KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2015-00418
ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

Witness: **Scott W. Rungren**

18. Reference the Kentucky American Water application. Provide copies of all credit reports for American Water and/or Kentucky American Water between January 1, 2014 and the present from the major credit rating agencies (Moody's, S&P, and Fitch).

Response:

The requested documents are attached.

STANDARD & POOR'S
RATINGS SERVICES
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Research Update:

American Water Works Co. Inc. And Subsidiaries Outlook Revised To Positive; 'A-' Corporate Credit Ratings Affirmed

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Table Of Contents

Overview

Rating Action

Rationale

Outlook

Modifiers

Group Influence

Ratings Score Snapshot

Related Criteria And Research

Ratings List

Research Update:

American Water Works Co. Inc. And Subsidiaries Outlook Revised To Positive; 'A-' Corporate Credit Ratings Affirmed

Overview

- American Water Works Co. Inc.'s (AWK) business risk profile remains "excellent" and its financial measures within the "intermediate" financial risk profile continue to improve, primarily reflecting the company's effective management of regulatory risk, which provides for incremental stability and certainty in cash flow generation.
- We are revising our outlook on AWK and its subsidiaries American Water Capital Corp., New Jersey-American Water Co., and Pennsylvania-American Water Co. to positive from stable.
- We are affirming our corporate credit rating on the company and its subsidiaries
- We based the outlook revision to positive on our expectations for incremental improvement in the financial profile throughout the forecast period. The improvement in financial measures stems from the company's effective handling of regulatory risk, which we expect should result in more favorable rate outcomes.

Rating Action

On June 2, 2014, Standard & Poor's Ratings Services revised its rating outlook on Voorhees, N.J.-based American Water Works Co. Inc. (AWK) and subsidiaries American Water Capital Corp. (AWCC), New Jersey-American Water Co., and Pennsylvania-American Water Co. to positive from stable. At the same time, we affirmed all of our ratings, including the 'A-' corporate credit ratings, on AWK and its subsidiaries.

Rationale

The positive outlook reflects our expectation of the continued strengthening of AWK's financial profile resulting from the company's increasingly effective handling of regulatory risk and leading to more favorable rate outcomes. Under our baseline forecast, we expect funds from operations (FFO) to debt of more than 16% and debt to EBITDA of about 4.5x.

We view AWK's business risk as "excellent," based on its monopolistic and lower-risk rate-regulated water distribution business that provides an essential service in regulatory jurisdictions that we generally view as supportive of credit quality. In addition, the company's geographic diversity, reliability, and efficient operations also support its business risk profile. AWK's elevated capital-spending requirements for infrastructure replacement, increased compliance costs for water quality standards, and reliance on acquisitions to provide growth, partly offset these strengths. The company serves approximately 3.2 million water and wastewater customers across 16 states. We currently view the company as consisting of 95% regulated businesses and 5% unregulated businesses on an EBITDA basis. While we view the unregulated businesses as having higher business risk compared with the regulated operations, we also recognize that AWK's unregulated businesses marginally affect the company's business risk profile because of its modest expected capital requirements, affiliation with its regulated service jurisdictions, and its lower-risk service contracts.

AWK is regulated by the public utility commissions of the states in which they operate primarily New Jersey, Pennsylvania, Illinois, Missouri, Indiana, California, and West Virginia, which represent approximately 88% of revenues and 85% of customers. We assess all of the aforementioned regulatory jurisdictions as "strong/adequate" (see "Utility Regulatory Assessments For U.S. Investor-Owned Utilities," published Jan. 7, 2014). We also view AWK's regulatory advantage assessment as "strong" resulting from the above-average overall effective management of regulatory risk partially through the use of multiple riders including a distribution system improvement charge in a number of its jurisdictions, including New Jersey and Pennsylvania, as well as a decoupling mechanism in New York. These mechanisms allow for rate increases outside of a general rate case, which we view as credit-supportive because it reduces regulatory lag.

We assess AWK's financial risk profile as "intermediate" based on our low volatility benchmark ratios, reflecting the company's lower-risk regulated water business model and our assessment of the regulatory advantage score as "strong." Under our base case scenario of rate case increases and higher capital spending, we expect FFO to debt of more than 16% and debt to EBITDA of about 4.5x. We also expect that AWK will continue to have negative discretionary cash flow, reflecting its higher capital spending level. Fundamentally, we expect that AWK will continue to fund its investments in a manner that preserves credit quality.

Liquidity

Our short-term rating on AWK is 'A-2'. AWK has "adequate" liquidity and can more than cover its needs for the next 12 months, even if EBITDA declines by 10%. We expect the company's liquidity sources over the next 12 months will exceed its uses by more than 1.1x, the minimum threshold for an "adequate" designation under our criteria, and that the company will also meet our other criteria for such a designation.

Principal liquidity sources:

- Credit facility availability of at least $500 million over the next 12 months
- FFO of about $1 billion over the next 12 months

Principal liquidity uses:

- Capital spending of about $900 million
- Potential dividend payment of about $150 million to $180 million

Recovery analysis

We assign recovery ratings to first-mortgage bonds (FMBs) issued by U.S. utilities, which can result in issue ratings being notched above a corporate credit rating on a utility depending on the rating category and the extent of the collateral coverage. The FMBs issued by U.S. utilities are a form of "secured utility bond" (SUB) that qualify for a recovery rating as defined in our criteria (see "Collateral Coverage and Issue Notching Rules for '1+' and '1' Recovery Ratings on Senior Bonds Secured by Utility Real Property, Feb. 14, 2013). The recovery methodology is supported by the ample historical record of 100% recovery for secured bondholders in utility bankruptcies in the U.S. and our view that the factors that enhanced those recoveries (limited size of the creditor class and the durable value of utility rate-based assets during and after a reorganization given the essential service provided and the high replacement cost) will persist in the future.

Under our SUB criteria, we calculate a ratio of our estimate of the value of the collateral pledged to bondholders relative to the amount of FMBs outstanding. FMB ratings can exceed a corporate credit rating on a utility by up to one notch in the 'A' category, two notches in the 'BBB' category, and three notches in speculative-grade categories, depending on the calculated ratio.

New Jersey-American Water and Pennsylvania-American Water's FMBs benefit from a first-priority lien on substantially all of the utility's real property owned or subsequently acquired. Collateral coverage of more than 1.5x supports a recovery rating of '1+' and an issue rating one notch above the corporate credit rating.

Outlook

The positive rating outlook on AWK reflects improvement in the financial measures, which we expect to continue throughout the forecast period. The improvement in financial measures stems from the company effectively managing its regulatory risk resulting in more favorable rate outcomes. Under our baseline forecast, we expect FFO to debt of more than 16% and debt to EBITDA of about 4.5x. We expect that AWK will continue to manage its regulatory risk while maintaining financial measures that remain consistent within its "intermediate" financial risk profile category.

Downside scenario

We could revise the outlook to stable if regulatory risk increased or financial performance stalled or deteriorated, which could result from substantial debt financing of capital spending or acquisitions, such that FFO to debt fell to less than 16% and debt to EBITDA rose to more than 4.5x on a sustained basis.

Upside scenario

We could raise the ratings if FFO to total debt consistently remained more than 17% and debt to EBITDA were less than 4.5x. This could most probably occur if the company were able to manage its regulatory risk and achieve higher-than-expected rate case outcomes along with continuing to manage its expenses in a conservative manner.

