\left(\frac{S_A}{S_B}\right)_i$		
	a	b	R^2	a	b	R^2	a	b	R^2
Eq. (12a)	−0.022 (0.021)	1.062 (0.021)	0.962	0.150 (0.048)	0.842 (0.045)	0.781	0.085 (0.041)	0.905 (0.038)	0.849
	constant suppressed	1.042 (0.009)	0.962	constant suppressed	0.966 (0.021)	0.781	constant suppressed	0.976 (0.017)	0.849
Eq. (12b)	−0.003 (0.013)	1.016 (0.013)	0.984	0.159 (0.047)	0.816 (0.044)	0.773	0.124 (0.037)	0.843 (0.034)	0.859
	constant suppressed	1.014 (0.005)	0.984	constant suppressed	0.952 (0.019)	0.773	constant suppressed	0.947 (0.015)	0.859

	Using 20-Year Average for $\left(\frac{S_B}{S_A}\right)_i$			Using 1947 Value for $\left(\frac{S_B}{S_A}\right)_i$			Using 1966 Value for $\left(\frac{S_B}{S_A}\right)_i$		
	a	b	R^2	a	b	R^2	a	b	R^2
Eq. (13a)	0.030 (0.016)	0.931 (0.017)	0.969	0.112 (0.028)	0.843 (0.030)	0.888	0.080 (0.027)	0.898 (0.030)	0.902
	constant suppressed	0.960 (0.007)	0.969	constant suppressed	0.948 (0.015)	0.888	constant suppressed	0.976 (0.014)	0.902
Eq. (13b)	0.007 (0.010)	0.979 (0.011)	0.988	0.119 (0.026)	0.852 (0.028)	0.902	0.063 (0.026)	0.942 (0.029)	0.911
	constant suppressed	1.004 (0.012)	0.911	constant suppressed	0.967 (0.013)	0.902	constant suppressed	1.005 (0.012)	0.911

* Standard error in parentheses.

satisfactory (at least with respect to our sample of firms and years) only if long-run averages of S_A and S_B are used. The second and third panels indicate that the equations (8) and (10) procedure is markedly superior when only one year's market value ratio is used as the adjustment factor. The annual debt-to-equity ratio is much too unstable for this latter procedure.

Thus, when forecasting systematic risk is the primary objective—for example, for portfolio decisions or for estimating the firm's cost of capital to apply to prospective projects—a long-run forecasted leverage adjustment is required. Assuming the firm's risk is more stable than the common stock's risk,[7] and if there is some reason to believe that a better forecast of the firm's future leverage can be obtained than using simply a past year's (or an average of past years') leverage, it should be possible to improve the usual extrapolation forecast of a stock's systematic risk by forecasting the total firm's systematic risk first, and then using the independent leverage estimate as an adjustment.

IV. Tests of the MM vs. Traditional Theories of Corporation Finance

To determine if the difference, ${}_B\beta - {}_A\beta$, found in this study is indeed the correct effect of leverage, some confirmation of the MM theory (since it was assumed to be correct up to this point) from the systematic risk approach is needed. Since a direct test by this approach seems impossible, an indirect, inferential test is suggested.

The MM theory [9, 10] predicts that for firms in the same risk-class, the capitalization rate if all the firms were financed with only common equity, $E(R_A)$, would be the same—regardless of the actual amount of debt and preferred each individual firm had. This would imply, from (11a), that if $E(R_A)$ must be the same for all firms in a risk-class, so must ${}_A\beta$. And if these firms had different ratios of fixed commitment obligations to common equity, this difference in financial risk would cause their observed ${}_B\beta$s to be different.

The major competing theory of corporation finance is what is now known as the "traditional theory," which has contrary implications. This theory predicts that the capitalization rate for common equity, $E(R_B)$, (sometimes called the required or expected stock yield, or expected earnings-price ratio) is constant, as debt is increased, up to some critical leverage point (this point being a function of gambler's ruin and bankruptcy costs).[8] The clear implication of this constant, horizontal, equity yield (or their initial downward sloping cost of capital curve) is that changes in market or covariability risk are assumed not to be discernible to the shareholders as debt is increased. Then the traditional theory is saying that the ${}_B\beta$s, a measure of this covariability risk, would be the same for all firms in a given risk-class irregardless of differences in leverage, as long as the critical leverage point is not reached.

Since there will always be unavoidable errors in estimating the β's of indi-

7. A faint, but possible, empirical indication of this point may be obtained from Table 1. The ratio of the mean point estimate to the mean standard error of estimate is less for the firm β than for the stock β in both the discrete and continuously compounded cases.

8. This interpretation of the traditional theory can be found in [9, especially their figure 2, page 275, and their equation (13) and footnote 24 where reference is made to Durand and Graham and Dodd].

TABLE 3

INDUSTRY MARKET VALUE RATIOS OF PREFERRED STOCK (P) AND DEBT (D) TO COMMON STOCK (S)

Industry Number	Industry	Number of Firms		P/S			D/S			(P + D)/S		
20	Food and Kindred Products	30	Mean*		0.22			0.81			1.04	
			ROM**	0.00		1.18	0.00		3.55	0.00		4.13
			ROCR***	0.00		2.52	0.00		8.10	0.00		10.01
28	Chemicals and Allied Products	30	Mean		0.07			0.25			0.33	
			ROM	0.00		0.51	0.00		0.90	0.00		1.20
			ROCR	0.00		1.54	0.00		2.07	0.00		2.92
29	Petroleum and Coal Products	18	Mean		0.06			0.22			0.27	
			ROM	0.00		0.26	0.00		0.55	0.03		0.57
			ROCR	0.00		0.83	0.00		1.54	0.00		2.30
33	Primary Metals	21	Mean		0.14			0.54			0.68	
			ROM	0.00		1.31	0.00		1.95	0.00		3.04
			ROCR	0.00		4.69	0.00		6.20	0.00		7.49
35	Machinery, except Electrical	28	Mean		0.07			0.33			0.40	
			ROM	0.00		0.49	0.00		1.92	0.00		2.32
			ROCR	0.00		1.28	0.00		6.92	0.00		7.62

TABLE 3 (*Continued*)

Industry Number	Industry	Number of Firms		P/S		D/S		$\frac{P+D}{S}$	
36	Electrical Machinery & Equipment	13	Mean	0.06		0.35		0.41	
			ROM	0.00	0.29	0.00	1.31	0.01	1.33
			ROCR	0.00	1.13	0.00	2.53	0.00	2.53
37	Transportation Equipment	24	Mean	0.08		0.38		0.47	
			ROM	0.00	0.54	0.00	0.93	0.00	1.32
			ROCR	0.00	2.33	0.00	3.76	0.00	6.09
49	Utilities	27	Mean	0.25		1.03		1.28	
			ROM	0.00	0.53	0.49	2.64	0.52	3.12
			ROCR	0.00	3.12	0.12	16.40	0.12	19.52
53	Dep't Stores, Order Houses & Vending Mach. Operators	17	Mean	0.13		0.49		0.62	
			ROM	0.00	0.38	0.01	1.52	0.01	1.87
			ROCR	0.00	1.09	0.00	3.19	0.00	3.66

* "Mean" refers to the average ratio over 20 years and over all firms in the industry.
** "Range of Means" (ROM) refers to the lowest firm's mean (over 20 years) ratio and the highest firm's mean (over 20 years) ratio in the industry.
*** "Range of Company Ranges" (ROCR) refers to the lowest and highest ratio in the industry, regardless of the year.

vidual firms and in specifying a risk-class, we would not expect to find a set of firms with identical systematic risk. But by specifying reasonable a priori risk-classes, if the individual firms had closer or less scattered ${}_A\beta$s than ${}_B\beta$s, then this would support the MM theory and contradict the traditional theory. If, instead, the ${}_B\beta$s were not discernibly more diverse than the ${}_A\beta$s, and the leverage ratio differed considerably among firms, then this would indicate support for the traditional theory.[9]

In order to test this implication, risk-classes must be first specified. The SEC two-digit industry classification was used for this purpose. Requiring enough firms for statistical reasons in any given industry, nine risk-classes were specified that had at least 13 firms; these nine classes are listed in Table 3 with their various leverage ratios.[10] It is clear from this table that our first requirement is met—that there is a considerable range of leverage ratios among firms in a risk-class and also over the twenty-year period.

Three tests will be performed to distinguish between the MM and traditional theories. The first is simply to calculate the standard deviation of the unbiased β estimates in a risk-class. The second is a chi-square test of the distribution of β's in an industry compared to the distribution of the β's in the total sample. Finally, an analysis of variance test on the estimated variance of the β's between industries, as opposed to within industries, is performed. In all tests, only the point estimate of β (which should be unbiased) for each stock and firm is used.[11]

The first test is reported in Table 4. If we compare the standard deviation of ${}_{AC}\beta$ with the standard deviation of ${}_{BC}\beta$ by industries (or risk-classes), we can note that $\sigma({}_{AC}\beta)$ is less than $\sigma({}_{BC}\beta)$ for eight out of the nine classes. The probability of obtaining this is only 0.0195, given a 50% probability that $\sigma({}_{AC}\beta)$ can be larger or smaller than $\sigma({}_{BC}\beta)$. These results indicate that the systematic risk of the firms in a given risk-class, if they were all financed only with common equity, is much less diverse than their observed stock's systematic risk. This supports the MM theory, at least in contrast to the traditional theory.[12]

9. The traditional theory also implies that $E(R_A)$ is equal to $E(R_B)$ for all firms. Unfortunately, we do not have a functional relationship between these traditional theory capitalization rates and the measured βs of this study. Clearly, since the ${}_A\beta$s were obtained assuming the validity of the MM theory, they would not be applicable for the traditional theory. In fact, no relationship between the ${}_A\beta$ and ${}_B\beta$ for a given firm, or for firms in a given risk-class, can be specified as was done for the capitalization rates.

10. The tenth largest industry had only eight firms. For our purpose of testing the uniformity of firm βs relative to stock βs within a risk-class, the use of the two-digit industry classification as a proxy does not seem as critical as, for instance, its use for the purpose of performing an MM valuation model study [8] wherein the ρ^τ must be pre-specified to be exactly the same for all firms in the industry.

11. Since these βs are estimated in the market model regressions with error, precise testing should incorporate the errors in the β estimation. Unfortunately, to do this is extremely difficult and more importantly, requires the normality assumption for the market model disturbance term. Since there is considerable evidence that is contrary to this required assumption [see 3], our tests will ignore the β measurement error entirely. But ignoring this is partially corrected in our first and third tests since means and variances of these point estimate βs must be calculated, and this procedure will "average out" the individual measurement errors by the factor 1/N.

12. Of course, there could always be another theory, as yet not formulated, which could be even

TABLE 4
MEAN AND STANDARD DEVIATION OF INDUSTRY β'S

Industry Number	Industry	Number of Firms		${}_A\beta$	${}_B\beta$	${}_{AC}\beta$	${}_{BC}\beta$
20	Food & Kindred Products	30	Mean β	0.515	0.815	0.528	0.806
			σ(β)	0.232	0.448	0.227	0.424
28	Chemicals & Allied Products	30	Mean β	0.747	0.928	0.785	0.946
			σ(β)	0.237	0.391	0.216	0.329
29	Petroleum & Coal Products	18	Mean β	0.633	0.747	0.656	0.756
			σ(β)	0.144	0.188	0.148	0.176
33	Primary Metals	21	Mean β	1.036	1.399	1.106	1.436
			σ(β)	0.223	0.272	0.197	0.268
35	Machinery, except Electrical	28	Mean β	0.878	1.037	0.917	1.068
			σ(β)	0.262	0.240	0.271	0.259
36	Electrical Machinery and Equipment	13	Mean β	0.940	1.234	0.951	1.164
			σ(β)	0.320	0.505	0.283	0.363
37	Transportation Equipment	24	Mean β	0.860	1.062	0.875	1.048
			σ(β)	0.225	0.313	0.225	0.289
49	Utilities	27	Mean β	0.160	0.255	0.166	0.254
			σ(β)	0.086	0.133	0.098	0.147
53	Department Stores, etc.	17	Mean β	0.652	0.901	0.692	0.923
			σ(β)	0.187	0.282	0.198	0.279

Our second test, the chi-square test, requires us to rank our 300 ${}_A\beta$s into ten equal categories, each with 30 ${}_A\beta$s (four miscellaneous firms were taken out randomly). By noting the value of the highest and lowest ${}_A\beta$ for each of the ten categories, a distribution of the number of ${}_A\beta$s in each category, by risk-class, can be obtained. This was then repeated for the other three betas. To test whether the distribution for each of the four β's and for each of the risk-classes follows the expected uniform distribution, a chi-square test was performed.[13]

Even with just casual inspection of these distributions of the betas by risk-class, it is clear that two industries, primary metals and utilities, are so highly skewed that they greatly exaggerate our results.[14] Eliminating these

more strongly supported than the MM theory. If we compare $\sigma({}_A\beta)$ to $\sigma({}_B\beta)$ by risk-classes in Table 4, precisely the same results are obtained as those reported above for the continuously-compounded betas.

13. By risk-classes, seven of the nine chi-square values of ${}_A\beta$ are larger than those of ${}_B\beta$, as are eight out of nine for the continuously-compounded betas. This would occur by chance with probabilities of 0.0898 and 0.0195, respectively, if there were a 50% chance that either the firm or stock chi-square value could be larger. Nevertheless, if we inspect the individual chi-square values by risk-class, we note that most of them are large so that the probabilities of obtaining these values are highly unlikely. For all four βs, the distributions for most of the risk-classes are nonuniform.

14. Primary metals have extremely large betas; utilities have extremely small betas.

two industries, and also two miscellaneous firms so that an even 250 firms are in the sample, new upper and lower values of the β's were obtained for each of the ten class intervals and for each of the four β's.

In Table 5, the chi-square values are presented; for the total of all risk-classes, the probability of obtaining a chi-square value less than 120.63 is over 99.95% (for ${}_{A}\beta$), whereas the probability of obtaining a chi-square value less than 99.75 is between 99.5% and 99.9% (for ${}_{B}\beta$). More sharply contrasting results are obtained when ${}_{AC}\beta$ is compared to ${}_{BC}\beta$. For ${}_{AC}\beta$, the probability of obtaining less than 128.47 is over 99.95%, whereas for ${}_{BC}\beta$, the probability of obtaining less than 78.65 is only 90.0%. By abstracting from financial risk, the underlying systematic risk is much less scattered when grouped into risk-classes than when leverage is assumed not to affect the systematic risk. The null hypothesis that the β's in a risk-class come from the same distribution as all β's is rejected for ${}_{AC}\beta$, but not for ${}_{BC}\beta$ (at the 90% level). Although this, in itself, does not tell us *how* a risk-class differs from the total market, an inspection of the distributions of the betas by risk-class underlying Table 5 does indicate more clustering of the ${}_{AC}\beta$s than the ${}_{BC}\beta$s so that the MM theory is again favored over the traditional theory.