Modifiers

We assess the comparable ratings analysis modifier as "negative," resulting in a one-notch lowering of the anchor score to 'a-' from 'a', which reflects weaker consolidated cash flow measures within the "intermediate" financial risk category and higher debt leverage. However, financial measures have improved, which we expect to continue throughout the forecast period.

Group Influence

Standard & Poor's bases its ratings on AWK on the consolidated group credit profile and application of our group ratings methodology. The GCP is 'a-'. As the parent company the issuer credit rating is the same as the GCP.

Ratings Score Snapshot

Corporate Credit Rating: A-/Positive/A-2

Business risk: Excellent
- Country risk: Very low
- Industry risk: Very low
- Competitive position: Excellent

Financial risk: Intermediate
- Cash flow/Leverage: Intermediate

Anchor: a

Modifiers
- Diversification/Portfolio effect: Neutral (no impact)
- Capital structure: Neutral (no impact)
- Liquidity: Adequate (no impact)
- Financial policy: Neutral (no impact)
- Management and governance: Satisfactory (no impact)
- Comparable rating analysis: Negative (-1 notch)

Stand-alone credit profile: a-
- Group credit profile: a-

Related Criteria And Research

Related Criteria

- Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Jan. 2, 2014
- Group Rating Methodology, Nov. 19, 2013
- Methodology: Industry Risk, Nov. 19, 2013
- Corporate Methodology, Nov. 19, 2013
- Corporate Methodology: Ratios And Adjustments, Nov. 19, 2013
- Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013
- General Criteria: Methodology For Linking Short-Term And Long-Term Ratings For Corporate, Insurance, And Sovereign Issuers, May 7, 2013
- Collateral Coverage And Issue Notching Rules For '1+' And '1' Recovery Ratings On Senior Bonds Secured By Utility Real Property, Feb. 14, 2013
- Methodology: Management And Governance Credit Factors For Corporate Entities And Insurers, Nov. 13, 2012
- 2008 Corporate Criteria: Rating Each Issue, April 15, 2008
- 2008 Corporate Criteria: Commercial Paper, April 15, 2008
- Country Risk Assessment Methodology And Assumptions, Nov. 19, 2013
- Notching Of U.S. Investment-Grade Investor-Owned Utility Unsecured Debt Now Better Reflects Anticipated Absolute Recovery, Nov. 10, 2008

Ratings List

Ratings Affirmed; Outlook Revised To Positive

	To	From
American Water Works Co. Inc.		
American Water Capital Corp.		
New Jersey-American Water Co.		
Pennsylvania-American Water Co.		
Corporate Credit Rating	A-/Positive/A-2	A-/Stable/A-2
New Jersey-American Water Co.		
Pennsylvania-American Water Co.		
Corporate Credit Rating	A-/Positive/--	A-/Stable/--

Ratings Affirmed

American Water Capital Corp.	
Senior unsecured	A-
Commercial paper	A-2

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MOODY'S
INVESTORS SERVICE

Rating Action: Moody's Upgrades American Water to A3

Global Credit Research - 07 Aug 2015

New York, August 07, 2015 -- Moody's Investors Service, ("Moody's") today upgraded the long-term ratings of American Water Works Company, Inc. (American Water, or AWK; A3 issuer rating) and its financing subsidiary American Water Capital Corp. (AWCC; A3 senior unsecured). Moody's also affirmed AWCC's commercial paper rating at P-2, along with affirming the ratings of New Jersey-American Water Company (NJ-AWC; see debt list below) and Pennsylvania-American Water Company (PAWC; see debt list below). The rating outlook for AWK, AWCC, NJ-AWC and PAWC is stable.

Upgrades:

..Issuer: American Water Capital Corp.

.... Issuer Rating, Upgraded to A3 from Baa1

....Senior Unsecured Regular Bond/Debenture, Upgraded to A3 from Baa1

..Issuer: American Water Works Company, Inc.

.... Issuer Rating, Upgraded to A3 from Baa1

..Issuer: Berks County Industrial Development Auth., PA (Supported by American Water Capital Corp.)

....Senior Unsecured Revenue Bonds, Upgraded to A3 from Baa1

..Issuer: California Pollution Control Financing Auth. (Supported by American Water Capital Corp.)

....Senior Unsecured Revenue Bonds, Upgraded to A3 from Baa1

..Issuer: Illinois Development Finance Authority (Supported by American Water Capital Corp.)

....Senior Unsecured Revenue Bonds, Upgraded to A3 from Baa1

..Issuer: Illinois Finance Authority (Supported by American Water Capital Corp.)

....Senior Unsecured Revenue Bonds, Upgraded to A3 from Baa1

..Issuer: Indiana Finance Authority (Supported by American Water Capital Corp.)

....Senior Unsecured Revenue Bonds, Upgraded to A3 from Baa1

..Issuer: Maricopa County Industrial Dev. Auth., AZ (Supported by American Water Capital Corp.)

....Senior Unsecured Revenue Bonds, Upgraded to A3 from Baa1

..Issuer: Northampton County I.D.A., PA (Supported by American Water Capital Corp.)

....Senior Unsecured Revenue Bonds, Upgraded to A3 from Baa1

..Issuer: Owen (County of) KY (Supported by American Water Capital Corp.)

....Senior Unsecured Revenue Bonds, Upgraded to A3 from Baa1

Outlook Actions:

..Issuer: American Water Capital Corp.

....Outlook, Changed To Stable From Positive

..Issuer: American Water Works Company, Inc.

....Outlook, Changed To Stable From Positive

..Issuer: New Jersey-American Water Company, Inc.

....Outlook, Remains Stable

..Issuer: Pennsylvania-American Water Company

....Outlook, Remains Stable

Affirmations:

..Issuer: American Water Capital Corp.

....Senior Unsecured Commercial Paper, Affirmed P-2

..Issuer: Clarion (County of) PA, I.D.A. (Supported by Pennsylvania-American Water Company)

....Senior Secured Revenue Bonds, Affirmed A1

..Issuer: Clarion County Industrial Dev. Auth., PA (Supported by Pennsylvania-American Water Company)

....Senior Secured Revenue Bonds, Affirmed A1

..Issuer: Luzerne County Industrial Dev. Auth., PA (Supported by Pennsylvania-American Water Company)

....Senior Secured Revenue Bonds, Affirmed A1

..Issuer: Montgomery County Industrial Dev Auth, PA (Supported by Pennsylvania-American Water Company)

....Senior Secured Revenue Bonds, Affirmed A1

..Issuer: New Jersey Economic Development Authority (Supported by New Jersey-American Water Company, Inc.)

....Senior Secured Revenue Bonds, Affirmed A1

..Issuer: New Jersey-American Water Company, Inc.

.... Issuer Rating, Affirmed A3

..Issuer: Pennsylvania Economic Dev. Fin. Auth. (Supported by Pennsylvania-American Water Company)

....Senior Secured Revenue Bonds, Affirmed A1

..Issuer: Pennsylvania-American Water Company

.... Issuer Rating , Affirmed A3

....Senior Secured Regular Bond/Debenture, Affirmed A1

RATINGS RATIONALE

"American Water's rating upgrade reflects its improving financial profile, which we think is sustainable" said Assistant Vice President Ryan Wobbrock. "With a ratio of FFO to net debt around 17% and regulated cash flow diversity across 16 states, we are collapsing the rating of American Water with the rating its largest operating subsidiaries" added Wobbrock.