The analysis of variance test is our last comparison of the implications of the two theories. The ratio of the estimated variance between industries to the estimated variance within the industries (the F-statistic) when the seven

TABLE 5
CHI-SQUARE RESULTS FOR ALL β's AND ALL INDUSTRIES
(EXCEPT UTILITIES AND PRIMARY METALS)

Industry		${}_{A}\beta$	${}_{B}\beta$	${}_{AC}\beta$	${}_{BC}\beta$
Food and Kindred	Chi-Square	18.67	11.33	26.00	9.33
	$P\{\chi^2 < \}^* =$	95-97.5%	70-75%	99.5-99.9%	50-60%
Chemicals	Chi-Square	9.33	10.67	12.00	7.33
	$P\{\chi^2 < \} =$	50-60%	60-70%	75-80%	30-40%
Petroleum	Chi-Square	17.56	25.33	18.67	22.00
	$P\{\chi^2 < \} =$	95-97.5%	99.5-99.9%	95-97.5%	99-99.5%
Machinery	Chi-Square	19.14	12.00	24.86	9.14
	$P\{\chi^2 < \} =$	97.5-98%	75-80%	99.5-99.9%	50-60%
Electrical Machinery	Chi-Square	13.92	7.77	12.38	9.31
	$P\{\chi^2 < \} =$	80-90%	40-50%	80-90%	50-60%
Transportation Equipment	Chi-Square	15.17	16.83	13.50	6.83
	$P\{\chi^2 < \} =$	90-95%	90-95%	80-90%	30-40%
Dep't Stores	Chi-Square	14.18	3.59	14.18	3.59
	$P\{\chi^2 < \} =$	80-90%	5-10%	80-90%	5-10%
Miscellaneous	Chi-Square	12.67	12.22	6.89	11.11
	$P\{\chi^2 < \} =$	80-90%	80-90%	30-40%	70-75%
Total	Chi-Square	120.63	99.75	128.47	78.65
	$P\{\chi^2 < \} =$	over 99.95%	99.5-99.90%	over 99.95%	90.0%

* Example: $P\{\chi^2 < 18.67\} = 95\text{-}97.5\%$ for 9 degrees of freedom.

industries are considered (again, the two obviously skewed industries, primary metals and utilities, were eliminated) is less for ${}_{B}\beta$ ($F = 3.90$) than for ${}_{A}\beta$ ($F = 9.99$), and less for ${}_{BC}\beta$ ($F = 4.18$) than for ${}_{AC}\beta$ ($F = 10.83$). The probability of obtaining these F-statistics for ${}_{A}\beta$ and ${}_{AC}\beta$ is less than 0.001, but for ${}_{B}\beta$ and ${}_{BC}\beta$ greater than or equal to 0.001. These results are consistent with the results obtained from our two previous tests. The MM theory is more compatible with the data than the traditional theory.[15]

V. Conclusions

This study attempted to tie together some of the notions associated with the field of corporation finance with those associated with security and portfolio analyses. Specifically, if the MM corporate tax leverage propositions are correct, then approximately 21 to 24% of the observed systematic risk of common stocks (when averaged over 304 firms) can be explained merely by the added financial risk taken on by the underlying firm with its use of debt and preferred stock. Corporate leverage does count considerably.

To determine whether the MM theory is correct, a number of tests on a contrasting implication of the MM and "traditional" theories of corporation finance were performed. The data confirmed MM's position, at least vis-à-vis our interpretation of the traditional theory's position. This should provide another piece of evidence on this controversial topic.

Finally, if the MM theory and the capital asset pricing model are correct, and if the adjustments made in equations (8) or (4a) result in accurate measures of the systematic risk of a leverage-free firm, the possibility is greater, without resorting to a fullblown risk-class study of the type MM did for the electric utility industry [8], of estimating the cost of capital for individual firms.

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15. All of our tests, it should be emphasized, although consistent, are only inferential. Aside from assuming that the two-digit SEC industry classification is a good proxy for risk-classes and that the errors in estimating the individual βs can be safely ignored, the tests rely on the two theories exhausting all the reasonable theories on leverage. But there is always the use of another line of reasoning. If the results of the MM electric utility study [8] are correct, and if these results can be generalized to all firms and to all risk-classes, then it can be claimed that the MM theory is universally valid. Then our result in Section III does indicate the correct effect of the firm's capital structure on the systematic risk of common stocks.

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Costs of Capital for Projects of Differing Riskiness. As noted in Chapter 11, care must be taken to assign different risk-adjusted discount rates to capital budgeting projects of differing degrees of riskiness.

Capital Structure Weights. In this chapter we have simply taken as given the target capital structure and used this target to obtain the weights used to calculate k. As we shall see in Chapter 17, establishing the target capital structure is a major task in itself.

Dynamic Considerations. Capital budgeting and cost of capital estimates are a part of the *planning process* — they deal with ex ante, or estimated, data rather than ex post, or historical data. Hence, we can be wrong about the location of the IOS and the MCC. For example, we can underestimate the MCC and hence accept projects that, with 20-20 hindsight, we should have rejected. In a dynamic, changing world this is a real problem. Interest rates and money costs could be low at the time plans are being laid and contracts to build plants are being let, but six or eight months later these capital costs could have risen substantially. Thus, a project that formerly looked good could turn out to be a bad one because we improperly forecasted the MCC schedule.

Although this listing of problem areas may appear formidable, the state of the art in cost of capital estimation is really not in bad shape. The procedures outlined in this chapter can be used to obtain cost of capital estimates that are sufficiently accurate for practical purposes, and the problems listed here merely indicate the desirability of certain refinements. The refinements are not unimportant, but the problems we have identified do not invalidate the usefulness of the procedures outlined in the chapter.

Small Business

COST OF EQUITY CAPITAL FOR SMALL FIRMS

The three equity cost estimating techniques that were discussed in this chapter have serious limitations when applied to small firms, thus increasing the need for the small-business manager to use judgment. Consider first the constant growth model, $k_s = D_1/P_0 + g$. Imagine a small, rapidly growing firm, such as Bio-Technology General (BTG), which does not now and will not in the foreseeable future pay dividends. For firms like this, the constant growth model is simply not applicable. In fact, it is difficult to imagine any dividend model that would be of practical benefit for such a firm because of the difficulty of estimating growth rates.

The method which calls for adding a risk premium of about 3 percent to the firm's cost of debt can be used for some small firms, but problems arise if the firm does not have a fixed rate issue outstanding. BTG, for example, has no such debt issue outstanding, so we could not use the bond-yield-plus-risk-premium approach for BTG.

The third approach, the CAPM, is also often unusable because if the firm's stock is not publicly

traded, then we cannot calculate the firm's beta. For the privately owned firm, we might use the so-called "pure play" CAPM technique. This involves finding a firm in the same line of business that does have public equity, estimating its beta, and then using this beta as a proxy for that of the small business in question.

To illustrate the pure play approach, again consider BTG. The firm is not publicly traded, so we cannot estimate its beta. However, data are available on more established firms, such as Genentech and Genetic Industries, so we could use their betas as representative of the biological and genetic engineering industry. Of course, these firms' betas would have to be subjectively modified to reflect their larger sizes and more established positions, as well as to take account of the differences in the nature of their products and their capital structures as compared to those of BTG. Still, as long as there are public companies in similar lines of business available for comparison, the estimates of their betas can be used to help estimate the cost of capital of a firm whose equity is not publicly traded. Note that a "liquidity premium" as discussed in Chapter 3 would also have to be added to reflect the illiquidity of the small, nonpublic firm's stock.

Flotation Costs for Small Issues

When external equity capital is raised, flotation costs increase the cost of equity capital beyond what it would be for internal funds. These external flotation costs are especially significant for smaller firms, and they can substantially affect capital budgeting decisions involving external equity funds. To illustrate this point, consider a firm that is expected to pay constant dividends forever, and hence whose growth rate is zero. In this case, if F is the percentage flotation cost, then the cost of equity capital is $k_e = D_1/[P_0(1 - F)]$. The higher the flotation cost, the higher the cost of external equity.

How big is F? According to the latest Securities and Exchange Commission data, the average flotation cost of large common stock offerings (more than $50 million) is only about 4 percent. For a firm that is expected to provide a 15 percent dividend yield (that is, $D_1/P_0 = 15\%$), the cost of equity is 15%/(1 − 0.04), or 15.6 percent. However, the SEC's data on small stock offerings (less than $1 million) show that flotation costs for such issues average about 21 percent. Thus, the cost of equity capital in the preceding example would be 15%/(1 − 0.21), or about 19 percent. When we compare this to the 15.6 percent for large offerings, it is clear that a small firm would have to earn considerably more on the same project than a large firm. Small firms are therefore at a substantial disadvantage because of the effects of flotation costs.

The Small-Firm Effect

A number of researchers have observed that portfolios of small-firm stocks have earned consistently higher average returns than those of large-firm stocks; this is called the "small-firm effect." On the surface, it would seem to be advantageous to the small firm to provide average returns in the stock market that are higher than those of large firms. In reality, it is bad news for the small firm; what the small-firm effect means is that the capital market demands higher returns on stocks of small firms than on otherwise similar stocks of large firms. Therefore, the cost of equity capital is higher for small firms. This compounds the high flotation cost problem noted above.

It may be argued that stocks of small firms are riskier than those of large ones and that this accounts for the differences in returns. It is true that academic research usually finds that betas are higher on average for small firms than for large ones. However, the larger returns for small firms remain larger even after adjusting for the effects of their higher risks as reflected in their beta coefficients.

The small-firm effect is an anomaly in the sense that it is not consistent with the CAPM theory. Still, higher returns reflect a higher cost of capital, so we must conclude that smaller firms do have higher capital costs than otherwise similar larger firms. The manager of a small firm should take this factor into account when estimating his or her firm's cost of equity capital. In general, the cost of equity capital appears to be about four percentage points higher for small firms (those with market values of less than $20 million) than for large, New York Stock Exchange firms with similar risk characteristics.

The Cross-Section of Expected Stock Returns

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The Cross-Section of Expected Stock Returns

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ABSTRACT

Two easily measured variables, size and book-to-market equity, combine to capture the cross-sectional variation in average stock returns associated with market β, size, leverage, book-to-market equity, and earnings-price ratios. Moreover, when the tests allow for variation in β that is unrelated to size, the relation between market β and average return is flat, even when β is the only explanatory variable.

THE ASSET-PRICING MODEL OF Sharpe (1964), Lintner (1965), and Black (1972) has long shaped the way academics and practitioners think about average returns and risk. The central prediction of the model is that the market portfolio of invested wealth is mean-variance efficient in the sense of Markowitz (1959). The efficiency of the market portfolio implies that (a) expected returns on securities are a positive linear function of their market βs (the slope in the regression of a security's return on the market's return), and (b) market βs suffice to describe the cross-section of expected returns.

There are several empirical contradictions of the Sharpe-Lintner-Black (SLB) model. The most prominent is the size effect of Banz (1981). He finds that market equity, ME (a stock's price times shares outstanding), adds to the explanation of the cross-section of average returns provided by market βs. Average returns on small (low ME) stocks are too high given their β estimates, and average returns on large stocks are too low.

Another contradiction of the SLB model is the positive relation between leverage and average return documented by Bhandari (1988). It is plausible that leverage is associated with risk and expected return, but in the SLB model, leverage risk should be captured by market β. Bhandari finds, however, that leverage helps explain the cross-section of average stock returns in tests that include size (ME) as well as β.

Stattman (1980) and Rosenberg, Reid, and Lanstein (1985) find that average returns on U.S. stocks are positively related to the ratio of a firm's book value of common equity, BE, to its market value, ME. Chan, Hamao, and Lakonishok (1991) find that book-to-market equity, BE/ME, also has a strong role in explaining the cross-section of average returns on Japanese stocks.

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Finally, Basu (1983) shows that earnings-price ratios (E/P) help explain the cross-section of average returns on U.S. stocks in tests that also include size and market β. Ball (1978) argues that E/P is a catch-all proxy for unnamed factors in expected returns; E/P is likely to be higher (prices are lower relative to earnings) for stocks with higher risks and expected returns, whatever the unnamed sources of risk.

Ball's proxy argument for E/P might also apply to size (ME), leverage, and book-to-market equity. All these variables can be regarded as different ways to scale stock prices, to extract the information in prices about risk and expected returns (Keim (1988)). Moreover, since E/P, ME, leverage, and BE/ME are all scaled versions of price, it is reasonable to expect that some of them are redundant for describing average returns. Our goal is to evaluate the joint roles of market β, size, E/P, leverage, and book-to-market equity in the cross-section of average returns on NYSE, AMEX, and NASDAQ stocks.

Black, Jensen, and Scholes (1972) and Fama and MacBeth (1973) find that, as predicted by the SLB model, there is a positive simple relation between average stock returns and β during the pre-1969 period. Like Reinganum (1981) and Lakonishok and Shapiro (1986), we find that the relation between β and average return disappears during the more recent 1963–1990 period, even when β is used alone to explain average returns. The appendix shows that the simple relation between β and average return is also weak in the 50-year 1941–1990 period. In short, our tests do not support the most basic prediction of the SLB model, that average stock returns are positively related to market βs.

Unlike the simple relation between β and average return, the univariate relations between average return and size, leverage, E/P, and book-to-market equity are strong. In multivariate tests, the negative relation between size and average return is robust to the inclusion of other variables. The positive relation between book-to-market equity and average return also persists in competition with other variables. Moreover, although the size effect has attracted more attention, book-to-market equity has a consistently stronger role in average returns. Our bottom-line results are: (a) β does not seem to help explain the cross-section of average stock returns, and (b) the combination of size and book-to-market equity seems to absorb the roles of leverage and E/P in average stock returns, at least during our 1963–1990 sample period.

If assets are priced rationally, our results suggest that stock risks are multidimensional. One dimension of risk is proxied by size, ME. Another dimension of risk is proxied by BE/ME, the ratio of the book value of common equity to its market value.

It is possible that the risk captured by BE/ME is the relative distress factor of Chan and Chen (1991). They postulate that the earning prospects of firms are associated with a risk factor in returns. Firms that the market judges to have poor prospects, signaled here by low stock prices and high ratios of book-to-market equity, have higher expected stock returns (they are penalized with higher costs of capital) than firms with strong prospects. It is

also possible, however, that BE/ME just captures the unraveling (regression toward the mean) of irrational market whims about the prospects of firms.

Whatever the underlying economic causes, our main result is straightforward. Two easily measured variables, size (ME) and book-to-market equity (BE/ME), provide a simple and powerful characterization of the cross-section of average stock returns for the 1963–1990 period.

In the next section we discuss the data and our approach to estimating β. Section II examines the relations between average return and β and between average return and size. Section III examines the roles of E/P, leverage, and book-to-market equity in average returns. In sections IV and V, we summarize, interpret, and discuss applications of the results.

I. Preliminaries

A. Data

We use all nonfinancial firms in the intersection of (a) the NYSE, AMEX, and NASDAQ return files from the Center for Research in Security Prices (CRSP) and (b) the merged COMPUSTAT annual industrial files of income-statement and balance-sheet data, also maintained by CRSP. We exclude financial firms because the high leverage that is normal for these firms probably does not have the same meaning as for nonfinancial firms, where high leverage more likely indicates distress. The CRSP returns cover NYSE and AMEX stocks until 1973 when NASDAQ returns also come on line. The COMPUSTAT data are for 1962–1989. The 1962 start date reflects the fact that book value of common equity (COMPUSTAT item 60), is not generally available prior to 1962. More important, COMPUSTAT data for earlier years have a serious selection bias; the pre-1962 data are tilted toward big historically successful firms.

To ensure that the accounting variables are known before the returns they are used to explain, we match the accounting data for all fiscal yearends in calendar year $t - 1$ (1962–1989) with the returns for July of year t to June of $t + 1$. The 6-month (minimum) gap between fiscal yearend and the return tests is conservative. Earlier work (e.g., Basu (1983)) often assumes that accounting data are available within three months of fiscal yearends. Firms are indeed required to file their 10-K reports with the SEC within 90 days of their fiscal yearends, but on average 19.8% do not comply. In addition, more than 40% of the December fiscal yearend firms that do comply with the 90-day rule file on March 31, and their reports are not made public until April. (See Alford, Jones, and Zmijewski (1992).)