The upgrade for AWCC reflects the support agreement it maintains with AWK, as the company's primary financing vehicle.

AWK's A3 issuer rating reflects a strong financial profile, underpinned by low-risk water utilities that receive strong regulatory support and cost recovery provisions in most of its 16 state jurisdictions. AWK's financial profile continues to improve from a growing utility rate base, which contributed nearly 90% of consolidated revenue in

2014, and the strong margin contribution from unregulated water and wastewater services.

Although AWK is growing its unregulated business exposure, including the recent acquisition of Keystone Clearwater Solutions (not rated), we expect that the revenue contribution from all unregulated activities will remain around 15% of consolidated revenues over the next twelve to eighteen months.

"We view the nature of these unregulated operations to be within the core competencies of the company, but we still see them as non-core businesses with a higher business risk profile than the regulated water utilities." Wobbrock added.

Rating Outlook

The stable rating outlook for AWK and AWCC reflects our expectation for a ratio of consolidated FFO to Net Debt in the high-teens range on a sustained basis, with continued regulatory support of costs and investment, and unregulated operations remaining around 15% of consolidated revenue.

What Could Change the Rating - Up

The ratings for AWK and AWCC could be upgraded if FFO / Net Debt metrics were to remain over 20%, on a sustainable basis, and while maintaining its current business risk profile.

What Could Change the Rating - Down

AWK's ratings would be negatively impacted by materially negative regulatory decisions, operational concerns such as supply or asset failure, or increasing leverage to the point that FFO / Net Debt declines to the low-teen's for an extended period. Furthermore, if the impacts of drought conditions in California were unmitigated by regulatory support or if materially negative outcomes to litigation (e.g., in West Virginia) were to result in significant financial harm to AWK, or if unregulated exposure and business risk grew beyond our expectations, ratings could be pressured downward.

The principal methodology used in these ratings was Global Regulated Water Utilities published in December 2009. Please see the Credit Policy page on www.moodys.com for a copy of this methodology.

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Credit Opinion: American Water Works Company, Inc.

Global Credit Research - 23 Apr 2015

Voorhees, New Jersey, United States

Ratings

Category	Moody's Rating
Outlook	Positive
Issuer Rating	Baa1
New Jersey-American Water Company, Inc.	
Outlook	Stable
Issuer Rating	A3
American Water Capital Corp.	
Outlook	Positive
Issuer Rating	Baa1
Senior Unsecured	Baa1
Bkd Subordinate Shelf	(P)Baa2
Commercial Paper	P-2
Pennsylvania-American Water Company	
Outlook	Stable
Issuer Rating	A3
Bkd Senior Secured	A1

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Key Indicators

[1]**AmericanWaterWorksCompany,Inc.**

	12/31/2014	12/31/2013	12/31/2012	12/31/2011
(FFO + Interest) / Interest Expense	**4.5x**	**4.1x**	**3.8x**	**3.6x**
FFO / Net Debt	**18%**	**18%**	**16%**	**14%**
RCF / Capex	**0.9x**	**0.9x**	**0.8x**	**0.8x**
Debt / Capitalization	**48%**	**48%**	**51%**	**54%**

[1] All ratios are calculated in accordance with the Regulated Water Utilities Rating Methodology using Moody's standard adjustments

Note: For definitions of Moody's most common ratio terms please see the accompanying User's Guide.

Opinion

Rating Drivers

Diversified holding company of regulated water utilities

Supportive regulatory environments with timely recovery mechanisms

Improving financial profile is credit positive

Support agreement at AWCC not a "guarantee" but provides sufficient credit substitution

Corporate Profile

Headquartered in Voorhees, New Jersey, American Water Works Company, Inc. (American Water, or AWK), is the largest investor-owned provider of water, wastewater and related services in North America, with operations serving an estimated 15 million people across approximately 47 states in the US and a Canadian province. American Water is a holding company and does not have any direct debt obligations; rather, it primarily issues debt through its non-operating financing subsidiary American Water Capital Corp. (AWCC; Baa1 positive), which has a support agreement with American Water. AWK's regulated operations span across 16 states and accounts for just under 90% of consolidated revenue. Its operations in Pennsylvania and New Jersey represent approximately 42% of consolidated Revenue.

Rating Rationale

American Water's Baa1 Issuer Rating reflects its portfolio of low risk, regulated utility operating subsidiaries with good geographical and regulatory diversity across the US. The rating is supported by an improving regulatory environment and strong financial metrics which help to finance a capital plan of over $1 billion per annum over the next five years. AWK's continued need for capital markets financing is likely to be executed at the AWCC entity level.

As of December 31, 2014, AWK had approximately $5.5 billion of consolidated long-term debt. $4.0 billion of reported long-term debt was issued at AWCC (about 73% of consolidated), $3.0 billion of which has been advanced via inter-company notes to various regulated utility subsidiaries. The remaining $1.0 billion of strictly holding company debt we view to be subordinate to the debt which supports the operating companies, since it only has utility dividend distributions as cash sources available for its debt service.

DETAILED RATING CONSIDERATIONS

DIVERSITY OF REGULATORY SUPPORT COULD OUTWEIGH STRUCTURAL SUBORDINATION

AWK's credit strength reflects the size, scale and diversity that results from regulated utility operations in 16 states. This is rather unique in the industry, as most US water utilities are smaller have a high degree of geographic and regulatory concentration. On the contrary, AWK's consolidated operations offer numerous revenue and cash flow streams. This helps protect AWK's financial position from the potential of a negative regulatory outcome in any one jurisdiction.

Given the broad improvement we have seen in regulatory environments across AWK's many jurisdictions, we see reason to view the credit profiles of AWK and AWCC as overcoming the limited structural subordination that exists at AWK's largest subsidiaries in New Jersey and Pennsylvania. The breadth of regulatory improvement could allow for the ratings of AWK and AWCC to be equal to that of its A3 subsidiaries, if continued financial improvement takes place at the consolidated level, as expected.

Holding companies are capable of having their standalone rating overcome structural subordination considerations if there is enough cash flow diversity and strength in supporting distributions from its utility opcos. American Electric Power (Baa1 stable) and Duke Energy (A3 stable) are examples of instances where the ratings of large utility holding companies have ratings on-par with, or even higher than, certain subsidiaries, despite the holding company debt being subordinated from a legal entity standpoint.

INCREASINGLY SUPPORTIVE REGULATORY ENVIRONMENTS

As a holding company with around 88% of its revenue produced by water utility companies, American Water is viewed as having a low business risk, primarily rate regulated credit profile. The regulated nature of AWK's operations provides the foundation for its investment grade ratings, as regulated monopoly service territories offer stable and predictable cost recovery and cash flow coverage of debt and interest.

Over the past several years, we have observed improving regulatory trends in the US, which include the increased prevalence of automatic cost recovery provisions such as revenue decoupling and infrastructure replacement mechanisms. This trend has helped to expedite cost recovery (and reduce regulatory lag) and improve fixed cost recovery across AWK's 16 regulatory jurisdictions. For instance, declining use per customer is a trend that challenges the industry and can cause sustained financial lag for water utilities. AWK had countermeasures for this trend (either through declining usage adjustments or through decoupling mechanisms) in rates for only three states in 2011; the company now has such adjustments incorporated in rates of eight states, including its six largest jurisdictions. These developments evidence the generally credit supportive relationships between AWK and its state regulators - a material credit positive.

MOST UNREGULATED OPERATIONS STILL WITHIN AWK'S CORE COMPETENCIES

American Water's non-regulated water services segment is relatively small (12% of revenues in 2014) and is comprised of contracted water and wastewater services with predominantly governmental entities, homeowner services and a contract operations group which operates and maintains water and wastewater facilities. The largest component of AWK's unregulated operating revenue grew by around $52 million in 2014, due primarily to contract growth in its homeowner services, in addition to price redeterminations in its military contracts. While non-regulated operations typically bring added credit risk, we do not believe that these activities negatively impact the overall credit of AWK as they are in related lines of business and have not, to date, required a significant amount of capital or reliance on credit support from the parent. We also incorporate a view that AWK's non-regulated businesses will remain relatively small (i.e., around 15% of consolidated revenue) on an ongoing basis.

IMPROVING FINANCIAL PROFILE OVER THE INTERMEDIATE-TERM

AWK's FFO / Net Debt percentage has increased each year since 2010, from 12.7% in 2010 to 17.8% in 2014. While the company has benefitted from recent federal tax policies that temporarily boost cash flow (e.g., 2010-2014 average FFO / Net Debt, when adjusting for the impacts of bonus depreciation, is just under 16% for 2014), we expect that these financial metrics will be improved upon on an ongoing basis, without the one-time tax inflows. This expectation is premised on an assumption of ongoing general base rate increases across 16 states, coupled with the increasing use of single issue cost recovery mechanisms. These features should allow AWK's cash flow generation to increase and become more stable and predictable over the next three years.

While the company plans to spend around $6 billion in capex through 2019, we expect that it will be funded largely through cash flow from operations (e.g., CFO in 2014 was about $1.1 billion), leaving the need to debt finance its annual dividend which we expect to grow commensurate with the company's earnings growth targets of 7-10%. At a 10% growth rate on the $216 million paid in 2014, this will increase debt by approximately $1.5 billion through 2019. Given the company's progress with cost management, coupled with a relatively high degree of capex recovered quickly through special recovery mechanisms (i.e., the company estimates that roughly 50% of 2015 capex is recovered on an annual basis through infrastructure riders and future test years), we believe that AWK will be able to produce FFO to debt in the high teens range over this time period.

SUPPORT AGREEMENT WITH AMERICAN WATER CAPITAL CORP

AWCC, a Delaware corporation, is the wholly-owned finance subsidiary of American Water, whose purpose is to streamline the financing function, create cash management efficiencies, and often obtain lower the cost of capital for American Water's regulated water utility subsidiaries. The source of upstream debt service funding comes from the regulated utility operations, which make cash principal and interest payments directly to AWCC. As noted above, approximately $3.0 billion of AWCC's long-term debt has been advanced to several regulated utility subsidiaries via intercompany loans which is incorporated in their respective capital structures for rate-making purposes. We expect any additional up-streamed cash flows, in the form of dividends, will be limited to maintain the respective regulatory allowed equity capitalization for each utility (generally around 50%).

AWCC's Baa1 senior unsecured rating is equalized with its parent, American Water, which provides credit enhancement through a support agreement between American Water and AWCC. The features contained in the support agreement, that support Moody's view of credit substitution include: 1) no termination of the support agreement until all debt shall have been irrevocably paid in full, without all lenders' (including debt trustees) consent, 2) American Water has agreed to make timely payment of interest, principal or premium on any debt issued by AWCC, if AWCC is unable to make such payments 3) the aforementioned payment is in the form of cash or liquid assets and not merely collection, 4) American Water waives any claims related to a failure or delay by AWCC in enforcing its rights under the support agreement, 5) the support agreement is binding on any successors of American Water, 6) the lender may proceed directly against American Water to obtain payment of defaulted interest, principle or premium, and 7) any changes to the support agreement that adversely affect lenders must be approved by such parties. Furthermore, American Water has committed to own, during the term of the support agreement, all of the voting stock of AWCC and to ensure that a positive tangible net worth at AWCC will be maintained at all times and the support agreement is governed by the laws of the state of New York, which we view to be hospitable to the enforcement of guarantees.

Although the support agreement has many attributes of what a guarantee provides, we note that it is not specifically or legally considered a guarantee. Also, debt at AWCC does not benefit from any explicit upstream guarantees from the regulated utility subsidiaries nor does the debt obligations of the subsidiaries benefit from any explicit downstream guarantee from American Water or AWCC. Nevertheless, given the agreement's stated protections, and that a significant amount of AWCC's debt has been incurred to finance rate base, we effectively view the support agreement structure as being similar to a guarantee for rating purposes and have made no notching differentiation between the two entities.

Liquidity

American Water's liquidity is managed through its financing subsidiary, AWCC, which increased its revolver capacity to $1.25 billion, with $70 million expiring in October 2017 and $1.18 billion expiring in October 2018. AWCC's credit facility offers support to the similarly increased $1.0 billion commercial paper program (P-2). Although there are no restrictions for revolver borrowings, related to CP outstanding, we expect the company to leave ample cushion under the revolver to effectively backstop any CP borrowings. The facility has same-day drawing availability and no ongoing material adverse change clause. The lone financial covenant is maximum debt to capitalization ratio of 70%. At February 19, 2015 there were no outstanding borrowings under the credit facility; however, about $503 million of commercial paper was outstanding and $36.5 million in letters of credit.

The next significant debt maturity for American Water is in October of 2017 when over $572 million of bonds mature.

Rating Outlook

The positive rating outlook for AWK and AWCC reflects our expectation for consolidated FFO / Net Debt to improve to the high-teens range on a sustained basis, with continued regulatory support of costs and investment, and strong operational performance.

What Could Change the Rating - Up

The ratings for AWK and AWCC could be positively impacted by further material improvement to the regulatory support offered to the company, or if FFO / Net Debt metrics were to continue in the high-teens, excluding the benefit from one-time tax incentives.

What Could Change the Rating - Down

We currently do not anticipate any negative ratings momentum; however, AWK's ratings would be negatively impacted by materially negative regulatory decisions, operational concerns such as supply or asset failure, or increasing leverage to the point that FFO / Net Debt declines to the low-teen's for an extended period. Furthermore, if the impacts of drought conditions in California were unmitigated by regulatory support or if materially negative outcomes to litigation (e.g., in West Virginia) were to result in significant financial harm to AWK, ratings could be pressured downward.

Rating Factors

AmericanWaterWorksCompany,Inc.