We use a firm's market equity at the end of December of year $t - 1$ to compute its book-to-market, leverage, and earnings-price ratios for $t - 1$, and we use its market equity for June of year t to measure its size. Thus, to be included in the return tests for July of year t, a firm must have a CRSP stock price for December of year $t - 1$ and June of year t. It must also have monthly returns for at least 24 of the 60 months preceding July of year t (for

"pre-ranking" β estimates, discussed below). And the firm must have COMPUSTAT data on total book assets (A), book equity (BE), and earnings (E), for its fiscal year ending in (any month of) calendar year $t - 1$.

Our use of December market equity in the E/P, BE/ME, and leverage ratios is objectionable for firms that do not have December fiscal yearends because the accounting variable in the numerator of a ratio is not aligned with the market value in the denominator. Using ME at fiscal yearends is also problematic; then part of the cross-sectional variation of a ratio for a given year is due to market-wide variation in the ratio during the year. For example, if there is a general fall in stock prices during the year, ratios measured early in the year will tend to be lower than ratios measured later. We can report, however, that the use of fiscal-yearend MEs, rather than December MEs, in the accounting ratios has little impact on our return tests.

Finally, the tests mix firms with different fiscal yearends. Since we match accounting data for all fiscal yearends in calendar year $t - 1$ with returns for July of t to June of $t + 1$, the gap between the accounting data and the matching returns varies across firms. We have done the tests using the smaller sample of firms with December fiscal yearends with similar results.

B. Estimating Market βs

Our asset-pricing tests use the cross-sectional regression approach of Fama and MacBeth (1973). Each month the cross-section of returns on stocks is regressed on variables hypothesized to explain expected returns. The time-series means of the monthly regression slopes then provide standard tests of whether different explanatory variables are on average priced.

Since size, E/P, leverage, and BE/ME are measured precisely for individual stocks, there is no reason to smear the information in these variables by using portfolios in the Fama-MacBeth (FM) regressions. Most previous tests use portfolios because estimates of market βs are more precise for portfolios. Our approach is to estimate βs for portfolios and then assign a portfolio's β to each stock in the portfolio. This allows us to use individual stocks in the FM asset-pricing tests.

B.1. β Estimation: Details

In June of each year, all NYSE stocks on CRSP are sorted by size (ME) to determine the NYSE decile breakpoints for ME. NYSE, AMEX, and NASDAQ stocks that have the required CRSP-COMPUSTAT data are then allocated to 10 size portfolios based on the NYSE breakpoints. (If we used stocks from all three exchanges to determine the ME breakpoints, most portfolios would include only small stocks after 1973, when NASDAQ stocks are added to the sample.)

We form portfolios on size because of the evidence of Chan and Chen (1988) and others that size produces a wide spread of average returns and βs. Chan and Chen use only size portfolios. The problem this creates is that size and the βs of size portfolios are highly correlated (-0.988 in their data), so

asset-pricing tests lack power to separate size from β effects in average returns.

To allow for variation in β that is unrelated to size, we subdivide each size decile into 10 portfolios on the basis of pre-ranking βs for individual stocks. The pre-ranking βs are estimated on 24 to 60 monthly returns (as available) in the 5 years before July of year t. We set the β breakpoints for each size decile using only NYSE stocks that satisfy our COMPUSTAT-CRSP data requirements for year $t-1$. Using NYSE stocks ensures that the β breakpoints are not dominated after 1973 by the many small stocks on NASDAQ. Setting β breakpoints with stocks that satisfy our COMPUSTAT-CRSP data requirements guarantees that there are firms in each of the 100 size-β portfolios.

After assigning firms to the size-β portfolios in June, we calculate the equal-weighted monthly returns on the portfolios for the next 12 months, from July to June. In the end, we have post-ranking monthly returns for July 1963 to December 1990 on 100 portfolios formed on size and pre-ranking βs. We then estimate βs using the full sample (330 months) of post-ranking returns on each of the 100 portfolios, with the CRSP value-weighted portfolio of NYSE, AMEX, and (after 1972) NASDAQ stocks used as the proxy for the market. We have also estimated βs using the value-weighted or the equal-weighted portfolio of NYSE stocks as the proxy for the market. These βs produce inferences on the role of β in average returns like those reported below.

We estimate β as the sum of the slopes in the regression of the return on a portfolio on the current and prior month's market return. (An additional lead and lag of the market have little effect on these sum βs.) The sum βs are meant to adjust for nonsynchronous trading (Dimson (1979)). Fowler and Rorke (1983) show that sum βs are biased when the market return is autocorrelated. The 1st- and 2nd-order autocorrelations of the monthly market returns for July 1963 to December 1990 are 0.06 and -0.05, both about 1 standard error from 0. If the Fowler-Rorke corrections are used, they lead to trivial changes in the βs. We stick with the simpler sum βs. Appendix Table AI shows that using sum βs produces large increases in the βs of the smallest ME portfolios and small declines in the βs of the largest ME portfolios.

Chan and Chen (1988) show that full-period β estimates for portfolios can work well in tests of the SLB model, even if the true βs of the portfolios vary through time, if the variation in the βs is proportional,

$$\beta_{jt} - \beta_j = k_t(\beta_j - \beta), \tag{1}$$

where β_{jt} is the true β for portfolio j at time t, β_j is the mean of β_{jt} across t, and β is the mean of the β_j. The Appendix argues that (1) is a good approximation for the variation through time in the true βs of portfolios (j) formed on size and β. For diehard β fans, sure to be skeptical of our results on the weak role of β in average stock returns, we can also report that the results stand up to robustness checks that use 5-year pre-ranking βs, or 5-year post-ranking βs, instead of the full-period post-ranking βs.

We allocate the full-period post-ranking β of a size-β portfolio to each stock in the portfolio. These are the βs that will be used in the Fama-MacBeth cross-sectional regressions for individual stocks. We judge that the precision of the full-period post-ranking portfolio βs, relative to the imprecise β estimates that would be obtained for individual stocks, more than makes up for the fact that true βs are not the same for all stocks in a portfolio. And note that assigning full-period portfolio βs to stocks does not mean that a stock's β is constant. A stock can move across portfolios with year-to-year changes in the stock's size (ME) and in the estimates of its β for the preceding 5 years.

B.2. β Estimates

Table I shows that forming portfolios on size and pre-ranking βs, rather than on size alone, magnifies the range of full-period post-ranking βs. Sorted on size alone, the post-ranking βs range from 1.44 for the smallest ME portfolio to 0.92 for the largest. This spread of βs across the 10 size deciles is smaller than the spread of post-ranking βs produced by the β sort of *any* size decile. For example, the post-ranking βs for the 10 portfolios in the smallest size decile range from 1.05 to 1.79. Across all 100 size-β portfolios, the post-ranking βs range from 0.53 to 1.79, a spread 2.4 times the spread, 0.52, obtained with size portfolios alone.

Two other facts about the βs are important. First, in each size decile the post-ranking βs closely reproduce the ordering of the pre-ranking βs. We take this to be evidence that the pre-ranking β sort captures the ordering of true post-ranking βs. (The appendix gives more evidence on this important issue.) Second, the β sort is not a refined size sort. In any size decile, the average values of ln(ME) are similar across the β-sorted portfolios. Thus the pre-ranking β sort achieves its goal. It produces strong variation in post-ranking βs that is unrelated to size. This is important in allowing our tests to distinguish between β and size effects in average returns.

II. β and Size

The Sharpe-Lintner-Black (SLB) model plays an important role in the way academics and practitioners think about risk and the relation between risk and expected return. We show next that when common stock portfolios are formed on size alone, there seems to be evidence for the model's central prediction: average return is positively related to β. The βs of size portfolios are, however, almost perfectly correlated with size, so tests on size portfolios are unable to disentangle β and size effects in average returns. Allowing for variation in β that is unrelated to size breaks the logjam, but at the expense of β. Thus, when we subdivide size portfolios on the basis of pre-ranking βs, we find a strong relation between average return and size, but no relation between average return and β.

A. Informal Tests

Table II shows post-ranking average returns for July 1963 to December 1990 for portfolios formed from one-dimensional sorts of stocks on size or β. The portfolios are formed at the end of June each year and their equal-weighted returns are calculated for the next 12 months. We use returns for July to June to match the returns in later tests that use the accounting data. When we sort on just size or 5-year pre-ranking βs, we form 12 portfolios. The middle 8 cover deciles of size or β. The 4 extreme portfolios (1A, 1B, 10A, and 10B) split the bottom and top deciles in half.

Table II shows that when portfolios are formed on size alone, we observe the familiar strong negative relation between size and average return (Banz (1981)), and a strong positive relation between average return and β. Average returns fall from 1.64% per month for the smallest ME portfolio to 0.90% for the largest. Post-ranking βs also decline across the 12 size portfolios, from 1.44 for portfolio 1A to 0.90 for portfolio 10B. Thus, a simple size sort seems to support the SLB prediction of a positive relation between β and average return. But the evidence is muddied by the tight relation between size and the βs of size portfolios.

The portfolios formed on the basis of the ranked market βs of stocks in Table II produce a wider range of βs (from 0.81 for portfolio 1A to 1.73 for 10B) than the portfolios formed on size. Unlike the size portfolios, the β-sorted portfolios do not support the SLB model. There is little spread in average returns across the β portfolios, and there is no obvious relation between β and average returns. For example, although the two extreme portfolios, 1A and 10B, have much different βs, they have nearly identical average returns (1.20% and 1.18% per month). These results for 1963–1990 confirm Reinganum's (1981) evidence that for β-sorted portfolios, there is no relation between average return and β during the 1964–1979 period.

The 100 portfolios formed on size and then pre-ranking β in Table I clarify the contradictory evidence on the relation between β and average return produced by portfolios formed on size or β alone. Specifically, the two-pass sort gives a clearer picture of the separate roles of size and β in average returns. Contrary to the central prediction of the SLB model, the second-pass β sort produces little variation in average returns. Although the post-ranking βs in Table I increase strongly in each size decile, average returns are flat or show a slight tendency to decline. In contrast, within the columns of the average return and β matrices of Table I, average returns and βs decrease with increasing size.

The two-pass sort on size and β in Table I says that variation in β that is tied to size is positively related to average return, but variation in β unrelated to size is not compensated in the average returns of 1963–1990. The proper inference seems to be that there is a relation between size and average return, but controlling for size, there is no relation between β and average return. The regressions that follow confirm this conclusion, and they produce another that is stronger. The regressions show that when one allows

Table I

Average Returns, Post-Ranking βs and Average Size For Portfolios Formed on Size and then β: Stocks Sorted on ME (Down) then Pre-Ranking β (Across): July 1963 to December 1990

Portfolios are formed yearly. The breakpoints for the size (ME, price times shares outstanding) deciles are determined in June of year t (t = 1963–1990) using all NYSE stocks on CRSP. All NYSE, AMEX, and NASDAQ stocks that meet the CRSP-COMPUSTAT data requirements are allocated to the 10 size portfolios using the NYSE breakpoints. Each size decile is subdivided into 10 β portfolios using pre-ranking βs of individual stocks, estimated with 2 to 5 years of monthly returns (as available) ending in June of year t. We use only NYSE stocks that meet the CRSP-COMPUSTAT data requirements to establish the β breakpoints. The equal-weighted monthly returns on the resulting 100 portfolios are then calculated for July of year t to June of year $t + 1$.

The post-ranking βs use the full (July 1963 to December 1990) sample of post-ranking returns for each portfolio. The pre- and post-ranking βs (here and in all other tables) are the sum of the slopes from a regression of monthly returns on the current and prior month's returns on the value-weighted portfolio of NYSE, AMEX, and (after 1972) NASDAQ stocks. The average return is the time-series average of the monthly equal-weighted portfolio returns, in percent. The average size of a portfolio is the time-series average of monthly averages of ln(ME) for stocks in the portfolio at the end of June of each year, with ME denominated in millions of dollars.

The average number of stocks per month for the size-β portfolios in the smallest size decile varies from 70 to 177. The average number of stocks for the size-β portfolios in size deciles 2 and 3 is between 15 and 41, and the average number for the largest 7 size deciles is between 11 and 22.

The All column shows statistics for equal-weighted size-decile (ME) portfolios. The All row shows statistics for equal-weighted portfolios of the stocks in each β group.

	All	Low-β	β-2	β-3	β-4	β-5	β-6	β-7	β-8	β-9	High-β
Panel A: Average Monthly Returns (in Percent)											
All	1.25	1.34	1.29	1.36	1.31	1.33	1.28	1.24	1.21	1.25	1.14
Small-ME	1.52	1.71	1.57	1.79	1.61	1.50	1.50	1.37	1.63	1.50	1.42
ME-2	1.29	1.25	1.42	1.36	1.39	1.65	1.61	1.37	1.31	1.34	1.11
ME-3	1.24	1.12	1.31	1.17	1.70	1.29	1.10	1.31	1.36	1.26	0.76
ME-4	1.25	1.27	1.13	1.54	1.06	1.34	1.06	1.41	1.17	1.35	0.98
ME-5	1.29	1.34	1.42	1.39	1.48	1.42	1.18	1.13	1.27	1.18	1.08
ME-6	1.17	1.08	1.53	1.27	1.15	1.20	1.21	1.18	1.04	1.07	1.02
ME-7	1.07	0.95	1.21	1.26	1.09	1.18	1.11	1.24	0.62	1.32	0.76
ME-8	1.10	1.09	1.05	1.37	1.20	1.27	0.98	1.18	1.02	1.01	0.94
ME-9	0.95	0.98	0.88	1.02	1.14	1.07	1.23	0.94	0.82	0.88	0.59
Large-ME	0.89	1.01	0.93	1.10	0.94	0.93	0.89	1.03	0.71	0.74	0.56

Table I—*Continued*

	All	Low-β	β-2	β-3	β-4	β-5	β-6	β-7	β-8	β-9	High-β
Panel B: Post-Ranking βs											
All		0.87	0.99	1.09	1.16	1.26	1.29	1.35	1.45	1.52	1.72
Small-ME	1.44	1.05	1.18	1.28	1.32	1.40	1.40	1.49	1.61	1.64	1.79
ME-2	1.39	0.91	1.15	1.17	1.24	1.36	1.41	1.43	1.50	1.66	1.76
ME-3	1.35	0.97	1.13	1.13	1.21	1.26	1.28	1.39	1.50	1.51	1.75
ME-4	1.34	0.78	1.03	1.17	1.16	1.29	1.37	1.46	1.51	1.64	1.71
ME-5	1.25	0.66	0.85	1.12	1.15	1.16	1.26	1.30	1.43	1.59	1.68
ME-6	1.23	0.61	0.78	1.05	1.16	1.22	1.28	1.36	1.46	1.49	1.70
ME-7	1.17	0.57	0.92	1.01	1.11	1.14	1.26	1.24	1.39	1.34	1.60
ME-8	1.09	0.53	0.74	0.94	1.02	1.13	1.12	1.18	1.26	1.35	1.52
ME-9	1.03	0.58	0.74	0.80	0.95	1.06	1.15	1.14	1.21	1.22	1.42
Large-ME	0.92	0.57	0.71	0.78	0.89	0.95	0.92	1.02	1.01	1.11	1.32
Panel C: Average Size (ln(ME))											
All	4.11	3.86	4.26	4.33	4.41	4.27	4.32	4.26	4.19	4.03	3.77
Small-ME	2.24	2.12	2.27	2.30	2.30	2.28	2.29	2.30	2.32	2.25	2.15
ME-2	3.63	3.65	3.68	3.70	3.72	3.69	3.70	3.69	3.69	3.70	3.68
ME-3	4.10	4.14	4.18	4.12	4.15	4.16	4.16	4.18	4.14	4.15	4.15
ME-4	4.50	4.53	4.53	4.57	4.54	4.56	4.55	4.52	4.58	4.52	4.56
ME-5	4.89	4.91	4.91	4.93	4.95	4.93	4.92	4.93	4.92	4.92	4.95
ME-6	5.30	5.30	5.33	5.34	5.34	5.33	5.33	5.33	5.33	5.34	5.36
ME-7	5.73	5.73	5.75	5.77	5.76	5.73	5.77	5.77	5.76	5.72	5.76
ME-8	6.24	6.26	6.27	6.26	6.24	6.24	6.27	6.24	6.24	6.24	6.26
ME-9	6.82	6.82	6.84	6.82	6.82	6.81	6.81	6.81	6.81	6.80	6.83
Large-ME	7.93	7.94	8.04	8.10	8.04	8.02	8.02	7.94	7.80	7.75	7.62

Table II

Properties of Portfolios Formed on Size or Pre-Ranking β: July 1963 to December 1990

At the end of June of each year t, 12 portfolios are formed on the basis of ranked values of size (ME) or pre-ranking β. The pre-ranking βs use 2 to 5 years (as available) of monthly returns ending in June of t. Portfolios 2-9 cover deciles of the ranking variables. The bottom and top 2 portfolios (1A, 1B, 10A, and 10B) split the bottom and top deciles in half. The breakpoints for the ME portfolios are based on ranked values of ME for all NYSE stocks on CRSP. NYSE breakpoints for pre-ranking βs are also used to form the β portfolios. NYSE, AMEX, and NASDAQ stocks are then allocated to the size or β portfolios using the NYSE breakpoints. We calculate each portfolio's monthly equal-weighted return for July of year t to June of year $t + 1$, and then reform the portfolios in June of $t + 1$.