Global Regulated Water Utilities [1][2]	**Current LTM 12/31/2014**			**Moody's 12-18 month Forward View As of Date Published**	
Factor 1: Regulatory Framework & Asset Ownership (40%)	**Measure**	**Score**		**Measure**	**Score**
a) Stability & Predictability of Regulatory Environment		Aa			Aa
b) Asset Ownership		Aa			Aa

c) Cost and Investment Recovery (Ability & Timeliness)		Baa		Baa
d) Revenue Risk		Baa		Baa
Factor 2: Operational Characteristics & Asset Risk (10%)				
a) Operational Efficiency		Baa		Baa
b) Scale of Capital Program and Asset Condition		Baa		Baa
Factor 3: Stability of Business Model and Financial Structure (10%)				
a) Ability & Willingness to Pursue Opportunistic Corp. Activity		Baa		Baa
b) Ability & Willingness to Increase Leverage		Baa		Baa
c) Proportion of Revenues Outside Core Water and Wastewater		Baa		Baa
Factor 4: Key Financial Metrics (40%)				
a) FFO Interest Coverage (3 Year Average)	4.1x	Baa	4.5x - 5.0x	A
b) Debt / Capitalization (3 Year Average)	48.9%	A	44% - 50%	A
c) FFO / Net Debt (3 Year Average)	17.0%	A	15% - 20%	A
d) RCF / Capex (3 Year Average)	0.9x	Ba	.7x - 1.0x	Ba
Rating:				
Indicated Rating from Grid		A3		A3
Actual Rating Assigned		Baa1		Baa1

* THIS REPRESENTS MOODY'S FORWARD VIEW; NOT THE VIEW OF THE ISSUER; AND UNLESS NOTED IN THE TEXT DOES NOT INCORPORATE SIGNIFICANT ACQUISITIONS OR DIVESTITURES

[1] All ratios are calculated using Moody's Standard Adjustments. [2] As of 12/31/2014; Source: Moody's Financial Metrics

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Research Update:

American Water Works Co. Inc. And Subsidiaries Ratings Raised To 'A' From 'A-' On Improved Financial Measures

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Table Of Contents

Overview

Rating Action

Rationale

Outlook

Ratings Score Snapshot

Recovery Analysis

Related Criteria And Research

Ratings List

Research Update:

American Water Works Co. Inc. And Subsidiaries Ratings Raised To 'A' From 'A-' On Improved Financial Measures

Overview

- American Water Works Co. Inc.'s (AWK) business risk profile remains "excellent" in our assessment and its financial measures continue to improve, primarily reflecting the company's effective management of regulatory risk and the continuation of its cost management initiative, which provides for incremental stability and certainty in cash flow generation.
- We have revised our comparable rating analysis modifier to "neutral" from "negative" based on the improvement in AWK's financial measures.
- We are raising our issuer credit ratings on AWK and its subsidiaries, American Water Capital Corp., New Jersey-American Water Co., and Pennsylvania-American Water Co., to 'A' from 'A-'. The outlooks are stable.
- At the same time we are raising our senior unsecured issue rating on American Water Capital Corp. to 'A' from 'A-', our senior secured issue ratings at New Jersey-American Water Co. and Pennsylvania American Water Co. to 'A+' from 'A', and our short-term rating on AWK and American Water Capital Corp. to 'A-1' from 'A-2'.
- The stable outlook reflects our expectation that the company will continue to effectively manage its regulatory risk, enabling the regulated business to, on average, earn its allowed return on equity. Under our baseline forecast, we expect funds from operations (FFO) to debt of 17% to 19% and operating cash flow to debt of about 17%.

Rating Action

On May 7, 2015, Standard & Poor's Ratings Services raised its issuer credit ratings on regulated water utility company American Water Works Co Inc. (AWK) and subsidiaries American Water Capital Corp. (AWCC), New Jersey-American Water Co., and Pennsylvania-American Water Co. to 'A' from 'A-'. The outlook is stable.

At the same time, we are raising our senior unsecured issue rating on American Water Capital Corp. to 'A' from 'A-', our senior secured issue ratings on New Jersey-American Water Co. and Pennsylvania American Water Co. to 'A+' from 'A', and our short-term rating on AWK and American Water Capital Corp. to 'A-1' from 'A-2'.

Rationale

The upgrade reflects the continued improvement in cash flow and leverage measures, primarily as a result of the company's improved management of regulatory risk along with the continued execution of its cost management initiative, which provides for incremental stability and certainty in cash flow generation. We expect that the company will continue its relatively conservative financial policies to maintain its credit measures.

We base our rating on AWK on our assessment of its "excellent" business risk profile and "intermediate" financial risk profile. The company serves approximately 3.2 million water and wastewater customers across 16 states. Based on EBITDA, we consider AWK's operations about 95% regulated and 5% unregulated operations. While we view the unregulated businesses as having higher business risk compared with the regulated operations, we also recognize that AWK's unregulated businesses marginally affect the company's business risk profile because of its modest expected capital requirements, affiliation with its regulated service jurisdictions, and lower-risk service contracts.

The "excellent" business risk profile reflects the company's lower-risk rate-regulated water and wastewater distribution business. In addition, the company's geographic diversity, reliability, and efficient operations also support its business risk profile. AWK is regulated by the public utility commissions of the states in which they operate, primarily New Jersey, Pennsylvania, Illinois, Missouri, Indiana, California, and West Virginia, which represent approximately 87% of revenues and 85% of customers. The company benefits from constructive mechanisms such as the distribution system investment charge (DSIC) in a number of its jurisdictions, which allows for the recovery of high capital spending outside of a traditional rate case proceeding and reduces regulatory lag. AWK's elevated capital-spending requirements for infrastructure replacement, increased compliance costs for water quality standards, and reliance on acquisitions to provide growth, partly offset these strengths.

We assess AWK's financial risk profile as "intermediate" based on our low volatility benchmark ratios, reflecting the company's lower-risk regulated water business model and its above-average management of regulatory risk. Under our base-case scenario, we expect FFO to debt and OCF to debt of more than 17%, which is now solidly in the "intermediate" category. We also expect that AWK will continue to have negative discretionary cash flow, reflecting its higher capital spending level. Fundamentally, we expect that AWK will continue to fund its investments in a manner that preserves credit quality.

Liquidity

Our short-term rating on AWK is 'A-1'. AWK has "adequate" liquidity and can more than cover its needs for the next 12 months, even if EBITDA declines by 10%. We expect the company's liquidity sources over the next 12 months will exceed its uses by more than 1.1x, the minimum threshold for an "adequate" designation under our criteria, and that the company will also meet our other criteria for such a designation.

Principal liquidity sources include:
- Credit facility availability of at least $500 million over the next 12 months.
- FFO of about $1.1 billion over the next 12 months.

Principal liquidity uses include:
- Capital spending of about $900 million.
- Dividends of about $240 million

Other credit considerations

Our assessment of modifiers results in no further changes to the anchor score.

Group influence

Under our group rating methodology, we view AWK as the parent of a group whose members are American Water Capital Corp, New Jersey American Water Co, andPennsylvania American Water Co. AWK's group credit profile is 'a', leading to an issuer credit rating of 'A'.

Outlook

The stable rating outlook on AWK reflects our expectation that the company will continue to effectively manage its regulatory risk while maintaining financial measures that remain consistently within the "intermediate" financial risk profile category. Under our baseline forecast, we expect FFO to debt of more than 17% to 19%.

Downside scenario

We could lower the ratings if the company were to significantly grow its non-utility operations from current levels increasing its business risk. We could also lower the ratings if regulatory risk increased or financial performance stalled or deteriorated, which could result from substantial debt financing of capital spending or acquisitions, such that FFO to debt fell to less than 15% on a sustained basis.

Upside scenario

We could raise the ratings if FFO to total debt consistently exceeded 20%. This could occur if the company would achieve more robust operating cash flow including through greater than forecasted rate case outcomes along with continuing to prudently manage expenses.

Ratings Score Snapshot

Corporate Credit Rating: A/Stable/A-1

Business risk: Excellent
- Country risk: Very low
- Industry risk: Very low
- Competitive position: Excellent

Financial risk: Intermediate
- Cash flow/Leverage: Intermediate

Anchor: a

Modifiers
- Diversification/Portfolio effect: Neutral (no impact)
- Capital structure: Neutral (no impact)
- Liquidity: Adequate (no impact)
- Financial policy: Neutral (no impact)
- Management and governance: Satisfactory (no impact)
- Comparable rating analysis: Neutral (no impact)
- Stand-alone credit profile: a
- Group credit profile: a

Recovery Analysis

New Jersey American Water and Pennsylvania American Water first-mortgage bonds (FMBs) benefit from a first-priority lien on substantially all of the utility's real property owned or subsequently acquired. Collateral coverage of more than 1.5x supports a recovery rating of '1+' and an issue rating two notches above the corporate credit rating.

American Water Capital Corp.'s senior unsecured debt is rated the same as the company's issuer credit rating because priority obligations are less than 20% of the total assets of American Water Works.

Related Criteria And Research

Related Criteria

- Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Dec. 16, 2014
- Group Rating Methodology, Nov. 19, 2013
- Methodology: Industry Risk, Nov. 19, 2013
- Corporate Methodology, Nov. 19, 2013
- Corporate Methodology: Ratios And Adjustments, Nov. 19, 2013
- Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013
- Country Risk Assessment Methodology And Assumptions, Nov. 19, 2013

- General Criteria: Methodology For Linking Short-Term And Long-Term Ratings For Corporate, Insurance, And Sovereign Issuers, May 7, 2013
- Collateral Coverage And Issue Notching Rules For '1+' And '1' Recovery Ratings On Senior Bonds Secured By Utility Real Property, Feb. 14, 2013
- Methodology: Management And Governance Credit Factors For Corporate Entities And Insurers, Nov. 13, 2012
- Notching Of U.S. Investment-Grade Investor-Owned Utility Unsecured Debt Now Better Reflects Anticipated Absolute Recovery, Nov. 10, 2008
- 2008 Corporate Criteria: Rating Each Issue, April 15, 2008

Ratings List

Upgraded; CreditWatch/Outlook Action

	To	From
American Water Works Co. Inc.		
American Water Capital Corp.		
Corporate Credit Rating	A/Stable/A-1	A-/Positive/A-2
New Jersey-American Water Co.		
Pennsylvania-American Water Co.		
Corporate Credit Rating	A/Stable/--	A-/Positive/--

Upgraded

	To	From
American Water Capital Corp.		
Senior Unsecured	A	A-
Commercial Paper	A-1	A-2

Complete ratings information is available to subscribers of RatingsDirect at www.globalcreditportal.com and at www.spcapitaliq.com. All ratings affected by this rating action can be found on Standard & Poor's public Web site at www.standardandpoors.com. Use the Ratings search box located in the left column.

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Research Update:

American Water Works Co. Inc. And Subsidiaries Outlook Revised To Positive; 'A-' Corporate Credit Ratings Affirmed

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Table Of Contents

Overview

Rating Action

Rationale

Outlook

Modifiers

Group Influence

Ratings Score Snapshot

Related Criteria And Research

Ratings List

Research Update:

American Water Works Co. Inc. And Subsidiaries Outlook Revised To Positive; 'A-' Corporate Credit Ratings Affirmed

Overview

- American Water Works Co. Inc.'s (AWK) business risk profile remains "excellent" and its financial measures within the "intermediate" financial risk profile continue to improve, primarily reflecting the company's effective management of regulatory risk, which provides for incremental stability and certainty in cash flow generation.
- We are revising our outlook on AWK and its subsidiaries American Water Capital Corp., New Jersey-American Water Co., and Pennsylvania-American Water Co. to positive from stable.
- We are affirming our corporate credit rating on the company and its subsidiaries
- We based the outlook revision to positive on our expectations for incremental improvement in the financial profile throughout the forecast period. The improvement in financial measures stems from the company's effective handling of regulatory risk, which we expect should result in more favorable rate outcomes.

Rating Action

On June 2, 2014, Standard & Poor's Ratings Services revised its rating outlook on Voorhees, N.J.-based American Water Works Co. Inc. (AWK) and subsidiaries American Water Capital Corp. (AWCC), New Jersey-American Water Co., and Pennsylvania-American Water Co. to positive from stable. At the same time, we affirmed all of our ratings, including the 'A-' corporate credit ratings, on AWK and its subsidiaries.

Rationale

The positive outlook reflects our expectation of the continued strengthening of AWK's financial profile resulting from the company's increasingly effective handling of regulatory risk and leading to more favorable rate outcomes. Under our baseline forecast, we expect funds from operations (FFO) to debt of more than 16% and debt to EBITDA of about 4.5x.

We view AWK's business risk as "excellent," based on its monopolistic and lower-risk rate-regulated water distribution business that provides an essential service in regulatory jurisdictions that we generally view as supportive of credit quality. In addition, the company's geographic diversity, reliability, and efficient operations also support its business risk profile. AWK's elevated capital-spending requirements for infrastructure replacement, increased compliance costs for water quality standards, and reliance on acquisitions to provide growth, partly offset these strengths. The company serves approximately 3.2 million water and wastewater customers across 16 states. We currently view the company as consisting of 95% regulated businesses and 5% unregulated businesses on an EBITDA basis. While we view the unregulated businesses as having higher business risk compared with the regulated operations, we also recognize that AWK's unregulated businesses marginally affect the company's business risk profile because of its modest expected capital requirements, affiliation with its regulated service jurisdictions, and its lower-risk service contracts.

AWK is regulated by the public utility commissions of the states in which they operate primarily New Jersey, Pennsylvania, Illinois, Missouri, Indiana, California, and West Virginia, which represent approximately 88% of revenues and 85% of customers. We assess all of the aforementioned regulatory jurisdictions as "strong/adequate" (see "Utility Regulatory Assessments For U.S. Investor-Owned Utilities," published Jan. 7, 2014). We also view AWK's regulatory advantage assessment as "strong" resulting from the above-average overall effective management of regulatory risk partially through the use of multiple riders including a distribution system improvement charge in a number of its jurisdictions, including New Jersey and Pennsylvania, as well as a decoupling mechanism in New York. These mechanisms allow for rate increases outside of a general rate case, which we view as credit-supportive because it reduces regulatory lag.

We assess AWK's financial risk profile as "intermediate" based on our low volatility benchmark ratios, reflecting the company's lower-risk regulated water business model and our assessment of the regulatory advantage score as "strong." Under our base case scenario of rate case increases and higher capital spending, we expect FFO to debt of more than 16% and debt to EBITDA of about 4.5x. We also expect that AWK will continue to have negative discretionary cash flow, reflecting its higher capital spending level. Fundamentally, we expect that AWK will continue to fund its investments in a manner that preserves credit quality.

Liquidity

Our short-term rating on AWK is 'A-2'. AWK has "adequate" liquidity and can more than cover its needs for the next 12 months, even if EBITDA declines by 10%. We expect the company's liquidity sources over the next 12 months will exceed its uses by more than 1.1x, the minimum threshold for an "adequate" designation under our criteria, and that the company will also meet our other criteria for such a designation.