BE is the book value of common equity plus balance-sheet deferred taxes, A is total book assets, and E is earnings (income before extraordinary items, plus income-statement deferred taxes, minus preferred dividends). BE, A, and E are for each firm's latest fiscal year ending in calendar year $t - 1$. The accounting ratios are measured using market equity ME in December of year $t - 1$. Firm size ln(ME) is measured in June of year t, with ME denominated in millions of dollars.

The average return is the time-series average of the monthly equal-weighted portfolio returns, in percent. ln(ME), ln(BE/ME), ln(A/ME), ln(A/BE), E/P, and E/P dummy are the time-series averages of the monthly average values of these variables in each portfolio. Since the E/P dummy is 0 when earnings are positive, and 1 when earnings are negative, E/P dummy gives the average proportion of stocks with negative earnings in each portfolio.

β is the time-series average of the monthly portfolio βs. Stocks are assigned the post-ranking β of the size-β portfolio they are in at the end of June of year t (Table I). These individual-firm βs are averaged to compute the monthly βs for each portfolio for July of year t to June of year $t + 1$.

Firms is the average number of stocks in the portfolio each month.

	1A	1B	2	3	4	5	6	7	8	9	10A	10B
Panel A: Portfolios Formed on Size												
Return	1.64	1.16	1.29	1.24	1.25	1.29	1.17	1.07	1.10	0.95	0.88	0.90
β	1.44	1.44	1.39	1.34	1.33	1.24	1.22	1.16	1.08	1.02	0.95	0.90
ln(ME)	1.98	3.18	3.63	4.10	4.50	4.89	5.30	5.73	6.24	6.82	7.39	8.44
ln(BE/ME)	−0.01	−0.21	−0.23	−0.26	−0.32	−0.36	−0.36	−0.44	−0.40	−0.42	−0.51	−0.65
ln(A/ME)	0.73	0.50	0.46	0.43	0.37	0.32	0.32	0.24	0.29	0.27	0.17	−0.03
ln(A/BE)	0.75	0.71	0.69	0.69	0.68	0.67	0.68	0.67	0.69	0.70	0.68	0.62
E/P dummy	0.26	0.14	0.11	0.09	0.06	0.04	0.04	0.03	0.03	0.02	0.02	0.01
E(+)/P	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09
Firms	772	189	236	170	144	140	128	125	119	114	60	64

Table II—*Continued*

	1A	1B	2	3	4	5	6	7	8	9	10A	10B
Panel B: Portfolios Formed on Pre-Ranking β												
Return	1.20	1.20	1.32	1.26	1.31	1.30	1.30	1.23	1.23	1.33	1.34	1.18
β	0.81	0.79	0.92	1.04	1.13	1.19	1.26	1.32	1.41	1.52	1.63	1.73
ln(ME)	4.21	4.86	4.75	4.68	4.59	4.48	4.36	4.25	3.97	3.78	3.52	3.15
ln(BE/ME)	−0.18	−0.13	−0.22	−0.21	−0.23	−0.22	−0.22	−0.25	−0.23	−0.27	−0.31	−0.50
ln(A/ME)	0.60	0.66	0.49	0.45	0.42	0.42	0.45	0.42	0.47	0.46	0.46	0.31
ln(A/BE)	0.78	0.79	0.71	0.66	0.64	0.65	0.67	0.67	0.70	0.73	0.77	0.81
E/P dummy	0.12	0.06	0.09	0.09	0.08	0.09	0.10	0.12	0.12	0.14	0.17	0.23
E(+)/P	0.11	0.12	0.10	0.10	0.10	0.10	0.10	0.09	0.10	0.09	0.09	0.08
Firms	116	80	185	181	179	182	185	205	227	267	165	291

for variation in β that is unrelated to size, the relation between β and average return is flat, even when β is the only explanatory variable.

B. Fama-MacBeth Regressions

Table III shows time-series averages of the slopes from the month-by-month Fama-MacBeth (FM) regressions of the cross-section of stock returns on size, β, and the other variables (leverage, E/P, and book-to-market equity) used to explain average returns. The average slopes provide standard FM tests for determining which explanatory variables on average have non-zero expected premiums during the July 1963 to December 1990 period.

Like the average returns in Tables I and II, the regressions in Table III say that size, ln(ME), helps explain the cross-section of average stock returns. The average slope from the monthly regressions of returns on size alone is -0.15%, with a t-statistic of -2.58. This reliable negative relation persists no matter which other explanatory variables are in the regressions; the average slopes on ln(ME) are always close to or more than 2 standard errors from 0. The size effect (smaller stocks have higher average returns) is thus robust in the 1963–1990 returns on NYSE, AMEX, and NASDAQ stocks.

In contrast to the consistent explanatory power of size, the FM regressions show that market β does not help explain average stock returns for 1963–1990. In a shot straight at the heart of the SLB model, the average slope from the regressions of returns on β alone in Table III is 0.15% per month and only 0.46 standard errors from 0. In the regressions of returns on size and β, size has explanatory power (an average slope -3.41 standard errors from 0), but the average slope for β is negative and only 1.21 standard errors from 0. Lakonishok and Shapiro (1986) get similar results for NYSE stocks for 1962–1981. We can also report that β shows no power to explain average returns (the average slopes are typically less than 1 standard error from 0) in FM regressions that use various combinations of β with size, book-to-market equity, leverage, and E/P.

C. Can β Be Saved?

What explains the poor results for β? One possibility is that other explanatory variables are correlated with true βs, and this obscures the relation between average returns and measured βs. But this line of attack cannot explain why β has no power when used alone to explain average returns. Moreover, leverage, book-to-market equity, and E/P do not seem to be good proxies for β. The averages of the monthly cross-sectional correlations between β and the values of these variables for individual stocks are all within 0.15 of 0.

Another hypothesis is that, as predicted by the SLB model, there is a positive relation between β and average return, but the relation is obscured by noise in the β estimates. However, our full-period post-ranking βs do not seem to be imprecise. Most of the standard errors of the βs (not shown) are

Table III

Average Slopes (*t*-Statistics) from Month-by-Month Regressions of Stock Returns on β, Size, Book-to-Market Equity, Leverage, and E/P: July 1963 to December 1990

Stocks are assigned the post-ranking β of the size-β portfolio they are in at the end of June of year t (Table I). BE is the book value of common equity plus balance-sheet deferred taxes, A is total book assets, and E is earnings (income before extraordinary items, plus income-statement deferred taxes, minus preferred dividends). BE, A, and E are for each firm's latest fiscal year ending in calendar year $t - 1$. The accounting ratios are measured using market equity ME in December of year $t - 1$. Firm size ln(ME) is measured in June of year t. In the regressions, these values of the explanatory variables for individual stocks are matched with CRSP returns for the months from July of year t to June of year $t + 1$. The gap between the accounting data and the returns ensures that the accounting data are available prior to the returns. If earnings are positive, E(+)/P is the ratio of total earnings to market equity and E/P dummy is 0. If earnings are negative, E(+)/P is 0 and E/P dummy is 1.

The average slope is the time-series average of the monthly regression slopes for July 1963 to December 1990, and the t-statistic is the average slope divided by its time-series standard error.

On average, there are 2267 stocks in the monthly regressions. To avoid giving extreme observations heavy weight in the regressions, the smallest and largest 0.5% of the observations on E(+)/P, BE/ME, A/ME, and A/BE are set equal to the next largest or smallest values of the ratios (the 0.005 and 0.995 fractiles). This has no effect on inferences.

β	ln(ME)	ln(BE/ME)	ln(A/ME)	ln(A/BE)	E/P Dummy	E(+)/P
0.15						
(0.46)						
	−0.15					
	(−2.58)					
−0.37	−0.17					
(−1.21)	(−3.41)					
		0.50				
		(5.71)				
			0.50	−0.57		
			(5.69)	(−5.34)		
					0.57	4.72
					(2.28)	(4.57)
	−0.11	0.35				
	(−1.99)	(4.44)				
	−0.11		0.35	−0.50		
	(−2.06)		(4.32)	(−4.56)		
	−0.16				0.06	2.99
	(−3.06)				(0.38)	(3.04)
	−0.13	0.33			−0.14	0.87
	(−2.47)	(4.46)			(−0.90)	(1.23)
	−0.13		0.32	−0.46	−0.08	1.15
	(−2.47)		(4.28)	(−4.45)	(−0.56)	(1.57)

0.05 or less, only 1 is greater than 0.1, and the standard errors are small relative to the range of the βs (0.53 to 1.79).

The β-sorted portfolios in Tables I and II also provide strong evidence against the β-measurement-error story. When portfolios are formed on pre-ranking βs alone (Table II), the post-ranking βs for the portfolios almost perfectly reproduce the ordering of the pre-ranking βs. Only the β for portfolio 1B is out of line, and only by 0.02. Similarly, when portfolios are formed on size and then pre-ranking βs (Table I), the post-ranking βs in each size decile closely reproduce the ordering of the pre-ranking βs.

The correspondence between the ordering of the pre-ranking and post-ranking βs for the β-sorted portfolios in Tables I and II is evidence that the post-ranking βs are informative about the ordering of the true βs. The problem for the SLB model is that there is no similar ordering in the average returns on the β-sorted portfolios. Whether one looks at portfolios sorted on β alone (Table II) or on size and then β (Table I), average returns are flat (Table II) or decline slightly (Table I) as the post-ranking βs increase.

Our evidence on the robustness of the size effect and the absence of a relation between β and average return is so contrary to the SLB model that it behooves us to examine whether the results are special to 1963–1990. The appendix shows that NYSE returns for 1941–1990 behave like the NYSE, AMEX, and NASDAQ returns for 1963–1990; there is a reliable size effect over the full 50-year period, but little relation between β and average return. Interestingly, there is a reliable simple relation between β and average return during the 1941–1965 period. These 25 years are a major part of the samples in the early studies of the SLB model of Black, Jensen, and Scholes (1972) and Fama and MacBeth (1973). Even for the 1941–1965 period, however, the relation between β and average return disappears when we control for size.

III. Book-to-Market Equity, E/P, and Leverage

Tables I to III say that there is a strong relation between the average returns on stocks and size, but there is no reliable relation between average returns and β. In this section we show that there is also a strong cross-sectional relation between average returns and book-to-market equity. If anything, this book-to-market effect is more powerful than the size effect. We also find that the combination of size and book-to-market equity absorbs the apparent roles of leverage and E/P in average stock returns.

A. Average Returns

Table IV shows average returns for July 1963 to December 1990 for portfolios formed on ranked values of book-to-market equity (BE/ME) or earnings-price ratio (E/P). The BE/ME and E/P portfolios in Table IV are formed in the same general way (one-dimensional yearly sorts) as the size and β portfolios in Table II. (See the tables for details.)

The relation between average return and E/P has a familiar U-shape (e.g., Jaffe, Keim, and Westerfield (1989) for U.S. data, and Chan, Hamao, and Lakonishok (1991) for Japan). Average returns decline from 1.46% per month for the negative E/P portfolio to 0.93% for the firms in portfolio 1B that have low but positive E/P. Average returns then increase monotonically, reaching 1.72% per month for the highest E/P portfolio.

The more striking evidence in Table IV is the strong positive relation between average return and book-to-market equity. Average returns rise from 0.30% for the lowest BE/ME portfolio to 1.83% for the highest, a difference of 1.53% per month. This spread is twice as large as the difference of 0.74% between the average monthly returns on the smallest and largest size portfolios in Table II. Note also that the strong relation between book-to-market equity and average return is unlikely to be a β effect in disguise; Table IV shows that post-ranking market βs vary little across portfolios formed on ranked values of BE/ME.

On average, only about 50 (out of 2317) firms per year have negative book equity, BE. The negative BE firms are mostly concentrated in the last 14 years of the sample, 1976–1989, and we do not include them in the tests. We can report, however, that average returns for negative BE firms are high, like the average returns of high BE/ME firms. Negative BE (which results from persistently negative earnings) and high BE/ME (which typically means that stock prices have fallen) are both signals of poor earning prospects. The similar average returns of negative and high BE/ME firms are thus consistent with the hypothesis that book-to-market equity captures cross-sectional variation in average returns that is related to relative distress.

B. Fama-MacBeth Regressions

B.1. BE/ME

The FM regressions in Table III confirm the importance of book-to-market equity in explaining the cross-section of average stock returns. The average slope from the monthly regressions of returns on ln(BE/ME) alone is 0.50%, with a *t*-statistic of 5.71. This book-to-market relation is stronger than the size effect, which produces a *t*-statistic of -2.58 in the regressions of returns on ln(ME) alone. But book-to-market equity does not replace size in explaining average returns. When both ln(ME) and ln(BE/ME) are included in the regressions, the average size slope is still -1.99 standard errors from 0; the book-to-market slope is an impressive 4.44 standard errors from 0.