Principal liquidity sources:

- Credit facility availability of at least $500 million over the next 12 months
- FFO of about $1 billion over the next 12 months

Principal liquidity uses:

- Capital spending of about $900 million
- Potential dividend payment of about $150 million to $180 million

Recovery analysis

We assign recovery ratings to first-mortgage bonds (FMBs) issued by U.S. utilities, which can result in issue ratings being notched above a corporate credit rating on a utility depending on the rating category and the extent of the collateral coverage. The FMBs issued by U.S. utilities are a form of "secured utility bond" (SUB) that qualify for a recovery rating as defined in our criteria (see "Collateral Coverage and Issue Notching Rules for '1+' and '1' Recovery Ratings on Senior Bonds Secured by Utility Real Property, Feb. 14, 2013). The recovery methodology is supported by the ample historical record of 100% recovery for secured bondholders in utility bankruptcies in the U.S. and our view that the factors that enhanced those recoveries (limited size of the creditor class and the durable value of utility rate-based assets during and after a reorganization given the essential service provided and the high replacement cost) will persist in the future.

Under our SUB criteria, we calculate a ratio of our estimate of the value of the collateral pledged to bondholders relative to the amount of FMBs outstanding. FMB ratings can exceed a corporate credit rating on a utility by up to one notch in the 'A' category, two notches in the 'BBB' category, and three notches in speculative-grade categories, depending on the calculated ratio.

New Jersey-American Water and Pennsylvania-American Water's FMBs benefit from a first-priority lien on substantially all of the utility's real property owned or subsequently acquired. Collateral coverage of more than 1.5x supports a recovery rating of '1+' and an issue rating one notch above the corporate credit rating.

Outlook

The positive rating outlook on AWK reflects improvement in the financial measures, which we expect to continue throughout the forecast period. The improvement in financial measures stems from the company effectively managing its regulatory risk resulting in more favorable rate outcomes. Under our baseline forecast, we expect FFO to debt of more than 16% and debt to EBITDA of about 4.5x. We expect that AWK will continue to manage its regulatory risk while maintaining financial measures that remain consistent within its "intermediate" financial risk profile category.

Downside scenario

We could revise the outlook to stable if regulatory risk increased or financial performance stalled or deteriorated, which could result from substantial debt financing of capital spending or acquisitions, such that FFO to debt fell to less than 16% and debt to EBITDA rose to more than 4.5x on a sustained basis.

Upside scenario

We could raise the ratings if FFO to total debt consistently remained more than 17% and debt to EBITDA were less than 4.5x. This could most probably occur if the company were able to manage its regulatory risk and achieve higher-than-expected rate case outcomes along with continuing to manage its expenses in a conservative manner.

Modifiers

We assess the comparable ratings analysis modifier as "negative," resulting in a one-notch lowering of the anchor score to 'a-' from 'a', which reflects weaker consolidated cash flow measures within the "intermediate" financial risk category and higher debt leverage. However, financial measures have improved, which we expect to continue throughout the forecast period.

Group Influence

Standard & Poor's bases its ratings on AWK on the consolidated group credit profile and application of our group ratings methodology. The GCP is 'a-'. As the parent company the issuer credit rating is the same as the GCP.

Ratings Score Snapshot

Corporate Credit Rating: A-/Positive/A-2

Business risk: Excellent
- Country risk: Very low
- Industry risk: Very low
- Competitive position: Excellent

Financial risk: Intermediate
- Cash flow/Leverage: Intermediate

Anchor: a

Modifiers
- Diversification/Portfolio effect: Neutral (no impact)
- Capital structure: Neutral (no impact)
- Liquidity: Adequate (no impact)
- Financial policy: Neutral (no impact)
- Management and governance: Satisfactory (no impact)
- Comparable rating analysis: Negative (-1 notch)

Stand-alone credit profile: a-
- Group credit profile: a-

Related Criteria And Research

Related Criteria

- Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Jan. 2, 2014
- Group Rating Methodology, Nov. 19, 2013
- Methodology: Industry Risk, Nov. 19, 2013
- Corporate Methodology, Nov. 19, 2013
- Corporate Methodology: Ratios And Adjustments, Nov. 19, 2013
- Key Credit Factors For The Regulated Utilities Industry, Nov. 19, 2013
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Ratings List

Ratings Affirmed; Outlook Revised To Positive

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American Water Works Co. Inc.		
American Water Capital Corp.		
New Jersey-American Water Co.		
Pennsylvania-American Water Co.		
Corporate Credit Rating	A-/Positive/A-2	A-/Stable/A-2
New Jersey-American Water Co.		
Pennsylvania-American Water Co.		
Corporate Credit Rating	A-/Positive/--	A-/Stable/--

Ratings Affirmed

American Water Capital Corp.	
Senior unsecured	A-
Commercial paper	A-2

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APRIL 10, 2014
CORPORATES

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COMPANY PROFILE

American Water Works Company, Inc.

Voorhees, New Jersey, United States

Table of Contents:

COMPANY OVERVIEW 1
BUSINESS DESCRIPTION 2
MANAGEMENT STRATEGY/PRIORITIES 4
FINANCIAL HIGHLIGHTS 5
  Overview 5
CAPITAL STRUCTURE AND DEBT MATURITY SCHEDULE 7
COMPANY MANAGEMENT 9
OWNERSHIP STRUCTURE 10
SUBSIDIARIES 11
SECTOR/INDUSTRY PEER GROUP 13
SUBSIDIARIES RATED BY MOODY'S 13
RELATED WEBSITES AND INFORMATION SOURCES 13
MOODY'S RELATED RESEARCH 13

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Company Overview

American Water Works Company, Inc. (American Water), is a holding company whose subsidiaries provide water-related and wastewater-related services to households, the US military, municipalities, and the food and beverage industry. It also offers associated water and wastewater line protection services to retail customers.

As of 31 December 2013, it operated in more than 40 US states and two Canadian provinces, servicing approximately 14 million people. In the financial year ended 31 December 2013 (2013), it reported revenue of USD2.9 billion.

American Water originated in 1886 with the establishment of American Water Works & Guarantee Company. In 1935, it was renamed American Water Works Company, Inc., and in 1947, it became publicly traded on the New York Stock Exchange (NYSE). Over 2003–08, the company was privately held, but it was relisted on the NYSE in 2008 through an initial public offering (Ticker: AWK). As of 31 December 2013, its largest shareholder was Vanguard Group Inc., which owned 5.6% of its total share capital.

Source: Company Reports (form 10K Dec 2013, Dec 2012 and Dec 2011), Company data, NASDAQ, Moody's Financial Metrics

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Business Description

American Water is a holding company whose subsidiaries provide water and wastewater-related services to approximately 14 million people. Furthermore, it provides water and sewer line protection services to households, and operates and maintains water and wastewater facilities for the US military, municipalities, and the food and beverage industry.

The company originated in 1886 with the establishment of American Water Works & Guarantee Company to build and acquire water systems in McKeesport, Pennsylvania. In 1935, it was renamed American Water, and in 1947 it became publicly traded on the NYSE. In 1965, to expand its operations, the company purchased water properties owned by Southern Gas & Water Company (West Virginia). In 1970, it consolidated 12 operating companies in New Jersey to create the New Jersey Water Company. In 2003, the company was acquired by the Germany-based stock corporation RWE Aktiengesellschaft (RWE). In April 2008, RWE Aqua Holdings GmbH, a wholly owned subsidiary of RWE (and at the time the sole owner of the company's common stock), divested part of its stake through an initial public offering on the NYSE (AWK). By 2009, RWE had disposed of all its remaining interests through similar transactions.