B.2. Leverage

The FM regressions that explain returns with leverage variables provide interesting insight into the relation between book-to-market equity and average return. We use two leverage variables, the ratio of book assets to market equity, A/ME, and the ratio of book assets to book equity, A/BE. We interpret A/ME as a measure of market leverage, while A/BE is a measure

Table IV

Properties of Portfolios Formed on Book-to-Market Equity (BE/ME) and Earnings-Price Ratio (E/P): July 1963 to December 1990

At the end of each year $t-1$, 12 portfolios are formed on the basis of ranked values of BE/ME or E/P. Portfolios 2-9 cover deciles of the ranking variables. The bottom and top 2 portfolios (1A, 1B, 10A, and 10B) split the bottom and top deciles in half. For E/P, there are 13 portfolios; portfolio 0 is stocks with negative E/P. Since BE/ME and E/P are not strongly related to exchange listing, their portfolio breakpoints are determined on the basis of the ranked values of the variables for all stocks that satisfy the CRSP-COMPUSTAT data requirements. BE is the book value of common equity plus balance-sheet deferred taxes, A is total book assets, and E is earnings (income before extraordinary items, plus income-statement deferred taxes, minus preferred dividends). BE, A, and E are for each firm's latest fiscal year ending in calendar year $t-1$. The accounting ratios are measured using market equity ME in December of year $t-1$. Firm size ln(ME) is measured in June of year t, with ME denominated in millions of dollars. We calculate each portfolio's monthly equal-weighted return for July of year t to June of year $t+1$, and then reform the portfolios at the end of year t.

Return is the time-series average of the monthly equal-weighted portfolio returns (in percent). ln(ME), ln(BE/ME), ln(A/ME), ln(A/BE), E(+)/P, and E/P dummy are the time-series averages of the monthly average values of these variables in each portfolio. Since the E/P dummy is 0 when earnings are positive, and 1 when earnings are negative, E/P dummy gives the average proportion of stocks with negative earnings in each portfolio.

β is the time-series average of the monthly portfolio βs. Stocks are assigned the post-ranking β of the size-β portfolio they are in at the end of June of year t (Table I). These individual-firm βs are averaged to compute the monthly βs for each portfolio for July of year t to June of year $t+1$.

Firms is the average number of stocks in the portfolio each month.

Portfolio	0	1A	1B	2	3	4	5	6	7	8	9	10A	10B
Panel A: Stocks Sorted on Book-to-Market Equity (BE/ME)													
Return		0.30	0.67	0.87	0.97	1.04	1.17	1.30	1.44	1.50	1.59	1.92	1.83
β		1.36	1.34	1.32	1.30	1.28	1.27	1.27	1.27	1.27	1.29	1.33	1.35
ln(ME)		4.53	4.67	4.69	4.56	4.47	4.38	4.23	4.06	3.85	3.51	3.06	2.65
ln(BE/ME)		−2.22	−1.51	−1.09	−0.75	−0.51	−0.32	−0.14	0.03	0.21	0.42	0.66	1.02
ln(A/ME)		−1.24	−0.79	−0.40	−0.05	0.20	0.40	0.56	0.71	0.91	1.12	1.35	1.75
ln(A/BE)		0.94	0.71	0.68	0.70	0.71	0.71	0.70	0.68	0.70	0.70	0.70	0.73
E/P dummy		0.29	0.15	0.10	0.08	0.08	0.08	0.09	0.09	0.11	0.15	0.22	0.36
E(+)/P		0.03	0.04	0.06	0.08	0.09	0.10	0.11	0.11	0.12	0.12	0.11	0.10
Firms		89	98	209	222	226	230	235	237	239	239	120	117

Table IV—*Continued*

Portfolio	0	1A	1B	2	3	4	5	6	7	8	9	10A	10B
	Panel B: Stocks Sorted on Earnings-Price Ratio (E/P)												
Return	1.46	1.04	0.93	0.94	1.03	1.18	1.22	1.33	1.42	1.46	1.57	1.74	1.72
β	1.47	1.40	1.35	1.31	1.28	1.26	1.25	1.26	1.24	1.23	1.24	1.28	1.31
ln(ME)	2.48	3.64	4.33	4.61	4.64	4.63	4.58	4.49	4.37	4.28	4.07	3.82	3.52
ln(BE/ME)	−0.10	−0.76	−0.91	−0.79	−0.61	−0.47	−0.33	−0.21	−0.08	0.02	0.15	0.26	0.40
ln(A/ME)	0.90	−0.05	−0.27	−0.16	0.03	0.18	0.31	0.44	0.58	0.70	0.85	1.01	1.25
ln(A/BE)	0.99	0.70	0.63	0.63	0.64	0.65	0.64	0.65	0.66	0.68	0.71	0.75	0.86
E/P dummy	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E(+)/P	0.00	0.01	0.03	0.05	0.06	0.08	0.09	0.11	0.12	0.14	0.16	0.20	0.28
Firms	355	88	90	182	190	193	196	194	197	195	195	95	91

of book leverage. The regressions use the natural logs of the leverage ratios, ln(A/ME) and ln(A/BE), because preliminary tests indicated that logs are a good functional form for capturing leverage effects in average returns. Using logs also leads to a simple interpretation of the relation between the roles of leverage and book-to-market equity in average returns.

The FM regressions of returns on the leverage variables (Table III) pose a bit of a puzzle. The two leverage variables are related to average returns, but with opposite signs. As in Bhandari (1988), higher market leverage is associated with higher average returns; the average slopes for ln(A/ME) are always positive and more than 4 standard errors from 0. But higher book leverage is associated with lower average returns; the average slopes for ln(A/BE) are always negative and more than 4 standard errors from 0.

The puzzle of the opposite slopes on ln(A/ME) and ln(A/BE) has a simple solution. The average slopes for the two leverage variables are opposite in sign but close in absolute value, e.g., 0.50 and −0.57. Thus it is the difference between market and book leverage that helps explain average returns. But the difference between market and book leverage is book-to-market equity, ln(BE/ME) = ln(A/ME) − ln(A/BE). Table III shows that the average book-to-market slopes in the FM regressions are indeed close in absolute value to the slopes for the two leverage variables.

The close links between the leverage and book-to-market results suggest that there are two equivalent ways to interpret the book-to-market effect in average returns. A high ratio of book equity to market equity (a low stock price relative to book value) says that the market judges the prospects of a firm to be poor relative to firms with low BE/ME. Thus BE/ME may capture the relative-distress effect postulated by Chan and Chen (1991). A high book-to-market ratio also says that a firm's market leverage is high relative to its book leverage; the firm has a large amount of market-imposed leverage because the market judges that its prospects are poor and discounts its stock price relative to book value. In short, our tests suggest that the relative-distress effect, captured by BE/ME, can also be interpreted as an involuntary leverage effect, which is captured by the difference between A/ME and A/BE.

B.3. E/P

Ball (1978) posits that the earnings-price ratio is a catch-all for omitted risk factors in expected returns. If current earnings proxy for expected future earnings, high-risk stocks with high expected returns will have low prices relative to their earnings. Thus, E/P should be related to expected returns, whatever the omitted sources of risk. This argument only makes sense, however, for firms with positive earnings. When current earnings are negative, they are not a proxy for the earnings forecasts embedded in the stock price, and E/P is not a proxy for expected returns. Thus, the slope for E/P in the FM regressions is based on positive values; we use a dummy variable for E/P when earnings are negative.

The U-shaped relation between average return and E/P observed in Table IV is also apparent when the E/P variables are used alone in the FM regressions in Table III. The average slope on the E/P dummy variable (0.57% per month, 2.28 standard errors from 0) confirms that firms with negative earnings have higher average returns. The average slope for stocks with positive E/P (4.72% per month, 4.57 standard errors from 0) shows that average returns increase with E/P when it is positive.

Adding size to the regressions kills the explanatory power of the E/P dummy. Thus the high average returns of negative E/P stocks are better captured by their size, which Table IV says is on average small. Adding both size and book-to-market equity to the E/P regressions kills the E/P dummy and lowers the average slope on E/P from 4.72 to 0.87 ($t = 1.23$). In contrast, the average slopes for ln(ME) and ln(BE/ME) in the regressions that include E/P are similar to those in the regressions that explain average returns with only size and book-to-market equity. The results suggest that most of the relation between (positive) E/P and average return is due to the positive correlation between E/P and ln(BE/ME), illustrated in Table IV; firms with high E/P tend to have high book-to-market equity ratios.

IV. A Parsimonious Model for Average Returns

The results to here are easily summarized:

(1) When we allow for variation in β that is unrelated to size, there is no reliable relation between β and average return.
(2) The opposite roles of market leverage and book leverage in average returns are captured well by book-to-market equity.
(3) The relation between E/P and average return seems to be absorbed by the combination of size and book-to-market equity.

In a nutshell, market β seems to have no role in explaining the average returns on NYSE, AMEX, and NASDAQ stocks for 1963–1990, while size and book-to-market equity capture the cross-sectional variation in average stock returns that is related to leverage and E/P.

A. Average Returns, Size and Book-to-Market Equity

The average return matrix in Table V gives a simple picture of the two-dimensional variation in average returns that results when the 10 size deciles are each subdivided into 10 portfolios based on ranked values of BE/ME for individual stocks. Within a size decile (across a row of the average return matrix), returns typically increase strongly with BE/ME: on average, the returns on the lowest and highest BE/ME portfolios in a size decile differ by 0.99% (1.63% − 0.64%) per month. Similarly, looking down the columns of the average return matrix shows that there is a negative relation between average return and size: on average, the spread of returns across the size portfolios in a BE/ME group is 0.58% per month. The average return matrix gives life to the conclusion from the regressions that,

Table V

Average Monthly Returns on Portfolios Formed on Size and Book-to-Market Equity; Stocks Sorted by ME (Down) and then BE/ME (Across): July 1963 to December 1990

In June of each year t, the NYSE, AMEX, and NASDAQ stocks that meet the CRSP-COMPUSTAT data requirements are allocated to 10 size portfolios using the NYSE size (ME) breakpoints. The NYSE, AMEX, and NASDAQ stocks in each size decile are then sorted into 10 BE/ME portfolios using the book-to-market ratios for year $t-1$. BE/ME is the book value of common equity plus balance-sheet deferred taxes for fiscal year $t-1$, over market equity for December of year $t-1$. The equal-weighted monthly portfolio returns are then calculated for July of year t to June of year $t+1$.

Average monthly return is the time-series average of the monthly equal-weighted portfolio returns (in percent).

The All column shows average returns for equal-weighted size decile portfolios. The All row shows average returns for equal-weighted portfolios of the stocks in each BE/ME group.

	Book-to-Market Portfolios										
	All	Low	2	3	4	5	6	7	8	9	High
All	1.23	0.64	0.98	1.06	1.17	1.24	1.26	1.39	1.40	1.50	1.63
Small-ME	1.47	0.70	1.14	1.20	1.43	1.56	1.51	1.70	1.71	1.82	1.92
ME-2	1.22	0.43	1.05	0.96	1.19	1.33	1.19	1.58	1.28	1.43	1.79
ME-3	1.22	0.56	0.88	1.23	0.95	1.36	1.30	1.30	1.40	1.54	1.60
ME-4	1.19	0.39	0.72	1.06	1.36	1.13	1.21	1.34	1.59	1.51	1.47
ME-5	1.24	0.88	0.65	1.08	1.47	1.13	1.43	1.44	1.26	1.52	1.49
ME-6	1.15	0.70	0.98	1.14	1.23	0.94	1.27	1.19	1.19	1.24	1.50
ME-7	1.07	0.95	1.00	0.99	0.83	0.99	1.13	0.99	1.16	1.10	1.47
ME-8	1.08	0.66	1.13	0.91	0.95	0.99	1.01	1.15	1.05	1.29	1.55
ME-9	0.95	0.44	0.89	0.92	1.00	1.05	0.93	0.82	1.11	1.04	1.22
Large-ME	0.89	0.93	0.88	0.84	0.71	0.79	0.83	0.81	0.96	0.97	1.18

controlling for size, book-to-market equity captures strong variation in average returns, and controlling for book-to-market equity leaves a size effect in average returns.

B. The Interaction between Size and Book-to-Market Equity

The average of the monthly correlations between the cross-sections of ln(ME) and ln(BE/ME) for individual stocks is -0.26. The negative correlation is also apparent in the average values of ln(ME) and ln(BE/ME) for the portfolios sorted on ME or BE/ME in Tables II and IV. Thus, firms with low market equity are more likely to have poor prospects, resulting in low stock prices and high book-to-market equity. Conversely, large stocks are more likely to be firms with stronger prospects, higher stock prices, lower book-to-market equity, and lower average stock returns.

The correlation between size and book-to-market equity affects the regressions in Table III. Including ln(BE/ME) moves the average slope on ln(ME) from -0.15 ($t = -2.58$) in the univariate regressions to -0.11 ($t = -1.99$) in the bivariate regressions. Similarly, including ln(ME) in the regressions

lowers the average slope on ln(BE/ME) from 0.50 to 0.35 (still a healthy 4.44 standard errors from 0). Thus, part of the size effect in the simple regressions is due to the fact that small ME stocks are more likely to have high book-to-market ratios, and part of the simple book-to-market effect is due to the fact that high BE/ME stocks tend to be small (they have low ME).

We should not, however, exaggerate the links between size and book-to-market equity. The correlation (-0.26) between ln(ME) and ln(BE/ME) is not extreme, and the average slopes in the bivariate regressions in Table III show that ln(ME) and ln(BE/ME) are both needed to explain the cross-section of average returns. Finally, the 10×10 average return matrix in Table V provides concrete evidence that, (a) controlling for size, book-to-market equity captures substantial variation in the cross-section of average returns, and (b) within BE/ME groups average returns are related to size.

C. Subperiod Averages of the FM Slopes

The message from the average FM slopes for 1963–1990 (Table III) is that size on average has a negative premium in the cross-section of stock returns, book-to-market equity has a positive premium, and the average premium for market β is essentially 0. Table VI shows the average FM slopes for two roughly equal subperiods (July 1963–December 1976 and January 1977–December 1990) from two regressions: (a) the cross-section of stock returns on size, ln(ME), and book-to-market equity, ln(BE/ME), and (b) returns on β, ln(ME), and ln(BE/ME). For perspective, average returns on the value-weighted and equal-weighted (VW and EW) portfolios of NYSE stocks are also shown.

In FM regressions, the intercept is the return on a standard portfolio (the weights on stocks sum to 1) in which the weighted averages of the explanatory variables are 0 (Fama (1976), chapter 9). In our tests, the intercept is weighted toward small stocks (ME is in millions of dollars so ln(ME) = 0 implies ME = \$1 million) and toward stocks with relatively high book-to-market ratios (Table IV says that ln(BE/ME) is negative for the typical firm, so ln(BE/ME) = 0 is toward the high end of the sample ratios). Thus it is not surprising that the average intercepts are always large relative to their standard errors and relative to the returns on the NYSE VW and EW portfolios.

Like the overall period, the subperiods do not offer much hope that the average premium for β is economically important. The average FM slope for β is only slightly positive for 1963–1976 (0.10% per month, $t = 0.25$), and it is negative for 1977–1990 (-0.44% per month, $t = -1.17$). There is a hint that the size effect is weaker in the 1977–1990 period, but inferences about the average size slopes for the subperiods lack power.

Unlike the size effect, the relation between book-to-market equity and average return is so strong that it shows up reliably in both the 1963–1976 and the 1977–1990 subperiods. The average slopes for ln(BE/ME) are all more than 2.95 standard errors from 0, and the average slopes for the

Table VI

Subperiod Average Monthly Returns on the NYSE Equal-Weighted and Value-Weighted Portfolios and Subperiod Means of the Intercepts and Slopes from the Monthly FM Cross-Sectional Regressions of Returns on (a) Size (ln(ME)) and Book-to-Market Equity (ln(BE/ME)), and (b) β, ln(ME), and ln(BE/ME)

Mean is the time-series mean of a monthly return, Std is its time-series standard deviation, and t(Mn) is Mean divided by its time-series standard error.

	7/63–12/90 (330 Mos.)			7/63–12/76 (162 Mos.)			1/77–12/90 (168 Mos.)		
Variable	Mean	Std	t(Mn)	Mean	Std	t(Mn)	Mean	Std	t(Mn)
NYSE Value-Weighted (VW) and Equal-Weighted (EW) Portfolio Returns									
VW	0.81	4.47	3.27	0.56	4.26	1.67	1.04	4.66	2.89
EW	0.97	5.49	3.19	0.77	5.70	1.72	1.15	5.28	2.82
$R_{it} = a + b_{2t}\ln(ME_{it}) + b_{3t}\ln(BE/ME_{it}) + e_{it}$									
a	1.77	8.51	3.77	1.86	10.10	2.33	1.69	6.67	3.27
b_2	−0.11	1.02	−1.99	−0.16	1.25	−1.62	−0.07	0.73	−1.16
b_3	0.35	1.45	4.43	0.36	1.53	2.96	0.35	1.37	3.30
$R_{it} = a + b_{1t}\beta_{it} + b_{2t}\ln(ME_{it}) + b_{3t}\ln(BE/ME_{it}) + e_{it}$									
a	2.07	5.75	6.55	1.73	6.22	3.54	2.40	5.25	5.92
b_1	−0.17	5.12	−0.62	0.10	5.33	0.25	−0.44	4.91	−1.17
b_2	−0.12	0.89	−2.52	−0.15	1.03	−1.91	−0.09	0.74	−1.64
b_3	0.33	1.24	4.80	0.34	1.36	3.17	0.31	1.10	3.67

subperiods (0.36 and 0.35) are close to the average slope (0.35) for the overall period. The subperiod results thus support the conclusion that, among the variables considered here, book-to-market equity is consistently the most powerful for explaining the cross-section of average stock returns.

Finally, Roll (1983) and Keim (1983) show that the size effect is stronger in January. We have examined the monthly slopes from the FM regressions in Table VI for evidence of a January seasonal in the relation between book-to-market equity and average return. The average January slopes for ln(BE/ME) are about twice those for February to December. Unlike the size effect, however, the strong relation between book-to-market equity and average return is not special to January. The average monthly February-to-December slopes for ln(BE/ME) are about 4 standard errors from 0, and they are close to (within 0.05 of) the average slopes for the whole year. Thus, there is a January seasonal in the book-to-market equity effect, but the positive relation between BE/ME and average return is strong throughout the year.

D. β and the Market Factor: Caveats

Some caveats about the negative evidence on the role of β in average returns are in order. The average premiums for β, size, and book-to-market

equity depend on the definitions of the variables used in the regressions. For example, suppose we replace book-to-market equity (ln(BE/ME)) with book equity (ln(BE)). As long as size (ln(ME)) is also in the regression, this change will not affect the intercept, the fitted values or the R^2. But the change, in variables increases the average slope (and the t-statistic) on ln(ME). In other words, it increases the risk premium associated with size. Other redefinitions of the β, size, and book-to-market variables will produce different regression slopes and perhaps different inferences about average premiums, including possible resuscitation of a role for β. And, of course, at the moment, we have no theoretical basis for choosing among different versions of the variables.

Moreover, the tests here are restricted to stocks. It is possible that including other assets will change the inferences about the average premiums for β, size, and book-to-market equity. For example, the large average intercepts for the FM regressions in Table VI suggest that the regressions will not do a good job on Treasury bills, which have low average returns and are likely to have small loadings on the underlying market, size, and book-to-market factors in returns. Extending the tests to bills and other bonds may well change our inferences about average risk premiums, including the revival of a role for market β.

We emphasize, however, that different approaches to the tests are not likely to revive the Sharpe-Lintner-Black model. Resuscitation of the SLB model requires that a better proxy for the market portfolio (a) overturns our evidence that the simple relation between β and average stock returns is flat and (b) leaves β as the only variable relevant for explaining average returns. Such results seem unlikely, given Stambaugh's (1982) evidence that tests of the SLB model do not seem to be sensitive to the choice of a market proxy. Thus, if there is a role for β in average returns, it is likely to be found in a multi-factor model that transforms the flat simple relation between average return and β into a positively sloped conditional relation.

V. Conclusions and Implications

The Sharpe-Lintner-Black model has long shaped the way academics and practitioners think about average return and risk. Black, Jensen, and Scholes (1972) and Fama and MacBeth (1973) find that, as predicted by the model, there is a positive simple relation between average return and market β during the early years (1926–1968) of the CRSP NYSE returns file. Like Reinganum (1981) and Lakonishok and Shapiro (1986), we find that this simple relation between β and average return disappears during the more recent 1963–1990 period. The appendix that follows shows that the relation between β and average return is also weak in the last half century (1941–1990) of returns on NYSE stocks. In short, our tests do not support the central prediction of the SLB model, that average stock returns are positively related to market β.

Banz (1981) documents a strong negative relation between average return and firm size. Bhandari (1988) finds that average return is positively related to leverage, and Basu (1983) finds a positive relation between average return

and E/P. Stattman (1980) and Rosenberg, Reid, and Lanstein (1985) document a positive relation between average return and book-to-market equity for U.S. stocks, and Chan, Hamao, and Lakonishok (1992) find that BE/ME is also a powerful variable for explaining average returns on Japanese stocks.

Variables like size, E/P, leverage, and book-to-market equity are all scaled versions of a firm's stock price. They can be regarded as different ways of extracting information from stock prices about the cross-section of expected stock returns (Ball (1978); Keim (1988)). Since all these variables are scaled versions of price, it is reasonable to expect that some of them are redundant for explaining average returns. Our main result is that for the 1963–1990 period, size and book-to-market equity capture the cross-sectional variation in average stock returns associated with size, E/P, book-to-market equity, and leverage.

A. Rational Asset-Pricing Stories

Are our results consistent with asset-pricing theory? Since the FM intercept is constrained to be the same for all stocks, FM regressions always impose a linear factor structure on returns and expected returns that is consistent with the multifactor asset-pricing models of Merton (1973) and Ross (1976). Thus our tests impose a rational asset-pricing framework on the relation between average return and size and book-to-market equity.

Even if our results are consistent with asset-pricing theory, they are not economically satisfying. What is the economic explanation for the roles of size and book-to-market equity in average returns? We suggest several paths of inquiry.

(a) The intercepts and slopes in the monthly FM regressions of returns on ln(ME) and ln(BE/ME) are returns on portfolios that mimic the underlying common risk factors in returns proxied by size and book-to-market equity (Fama (1976), chapter 9). Examining the relations between the returns on these portfolios and economic variables that measure variation in business conditions might help expose the nature of the economic risks captured by size and book-to-market equity.

(b) Chan, Chen, and Hsieh (1985) argue that the relation between size and average return proxies for a more fundamental relation between expected returns and economic risk factors. Their most powerful factor in explaining the size effect is the difference between the monthly returns on low- and high-grade corporate bonds, which in principle captures a kind of default risk in returns that is priced. It would be interesting to test whether loadings on this or other economic factors, such as those of Chen, Roll, and Ross (1986), can explain the roles of size and book-to-market equity in our tests.

(c) In a similar vein, Chan and Chen (1991) argue that the relation between size and average return is a relative-prospects effect. The earning prospects of distressed firms are more sensitive to economic

conditions. This results in a distress factor in returns that is priced in expected returns. Chan and Chen construct two mimicking portfolios for the distress factor, based on dividend changes and leverage. It would be interesting to check whether loadings on their distress factors absorb the size and book-to-market equity effects in average returns that are documented here.

(d) In fact, if stock prices are rational, BE/ME, the ratio of the book value of a stock to the market's assessment of its value, should be a direct indicator of the relative prospects of firms. For example, we expect that high BE/ME firms have low earnings on assets relative to low BE/ME firms. Our work (in progress) suggests that there is indeed a clean separation between high and low BE/ME firms on various measures of economic fundamentals. Low BE/ME firms are persistently strong performers, while the economic performance of high BE/ME firms is persistently weak.

B. Irrational Asset-Pricing Stories

The discussion above assumes that the asset-pricing effects captured by size and book-to-market equity are rational. For BE/ME, our most powerful expected-return variable, there is an obvious alternative. The cross-section of book-to-market ratios might result from market overreaction to the relative prospects of firms. If overreaction tends to be corrected, BE/ME will predict the cross-section of stock returns.

Simple tests do not confirm that the size and book-to-market effects in average returns are due to market overreaction, at least of the type posited by DeBondt and Thaler (1985). One overreaction measure used by DeBondt and Thaler is a stock's most recent 3-year return. Their overreaction story predicts that 3-year losers have strong post-ranking returns relative to 3-year winners. In FM regressions (not shown) for individual stocks, the 3-year lagged return shows no power even when used alone to explain average returns. The univariate average slope for the lagged return is negative, -6 basis points per month, but less than 0.5 standard errors from 0.

C. Applications

Our main result is that two easily measured variables, size and book-to-market equity, seem to describe the cross-section of average stock returns. Prescriptions for using this evidence depend on (a) whether it will persist, and (b) whether it results from rational or irrational asset-pricing.

It is possible that, by chance, size and book-to-market equity happen to describe the cross-section of average returns in our sample, but they were and are unrelated to expected returns. We put little weight on this possibility, especially for book-to-market equity. First, although BE/ME has long been touted as a measure of the return prospects of stocks, there is no evidence that its explanatory power deteriorates through time. The 1963–1990 relation between BE/ME and average return is strong, and remarkably similar

for the 1963–1976 and 1977–1990 subperiods. Second, our preliminary work on economic fundamentals suggests that high-BE/ME firms tend to be persistently poor earners relative to low-BE/ME firms. Similarly, small firms have a long period of poor earnings during the 1980s not shared with big firms. The systematic patterns in fundamentals give us some hope that size and book-to-market equity proxy for risk factors in returns, related to relative earning prospects, that are rationally priced in expected returns.

If our results are more than chance, they have practical implications for portfolio formation and performance evaluation by investors whose primary concern is long-term average returns. If asset-pricing is rational, size and BE/ME must proxy for risk. Our results then imply that the performance of managed portfolios (e.g., pension funds and mutual funds) can be evaluated by comparing their average returns with the average returns of benchmark portfolios with similar size and BE/ME characteristics. Likewise, the expected returns for different portfolio strategies can be estimated from the historical average returns of portfolios with matching size and BE/ME properties.

If asset-pricing is irrational and size and BE/ME do not proxy for risk, our results might still be used to evaluate portfolio performance and measure the expected returns from alternative investment strategies. If stock prices are irrational, however, the likely persistence of the results is more suspect.

Appendix
Size Versus β: 1941–1990

Our results on the absence of a relation between β and average stock returns for 1963–1990 are so contrary to the tests of the Sharpe-Lintner-Black model by Black, Jensen, and Scholes (1972), Fama and MacBeth (1973), and (more recently) Chan and Chen (1988), that further tests are appropriate. We examine the roles of size and β in the average returns on NYSE stocks for the half-century 1941–1990, the longest available period that avoids the high volatility of returns in the Great Depression. We do not include the accounting variables in the tests because of the strong selection bias (toward successful firms) in the COMPUSTAT data prior to 1962.

We first replicate the results of Chan and Chen (1988). Like them, we find that when portfolios are formed on size alone, there are strong relations between average return and either size or β; average return increases with β and decreases with size. For size portfolios, however, size (ln(ME)) and β are almost perfectly correlated (-0.98), so it is difficult to distinguish between the roles of size and β in average returns.

One way to generate strong variation in β that is unrelated to size is to form portfolios on size and then on β. As in Tables I to III, we find that the resulting independent variation in β just about washes out the positive simple relation between average return and β observed when portfolios are formed on size alone. The results for NYSE stocks for 1941–1990 are thus much like those for NYSE, AMEX, and NASDAQ stocks for 1963–1990.

This appendix also has methodological goals. For example, the FM regressions in Table III use returns on individual stocks as the dependent variable. Since we allocate portfolio βs to individual stocks but use firm-specific values of other variables like size, β may be at a disadvantage in the regressions for individual stocks. This appendix shows, however, that regressions for portfolios, which put β and size on equal footing, produce results comparable to those for individual stocks.

A. Size Portfolios

Table AI shows average monthly returns and market βs for 12 portfolios of NYSE stocks formed on the basis of size (ME) at the end of each year from 1940 to 1989. For these size portfolios, there is a strong positive relation between average return and β. Average returns fall from 1.96% per month for the smallest ME portfolio (1A) to 0.93% for the largest (10B) and β falls from 1.60 to 0.95. (Note also that, as claimed earlier, estimating β as the sum of the slopes in the regression of a portfolio's return on the current and prior month's NYSE value-weighted return produces much larger βs for the smallest ME portfolios and slightly smaller βs for the largest ME portfolios.)

The FM regressions in Table AI confirm the positive simple relation between average return and β for size portfolios. In the regressions of the size-portfolio returns on β alone, the average premium for a unit of β is 1.45% per month. In the regressions of individual stock returns on β (where stocks are assigned the β of their size portfolio), the premium for a unit of β is 1.39%. Both estimates are about 3 standard errors from 0. Moreover, the βs of size portfolios do not leave a residual size effect; the average residuals from the simple regressions of returns on β in Table AI show no relation to size. These positive SLB results for 1941–1990 are like those obtained by Chan and Chen (1988) in tests on size portfolios for 1954–1983.

There is, however, evidence in Table AI that all is not well with the βs of the size portfolios. They do a fine job on the relation between size and average return, but they do a lousy job on their main task, the relation between β and average return. When the residuals from the regressions of returns on β are grouped using the pre-ranking βs of individual stocks, the average residuals are strongly positive for low-β stocks (0.51% per month for group 1A) and negative for high-β stocks (-1.05% for 10B). Thus the market lines estimated with size-portfolio βs exaggerate the tradeoff of average return for β; they underestimate average returns on low-β stocks and overestimate average returns on high-β stocks. This pattern in the β-sorted average residuals for individual stocks suggests that (a) there is variation in β across stocks that is lost in the size portfolios, and (b) this variation in β is not rewarded as well as the variation in β that is related to size.

B. Two-Pass Size-β Portfolios

Like Table I, Table AII shows that subdividing size deciles using the (pre-ranking) βs of individual stocks results in strong variation in β that is

Table AI

Average Returns, Post-Ranking βs and Fama-MacBeth Regression Slopes for Size Portfolios of NYSE Stocks: 1941-1990

At the end of each year $t - 1$, stocks are assigned to 12 portfolios using ranked values of ME. Included are all NYSE stocks that have a CRSP price and shares for December of year $t - 1$ and returns for at least 24 of the 60 months ending in December of year $t - 1$ (for pre-ranking β estimates). The middle 8 portfolios cover size deciles 2 to 9. The 4 extreme portfolios (1A, 1B, 10A, and 10B) split the smallest and largest deciles in half. We compute equal-weighted returns on the portfolios for the 12 months of year t using all surviving stocks. Average Return is the time-series average of the monthly portfolio returns for 1941-1990, in percent. Average firms is the average number of stocks in the portfolios each month. The simple βs are estimated by regressing the 1941-1990 sample of post-ranking monthly returns for a size portfolio on the current month's value-weighted NYSE portfolio return. The sum βs are the sum of the slopes from a regression of the post-ranking monthly returns on the current and prior month's VW NYSE returns.

The independent variables in the Fama-MacBeth regressions are defined for each firm at the end of December of each year $t - 1$. Stocks are assigned the post-ranking (sum) β of the size portfolio they are in at the end of year $t - 1$. ME is price times shares outstanding at the end of year $t - 1$. In the individual-stock regressions, these values of the explanatory variables are matched with CRSP returns for each of the 12 months of year t. The portfolio regressions match the equal-weighted portfolio returns with the equal-weighted averages of β and ln(ME) for the surviving stocks in each month of year t. Slope is the average of the (600) monthly FM regression slopes and SE is the standard error of the average slope. The residuals from the monthly regressions for year t are grouped into 12 portfolios on the basis of size (ME) or pre-ranking β (estimated with 24 to 60 months of data, as available) at the end of year $t - 1$. The average residuals are the time-series averages of the monthly equal-weighted portfolio residuals, in percent. The average residuals for regressions (1) and (2) (not shown) are quite similar to those for regressions (4) and (5) (shown).

	Portfolios Formed on Size											
	1A	1B	2	3	4	5	6	7	8	9	10A	10B
Ave. return	1.96	1.59	1.44	1.36	1.28	1.24	1.23	1.17	1.15	1.13	0.97	0.93
Ave. firms	57	56	110	107	107	108	111	113	115	118	59	59
Simple β	1.29	1.24	1.21	1.19	1.16	1.13	1.13	1.12	1.09	1.05	1.00	0.98
Standard error	0.07	0.05	0.04	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Sum β	1.60	1.44	1.37	1.32	1.26	1.23	1.19	1.17	1.12	1.06	0.99	0.95
Standard error	0.10	0.06	0.05	0.04	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.01

Table AI—*Continued*

	Portfolio Regressions				Individual Stock Regressions			
	(1) β	(2) ln(ME)	(3) β and ln(ME)		(4) β	(5) ln(ME)	(6) β and ln(ME)	
Slope	1.45	−0.137	3.05	0.149	1.39	−0.133	0.71	−0.060
SE	0.47	0.044	1.51	0.115	0.46	0.043	0.81	0.062

Average Residuals for Stocks Grouped on Size

	1A	1B	2	3	4	5	6	7	8	9	10A	10B
Regression (4)	0.17	0.00	−0.04	−0.06	−0.05	−0.04	0.00	−0.03	0.03	0.08	0.01	0.04
Standard error	0.11	0.06	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.05	0.06
Regression (5)	0.30	0.02	−0.05	−0.06	−0.08	−0.07	−0.03	−0.04	0.02	0.08	0.01	0.13
Standard error	0.14	0.07	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.07
Regression (6)	0.20	0.02	−0.05	−0.07	−0.08	−0.06	−0.01	−0.02	0.04	0.09	0.00	0.06
Standard error	0.10	0.06	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.05	0.05

Average Residuals for Stocks Grouped on Pre-Ranking β

	1A	1B	2	3	4	5	6	7	8	9	10A	10B
Regression (4)	0.51	0.61	0.38	0.32	0.16	0.12	0.03	−0.10	−0.27	−0.31	−0.66	−1.05
Standard error	0.21	0.19	0.13	0.08	0.04	0.03	0.04	0.05	0.09	0.11	0.18	0.23
Regression (5)	−0.10	0.00	0.02	0.09	0.05	0.07	0.05	0.00	−0.03	−0.01	−0.11	−0.33
Standard error	0.11	0.10	0.07	0.05	0.04	0.03	0.03	0.04	0.05	0.07	0.10	0.13
Regression (6)	0.09	0.25	0.13	0.19	0.11	0.14	0.09	0.01	−0.11	−0.12	−0.38	−0.70
Standard error	0.41	0.37	0.24	0.14	0.07	0.04	0.04	0.09	0.16	0.21	0.34	0.43

Table AII

Properties of Portfolios Formed on Size and Pre-Ranking β: NYSE Stocks Sorted by ME (Down) then Pre-Ranking β (Across): 1941–1990

At the end of year $t - 1$, the NYSE stocks on CRSP are assigned to 10 size (ME) portfolios. Each size decile is subdivided into 10 β portfolios using pre-ranking βs of individual stocks, estimated with 24 to 60 monthly returns (as available) ending in December of year $t - 1$. The equal-weighted monthly returns on the resulting 100 portfolios are then calculated for year t. The average returns are the time-series averages of the monthly returns, in percent. The post-ranking βs use the full 1941–1990 sample of post-ranking returns for each portfolio. The pre- and post-ranking βs are the sum of the slopes from a regression of monthly returns on the current and prior month's NYSE value-weighted market return. The average size for a portfolio is the time-series average of each month's average value of ln(ME) for stocks in the portfolio. ME is denominated in millions of dollars. There are, on average, about 10 stocks in each size-β portfolio each month. The All column shows parameter values for equal-weighted size-decile (ME) portfolios. The All rows show parameter values for equal-weighted portfolios of the stocks in each β group.

	All	Low-β	β-2	β-3	β-4	β-5	β-6	β-7	β-8	β-9	High-β
Panel A: Average Monthly Return (in Percent)											
All		1.22	1.30	1.32	1.35	1.36	1.34	1.29	1.34	1.14	1.10
Small-ME	1.78	1.74	1.76	2.08	1.91	1.92	1.72	1.77	1.91	1.56	1.46
ME-2	1.44	1.41	1.35	1.33	1.61	1.72	1.59	1.40	1.62	1.24	1.11
ME-3	1.36	1.21	1.40	1.22	1.47	1.34	1.51	1.33	1.57	1.33	1.21
ME-4	1.28	1.26	1.29	1.19	1.27	1.51	1.30	1.19	1.56	1.18	1.00
ME-5	1.24	1.22	1.30	1.28	1.33	1.21	1.37	1.41	1.31	0.92	1.06
ME-6	1.23	1.21	1.32	1.37	1.09	1.34	1.10	1.40	1.21	1.22	1.08
ME-7	1.17	1.08	1.23	1.37	1.27	1.19	1.34	1.10	1.11	0.87	1.17
ME-8	1.15	1.06	1.18	1.26	1.25	1.26	1.17	1.16	1.05	1.08	1.04
ME-9	1.13	0.99	1.13	1.00	1.24	1.28	1.31	1.15	1.11	1.09	1.05
Large-ME	0.95	0.99	1.01	1.12	1.01	0.89	0.95	0.95	1.00	0.90	0.68

Table AII—*Continued*

	All	Low-β	β-2	β-3	β-4	β-5	β-6	β-7	β-8	β-9	High-β
Panel B: Post-Ranking β											
All		0.76	0.95	1.05	1.14	1.22	1.26	1.34	1.38	1.49	1.69
Small-ME	1.52	1.17	1.40	1.31	1.50	1.46	1.50	1.69	1.60	1.75	1.92
ME-2	1.37	0.86	1.09	1.12	1.24	1.39	1.42	1.48	1.60	1.69	1.91
ME-3	1.32	0.88	0.96	1.18	1.19	1.33	1.40	1.43	1.56	1.64	1.74
ME-4	1.26	0.69	0.95	1.06	1.15	1.24	1.29	1.46	1.43	1.64	1.83
ME-5	1.23	0.70	0.95	1.04	1.10	1.22	1.32	1.34	1.41	1.56	1.72
ME-6	1.19	0.68	0.86	1.04	1.13	1.20	1.20	1.35	1.36	1.48	1.70
ME-7	1.17	0.67	0.88	0.95	1.14	1.18	1.26	1.27	1.32	1.44	1.68
ME-8	1.12	0.64	0.83	0.99	1.06	1.14	1.14	1.21	1.26	1.39	1.58
ME-9	1.06	0.68	0.81	0.94	0.96	1.06	1.11	1.18	1.22	1.25	1.46
Large-ME	0.97	0.65	0.73	0.90	0.91	0.97	1.01	1.01	1.07	1.12	1.38
Panel C: Average Size (ln(ME))											
All		4.39	4.39	4.40	4.40	4.39	4.40	4.38	4.37	4.37	4.34
Small-ME	1.93	2.04	1.99	2.00	1.96	1.92	1.92	1.91	1.90	1.87	1.80
ME-2	2.80	2.81	2.79	2.81	2.83	2.80	2.79	2.80	2.80	2.79	2.79
ME-3	3.27	3.28	3.27	3.28	3.27	3.27	3.28	3.29	3.27	3.27	3.26
ME-4	3.67	3.67	3.67	3.67	3.68	3.68	3.67	3.68	3.66	3.67	3.67
ME-5	4.06	4.07	4.06	4.05	4.06	4.07	4.06	4.05	4.05	4.06	4.06
ME-6	4.45	4.45	4.44	4.46	4.45	4.45	4.45	4.45	4.44	4.45	4.45
ME-7	4.87	4.86	4.87	4.86	4.87	4.87	4.88	4.87	4.87	4.85	4.87
ME-8	5.36	5.38	5.38	5.38	5.35	5.36	5.37	5.37	5.36	5.35	5.34
ME-9	5.98	5.96	5.98	5.99	6.00	5.98	5.98	5.97	5.95	5.96	5.96
Large-ME	7.12	7.10	7.12	7.16	7.17	7.20	7.29	7.14	7.09	7.04	6.83

independent of size. The β sort of a size decile always produces portfolios with similar average ln(ME) but much different (post-ranking) βs. Table AII also shows, however, that investors are not compensated for the variation in β that is independent of size. Despite the wide range of βs in each size decile, average returns show no tendency to increase with β. AII

The FM regressions in Table AIII formalize the roles of size and β in NYSE average returns for 1941–1990. The regressions of returns on β alone show that using the βs of the portfolios formed on size and β, rather than size alone, causes the average slope on β to fall from about 1.4% per month (Table AI) to about 0.23% (about 1 standard error from 0). Thus, allowing for variation in β that is unrelated to size flattens the relation between average return and β, to the point where it is indistinguishable from no relation at all.

The flatter market lines in Table AIII succeed, however, in erasing the negative relation between β and average residuals observed in the regressions of returns on β alone in Table AI. Thus, forming portfolios on size and β (Table AIII) produces a better description of the simple relation between average return and β than forming portfolios on size alone (Table AI). This improved description of the relation between average return and β is evidence that the β estimates for the two-pass size-β portfolios capture variation in true βs that is missed when portfolios are formed on size alone.

Unfortunately, the flatter market lines in Table AIII have a cost, the emergence of a residual size effect. Grouped on the basis of ME for individual stocks, the average residuals from the univariate regressions of returns on the βs of the 100 size-β portfolios are strongly positive for small stocks and negative for large stocks (0.60% per month for the smallest ME group, 1A, and -0.27% for the largest, 10B). Thus, when we allow for variation in β that is independent of size, the resulting βs leave a large size effect in average returns. This residual size effect is much like that observed by Banz (1981) with the βs of portfolios formed on size and β.

The correlation between size and β is -0.98 for portfolios formed on size alone. The independent variation in β obtained with the second-pass sort on β lowers the correlation to -0.50. The lower correlation means that bivariate regressions of returns on β and ln(ME) are more likely to distinguish true size effects from true β effects in average returns.

The bivariate regressions (Table AIII) that use the βs of the size-β portfolios are more bad news for β. The average slopes for ln(ME) are close to the values in the univariate size regressions, and almost 4 standard errors from 0, but the average slopes for β are negative and less than 1 standard error from 0. The message from the bivariate regressions is that there is a strong relation between size and average return. But like the regressions in Table AIII that explain average returns with β alone, the bivariate regressions say that there is no reliable relation between β and average returns when the tests use βs that are not close substitutes for size. These uncomfortable SLB results for NYSE stocks for 1941–1990 are much like those for NYSE, AMEX, and NASDAQ stocks for 1963–1990 in Table III.

C. Subperiod Diagnostics

Our results for 1941–1990 seem to contradict the evidence in Black, Jensen, and Scholes (BJS) (1972) and Fama and MacBeth (FM) (1973) that there is a reliable positive relation between average return and β. The βs in BJS and FM are from portfolios formed on β alone, and the market proxy is the NYSE equal-weighted portfolio. We use the βs of portfolios formed on size and β, and our market is the value-weighted NYSE portfolio. We can report, however, that our inference that there isn't much relation between β and average return is unchanged when (a) the market proxy is the NYSE EW portfolio, (b) portfolios are formed on just (pre-ranking) βs, or (c) the order of forming the size-β portfolios is changed from size then β to β then size.

A more important difference between our results and the earlier studies is the sample periods. The tests in BJS and FM end in the 1960s. Table AIV shows that when we split the 50-year 1941–1990 period in half, the univariate FM regressions of returns on β produce an average slope for 1941–1965 (0.50% per month, $t = 1.82$) more like that of the earlier studies. In contrast, the average slope on β for 1966–1990 is close to 0 (-0.02, $t = 0.06$).

But Table AIV also shows that drawing a distinction between the results for 1941–1965 and 1966–1990 is misleading. The stronger tradeoff of average return for β in the simple regressions for 1941–1965 is due to the first 10 years, 1941–1950. This is the only period in Table AIV that produces an average premium for β (1.26% per month) that is both positive and more than 2 standard errors from 0. Conversely, the weak relation between β and average return for 1966–1990 is largely due to 1981–1990. The strong negative average slope in the univariate regressions of returns on β for 1981–1990 (-1.01, $t = -2.10$) offsets a positive slope for 1971–1980 (0.82, $t = 1.27$).

The subperiod variation in the average slopes from the FM regressions of returns on β alone seems moot, however, given the evidence in Table AIV that adding size always kills any positive tradeoff of average return for β in the subperiods. Adding size to the regressions for 1941–1965 causes the average slope for β to drop from 0.50 ($t = 1.82$) to 0.07 ($t = 0.28$). In contrast, the average slope on size in the bivariate regressions (-0.16, $t = -2.97$) is close to its value (-0.17, $t = -2.88$) in the regressions of returns on ln(ME) alone. Similar comments hold for 1941–1950. In short, any evidence of a positive average premium for β in the subperiods seems to be a size effect in disguise.

D. Can the SLB Model Be Saved?

Before concluding that β has no explanatory power, it is appropriate to consider other explanations for our results. One possibility is that the variation in β produced by the β sorts of size deciles in just sampling error. If so, it is not surprising that the variation in β within a size decile is unrelated to average return, or that size dominates β in bivariate tests. The standard errors of the βs suggest, however, that this explanation cannot save the SLB

Table AIII

Average Slopes, Their Standard Errors (SE), and Average Residuals from Monthly FM Regressions for Individual NYSE Stocks and for Portfolios Formed on Size and Pre-Ranking β: 1941-1990

Stocks are assigned the post-ranking β of the size-β portfolio they are in at the end of year $t-1$ (Table AII). ln(ME) is the natural log of price times shares outstanding at the end of year $t-1$. In the individual-stock regressions, these values of the explanatory variables are matched with CRSP returns for each of the 12 months in year t. The portfolio regressions match the equal-weighted portfolio returns for the size-β portfolios (Table AII) with the equal-weighted averages of β and ln(ME) for the surviving stocks in each month of year t. Slope is the time-series average of the monthly regression slopes from 1941-1990 (600 months); SE is the time-series standard error of the average slope.

The residuals from the monthly regressions in year t are grouped into 12 portfolios on the basis of size or pre-ranking β (estimated with 24 to 60 months of returns, as available) as of the end of year $t-1$. The average residuals are the time-series averages of the monthly equal-weighted averages of the residuals in percent. The average residuals (not shown) from the FM regressions (1) to (3) that use the returns on the 100 size-β portfolios as the dependent variable are always within 0.01 of those from the regressions for individual stock returns. This is not surprising given that the correlation between the time-series of 1941-1990 monthly FM slopes on β or ln(ME) for the comparable portfolio and individual stock regressions is always greater than 0.99.

	Portfolio Regressions				Individual Stock Regressions			
	(1) β	(2) ln(ME)	(3) β and ln(ME)		(4) β	(5) ln(ME)	(6) β and ln(ME)	
Slope	0.22	−0.128	−0.13	−0.143	0.24	−0.133	−0.14	−0.147
SE	0.24	0.043	0.21	0.039	0.23	0.043	0.21	0.039

	Average Residuals for Stocks Grouped on Size											
	1A	1B	2	3	4	5	6	7	8	9	10A	10B
Regression (4)	0.60	0.26	0.13	0.06	−0.01	−0.03	−0.03	−0.09	−0.10	−0.11	−0.25	−0.27
Standard error	0.21	0.10	0.06	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.06	0.08
Regression (5)	0.30	0.02	−0.05	−0.06	−0.08	−0.07	−0.03	−0.04	0.02	0.08	0.01	0.13
Standard error	0.14	0.07	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.07
Regression (6)	0.31	0.02	−0.05	−0.06	−0.09	−0.07	−0.03	−0.04	0.02	0.08	0.01	0.13
Standard error	0.14	0.07	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.07

Table AIII—*Continued*

	Portfolio Regressions						Individual Stock Regressions					
	(1) β		(2) ln(ME)		(3) β and ln(ME)		(4) β		(5) ln(ME)		(6) β and ln(ME)	
	Average Residuals for Stocks Grouped on Pre-Ranking β											
	1A	1B	2	3	4	5	6	7	8	9	10A	10B
Regression (4)	−0.08	0.03	−0.01	0.08	0.04	0.08	0.04	0.02	−0.03	0.02	−0.11	−0.32
Standard error	0.07	0.05	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.06	0.07
Regression (5)	−0.10	0.00	0.02	0.09	0.05	0.07	0.05	0.00	−0.03	−0.01	−0.11	−0.33
Standard error	0.11	0.10	0.07	0.05	0.04	0.03	0.03	0.04	0.05	0.07	0.10	0.13
Regression (6)	−0.17	−0.07	−0.02	0.07	0.04	0.06	0.05	0.03	0.00	0.04	−0.04	−0.23
Standard error	0.05	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.06	0.07

Table AIV

Subperiod Average Returns on the NYSE Value-Weighted and Equal-Weighted Portfolios and Average Values of the Intercepts and Slopes for the FM Cross-Sectional Regressions of Individual Stock Returns on β and Size (ln(ME))

Mean is the average VW or EW return or an average slope from the monthly cross-sectional regressions of individual stock returns on β and/or ln(ME). Std is the standard deviation of the time-series of returns or slopes, and t(Mn) is Mean over its time-series standard error. The average slopes (not shown) from the FM regressions that use the returns on the 100 size-β portfolios of Table AII as the dependent variable are quite close to those for individual stock returns. (The correlation between the 1941–1990 month-by-month slopes on β or ln(ME) for the comparable portfolio and individual stock regressions is always greater than 0.99.)

Panel A

	1941–1990 (600 Mos.)			1941–1965 (300 Mos.)			1966–1990 (300 Mos.)		
Variable	Mean	Std	t(Mn)	Mean	Std	t(Mn)	Mean	Std	t(Mn)
NYSE Value-Weighted (VW) and Equal-Weighted (EW) Portfolio Returns									
VW	0.93	4.15	5.49	1.10	3.58	5.30	0.76	4.64	2.85
EW	1.12	5.10	5.37	1.33	4.42	5.18	0.91	5.70	2.77
$R_{it} = a + b_{1t}\beta_{it} + e_{it}$									
a	0.98	3.93	6.11	0.84	3.18	4.56	1.13	4.57	4.26
b_1	0.24	5.52	1.07	0.50	4.75	1.82	−0.02	6.19	−0.06
$R_{it} = a + b_{2t}\ln(ME_{it}) + e_{it}$									
a	1.70	8.24	5.04	1.88	6.43	5.06	1.51	9.72	2.69
b_2	−0.13	1.06	−3.07	−0.17	1.01	−2.88	−0.10	1.11	−1.54
$R_{it} = a + b_{1t}\beta_{it} + b_{2t}\ln(ME_{it}) + e_{it}$									
a	1.97	6.16	7.84	1.80	4.77	6.52	2.14	7.29	5.09
b_1	−0.14	5.05	−0.66	0.07	4.15	0.28	−0.34	5.80	−1.01
b_2	−0.15	0.96	−3.75	−0.16	0.94	−2.97	−0.13	0.99	−2.34

Table AIV—*Continued*

Panel B:

Return	1941–1950 Mean	1941–1950 t(Mn)	1951–1960 Mean	1951–1960 t(Mn)	1961–1970 Mean	1961–1970 t(Mn)	1971–1980 Mean	1971–1980 t(Mn)	1981–1990 Mean	1981–1990 t(Mn)
NYSE Value-Weighted (VW) and Equal-Weighted (EW) Portfolio Returns										
VW	1.05	2.88	1.18	3.95	0.66	1.84	0.72	1.67	1.04	2.40
EW	1.59	3.16	1.13	3.76	0.88	1.96	1.04	1.82	0.95	2.01
$R_{it} = a + b_{1t}\beta_{it} + e_{it}$										
a	0.24	0.66	1.41	6.36	0.64	1.94	0.27	0.62	2.35	5.99
b_1	1.26	2.20	−0.19	−0.63	0.32	0.72	0.82	1.27	−1.01	−2.10
$R_{it} = a + b_{2t}\ln(ME_{it}) + e_{it}$										
a	2.63	3.47	1.08	2.73	1.78	2.50	2.18	2.03	0.82	1.20
b_2	−0.37	−2.90	0.03	0.53	−0.17	−2.19	−0.20	−1.57	0.04	0.57
$R_{it} = a + b_{1t}\beta_{it} + b_{2t}\ln(ME_{it}) + e_{it}$										
a	2.14	3.93	1.38	4.03	2.01	4.16	1.50	2.12	2.84	4.25
b_1	0.34	0.75	−0.17	−0.53	−0.11	−0.27	0.41	0.75	−1.14	−2.16
b_2	−0.34	−2.92	0.01	0.20	−0.18	−2.89	−0.16	−1.50	−0.07	−0.84

model. The standard errors for portfolios formed on size and β are only slightly larger (0.02 to 0.11) than those for portfolios formed on size alone (0.01 to 0.10, Table AI). And the range of the post-ranking βs within a size decile is always large relative to the standard errors of the βs.

Another possibility is that the proportionality condition (1) for the variation through time in true βs, that justifies the use of full-period post-ranking βs in the FM tests, does not work well for portfolios formed on size and β. If this is a problem, post-ranking βs for the size-β portfolios should not be highly correlated across subperiods. The correlation between the half-period (1941–1965 and 1966–1990) βs of the size-β portfolios is 0.91, which we take to be good evidence that the full-period β estimates for these portfolios are informative about true βs. We can also report that using 5-year βs (pre- or post-ranking) in the FM regressions does not change our negative conclusions about the role of β in average returns, as long as portfolios are formed on β as well as size, or on β alone.

Any attempt to salvage the simple positive relation between β and average return predicted by the SLB model runs into three damaging facts, clear in Table AII. (a) Forming portfolios on size and pre-ranking βs produces a wide range of post-ranking βs in every size decile. (b) The post-ranking βs closely reproduce (in deciles 2 to 10 they exactly reproduce) the ordering of the pre-ranking βs used to form the β-sorted portfolios. It seems safe to conclude that the increasing pattern of the post-ranking βs in every size decile captures the ordering of the true βs. (c) Contrary to the SLB model, the β sorts do not produce a similar ordering of average returns. Within the rows (size deciles) of the average return matrix in Table AII, the high-β portfolios have average returns that are close to or less than the low-β portfolios.

But the most damaging evidence against the SLB model comes from the univariate regressions of returns on β in Table AIII. They say that when the tests allow for variation in β that is unrelated to size, the relation between β and average return for 1941–1990 is weak, perhaps nonexistent, even when β is the only explanatory variable. We are forced to conclude that the SLB model does not describe the last 50 years of average stock returns.

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Financial News

By Michael Annin

Equity and the Small-Stock Effect

The capital asset pricing model shows risk inherent in return on equity. But something goes wrong when it's used for small-sized companies.

Does the size of a company affect the rate of return it should earn? If smaller companies should earn a higher return than larger firms, then small utilities, because of their size, should be allowed to adjust the rates they charge to customers.

By far the most notable and well-documented apparent anomaly in the stock market is the effect of company size on equity returns. The first study focusing on the impact that company size exerts on security returns was performed by Rolf W. Banz. Banz sorted New York Stock Exchange (NYSE) stocks into quintiles based on their market capitalization (price per share times number of shares outstanding), and calculated total returns for a value-weighted portfolio of the stocks in each quintile. His results indicate that returns for companies from the smallest quintile surpassed all other quintiles, as well as the Standard & Poor's 500 and other large stock indices. A number of other researchers have replicated Banz's work in other countries; nevertheless, a consensus has not yet been formed on why small stocks behave as they do.

One explanation for the higher returns is the lack of information on small companies. Investors must search more diligently for data. For small utilities, investors face additional obstacles, such as a smaller customer base, limited financial resources, and a lack of diversification across customers, energy sources, and geography. These obstacles imply a higher investor return.

The Flaw in CAPM

One of the more common cost of equity models used in practice today is the capital asset pricing model (CAPM). The CAPM describes the expected return on any company's stock as proportional to the amount of systematic risk an investor assumes. The traditional CAPM formula can be stated as:

$$R_s = [\beta_s \times RP] + R_f$$

where:

- R_s = expected return or cost of equity on the stock of company "s"
- β = the *beta* of the stock of company "s"
- RP = the expected equity risk premium
- R_f = expected return on a riskless asset.

Table 1: The Size Premium in CAPM
(By Decile Portfolio in NYSE, 1926-94)

Decile	Beta*	Arithmetic Mean Return	Actual Return in Excess of Riskless Rate**	CAPM Return in Excess of Riskless Rate**	Size Premium (Return in Excess CAPM)
1	0.90	11.01%	5.88%	6.33%	-0.44%
2	1.04	13.09	7.97	7.34	0.63
3	1.09	13.83	8.71	7.70	1.01
4	1.13	14.44	9.32	7.98	1.33
5	1.17	15.50	10.38	8.22	2.16
6	1.19	15.45	10.33	8.38	1.95
7	1.24	15.92	10.79	8.75	2.05
8	1.29	16.84	11.72	9.05	2.67
9	1.36	17.83	12.71	9.57	3.14
10	1.47	21.98	16.86	10.33	6.53

*Betas are estimated from monthly returns in excess of the 20-year government bond income return, January 1926-December 1994.
**Historical riskless rate measured by the 69-year arithmetic mean income return component of 20-year government bonds.
Source: SBBI 1995 Yearbook

Table 2: CAPM vs. CAPM w/ Size Premium

(By Percentile for Electric, Gas, and Sanitary Services Utilities)

	CAPM	CAPM with Size Premium
90th Percentile	16.42%	18.92%
75th Percentile	12.56%	14.72%
Median	10.89%	12.58%
25th Percentile	9.86%	11.39%
10th Percentile	8.63%	10.65%

(Weighted by Market Capitalization)

	CAPM	CAPM with Size Premium
Industry Composite	11.76%	12.33%
Large Company Composite	12.05%	12.07%
Small Company Composite	13.93%	17.95%

Source: Cost of Capital Quarterly '95 Yearbook by Ibbotson Associates
Note: Public utilities include electric, gas, and sanitary services companies.

Table 1 shows *beta* and risk premiums over the past 69 years for each decile of the NYSE. It shows that a hypothetical risk premium calculated under the CAPM fails to match the actual risk premium, shown by actual market returns. The shortfall in the CAPM return rises as company size decreases, suggesting a need to revise the CAPM.

The risk premium component in the actual returns (realized equity risk premium) is the return that compensates investors for taking on risk equal to the risk of the market as a whole (estimated by the 69-year arithmetic mean return on large company stocks, 12.2 percent, less the historical riskless rate). The risk premium in the CAPM returns is *beta* multiplied by the realized equity risk premium.

The smaller deciles show returns not fully explainable by the CAPM. The difference in risk premiums (realized versus CAPM) grows larger as one moves from the largest companies in decile 1 to the smallest in decile 10. The difference is especially pronounced for deciles 9 and 10, which contain the smallest companies.

Based on this analysis, we modify the CAPM formula to include a small-stock premium. The modified CAPM formula can be stated as follows:

$$R_s = [\beta_s \times RP] + R_f + SP$$

where:

SP = small-stock premium.

Because the small-stock premium can be identified by company size, the appropriate premium to add for any particular company will depend on its equity capitalization. For instance, a utility with a market capitalization of $1 billion would require a small capitalization adjustment of approximately 1.3 percent over the traditional CAPM; at $400 million, approximately 2.1 percent, and at only $100 million, approximately 4 percent.

Again, these additions to the traditional CAPM represent an adjustment over and above any increase already provided to these smaller companies by having higher *betas*.

Implications for Smaller Utilities

These findings carry important ramifications for relatively small public utilities. Boosting the traditional CAPM return by a full 400 basis points for small utilities translates into a substantial premium over larger utilities.

Table 2 shows the results of an analysis of 202 utility companies that calculated cost of equity figures. Composites (arithmetic means) weighted by equity capitalization were also calculated for the largest and smallest 20 companies. The results show the impact size has on cost of equity.

For the traditional CAPM, the large-company composite shows a cost of equity of 12.05 percent; the small company composite, 13.93 percent. However, once the respective small capitalization premium is added in, the spread increases dramatically, to 12.07 and 17.95 percent, respectively. Clearly, the smaller the utility (in terms of equity capitalization), the larger the impact that size exerts on the expected return of that security. ▼

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Table 7-5 **Decile Portfolios of the NYSE** Bounds, Size, and Composition

From 1926 to 1994

Decile	Historical Average Percentage of Total Capitalization	Recent Number of Companies	Recent Decile Market Capitalization (in thousands)	Recent Percentage of Total Capitalization
1-Largest	62.34	168	2,384,444,683	63.19%
2	15.41	167	585,938,436	15.52
3	8.56	168	306,811,948	8.13
4	5.18	168	187,218,791	4.96
5	3.32	167	121,844,654	3.23
6	2.15	168	81,362,005	2.16
7	1.39	168	49,092,923	1.30
8	0.89	167	32,431,847	0.86
9	0.53	168	17,552,595	0.46
10-Smallest	0.23	168	6,970,879	0.18
Mid-Cap 3–5	17.06	503	615,875,394	16.32
Low-Cap 6–8	4.43	503	162,686,775	4.32
Micro-Cap 9–10	0.76	336	24,523,475	0.65

Source: Center for Research in Security Prices, University of Chicago

Historical average percentage of total capitalization shows the average, over the last 69 years, of the decile market values as a percentage of the total NYSE calculated each year. Number of companies in deciles, recent market capitalization of deciles and recent percentage of total capitalization are as of September 30, 1994.

Decile	Recent Market Capitalization	Company Name
1-Largest	$84,752,352,000	AT&T Corporation
2	5,071,977,000	Alltel Corporation
3	2,570,451,000	Citizens Utilities Corporation
4	1,462,677,000	Owens Corning Fiberglass Corporation
5	915,547,750	Tosco Corporation
6	617,148,250	Enterra Corporation
7	403,901,625	Commonwealth Energy Systems
8	241,976,250	Zum Industries Incorporated
9	149,297,500	Oneida Limited
10-Smallest	70,284,375	Mestek Incorporated

Source: Center for Research in Security Prices, University of Chicago.

Market capitalization and name of largest company in each decile as of September 30, 1994.