Since 2012, American Water has divested its regulated businesses where regulatory jurisdictions are challenging, and instead acquired assets in areas where the jurisdictions are more supportive. In 2012, it sold all its water and wastewater companies in Arizona and New Mexico, as well as eight water systems and one wastewater system in Ohio. During that period, it acquired 10 regulated water and wastewater systems for USD44.6 million, including seven regulated water systems in New York. In 2013, the company's regulated businesses acquired 10 water systems and five wastewater systems (including the regulated wastewater utility company Dale Service Corporation in November 2013) for approximately USD23.7 million.

As of 31 December 2013, the company provided services in more than 40 US states and two Canadian provinces, through two reportable segments: Regulated Businesses and Market-Based Operations.

Regulated Businesses: As of 31 December 2013, this segment operated through 18 utility subsidiaries, providing water and wastewater utility services to households, companies and public authorities in around 1,500 communities across 16 US states. It also provides water to private fire hydrants and other water utilities for resale. In 2013, this segment provided water services to 2.8 million residential customers (181.0 billion gallons of water), 219,510 commercial customers (80.4 billion gallons), 3,822 industrial customers (37.1 billion gallons) and 58,420 public and other customers (51.0 billion gallons). That year, it delivered wastewater services to 117,584 residential customers, 6,287 commercial customers, 16 industrial customers and 259 public and other customers. As of 31 December 2013, it owned and operated approximately 80 surface water and 500 groundwater treatment plants, 1,000 groundwater wells, 100 wastewater treatment facilities, 1,200 treated water storage facilities, 1,300 pumping stations, 87 dams and 47,000 miles of water mains and collection pipes. Its key competitors include government agencies and publicly owned utilities such as Aqua America Inc., United Water, American States Water Co. and California Water Services Group. In 2013, this segment accounted for 88.9% of the company's revenue.

For research publications that reference Credit Ratings, please see the ratings tab on the issuer/entity page on www.moodys.com for the most updated Credit Rating Action information and rating history.

Market-Based Operations: Accounting for 11.1% of the company's revenue in 2013, this segment includes various unregulated businesses that provide market-based water and wastewater products and services. It operates through three business lines:

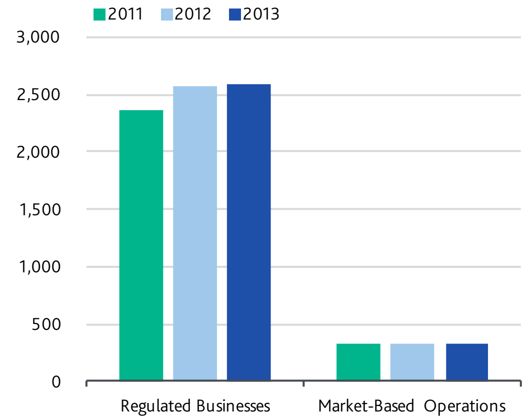
- **Contract Operations Group:** This business line designs, builds, operates and maintains water and wastewater facilities primarily for US military authorities, municipalities, and the food and beverage industry. Its key competitors include Veolia Environnement, American States Water, OMI and Southwest Water.
- **Homeowner Services Group:** This business line operates in partnership with various municipal authorities to repair broken or leaking water pipes and clogged or blocked sewer pipes that service households and small companies. Its key competitors include HomeServe USA and Utility Service Partners, Inc. In 2013, the Market-Based Operations segment expanded its water and sewer line protection programs through the Homeowner Services Group in 10 additional US states and Washington, D.C.
- **Terratec Environmental Ltd. (Terratec):** This business line mainly provides biosolids[1] management, transport and disposal services to municipal and industrial customers through a Canadian subsidiary, Terratec.

Source: Company Reports (form 10K Dec 2013, Dec 2012 and Dec 2011), Company data, Moody's research

EXHIBIT 1

Revenue by Segment

(in USD Million)



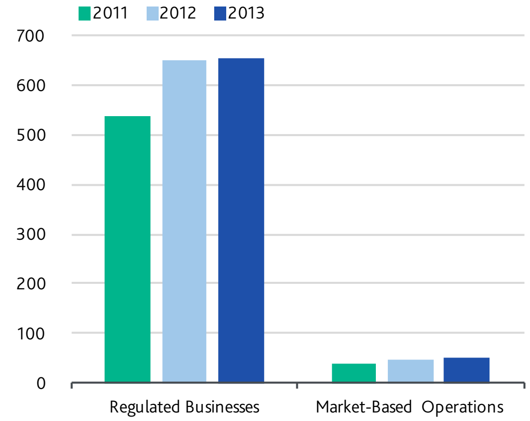
Note: Excluding "Other", which includes inter-segment eliminations and corporate adjustments

Source: Company Report (form 10K Dec 2013), Moody's Financial Metrics

EXHIBIT 2

Operating Income by Segment

(in USD Million)



Note: Excluding "Other", which includes inter-segment eliminations and corporate adjustments

Source: Company Report (form 10K Dec 2013), Moody's Financial Metrics

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[1] Biosolids are a residual product of wastewater treatment.

Management Strategy/Priorities

Strategically, American Water seeks to:

- Maximize customer satisfaction and improve service quality
- Expand its Regulated Businesses segment through acquisitions and organic growth, as well as by selling water to the water systems of other communities
- Extend its Market-Based Operations segment (primarily the Homeowner Services Group and military services contracts) through fostering new core growth, introducing new products and increasing operations in new markets
- Reduce its carbon and waste footprints, as well as the amount of water lost through leakage
- Reduce the adverse effects of regulatory delays on investment returns and promote constructive regulatory frameworks
- Undertake capital expenditure of USD5.8 billion over 2014–18, including USD1.1 billion in 2014 to upgrade company infrastructure and systems (USD900 million; 2014–18: USD5.1 billion), make strategic investments (USD100 million), and conduct acquisitions (USD100 million)
- Optimize supply chain processes and secure a regulated operation and maintenance efficiency ratio[2] not exceeding 35% by 2018
- Innovate and leverage processes to improve effectiveness and increase efficiency
- Invest in research and development to provide high-quality, reliable services at reasonable rates, maintain industry leadership and increase company competitiveness

Additionally, the company aims to achieve long-term growth in its earnings per share of 7%–10%.

Source: Company Reports (form 10 K Dec 2013, investor day presentation Dec 2013)

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[2] The O&M efficiency ratio is calculated by dividing the adjusted regulated O&M expense by adjusted regulated operating revenues.

Financial Highlights

Overview

Company Type:	Public
Exchange Listing:	New York Stock Exchange: AWK
Fiscal Year End:	December
Financial Filings:	Securities and Exchange Commission
Auditor:	PricewaterhouseCoopers LLP

Note: The financials presented below have been adjusted for Moody's analytic purposes. To see how adjustments have been made, please see Moody's Financial Metrics, a fundamental financial data and analytics platform that offers insight into the drivers of Moody's Corporate ratings.

EXHIBIT 3

Selected Adjusted Financial Data

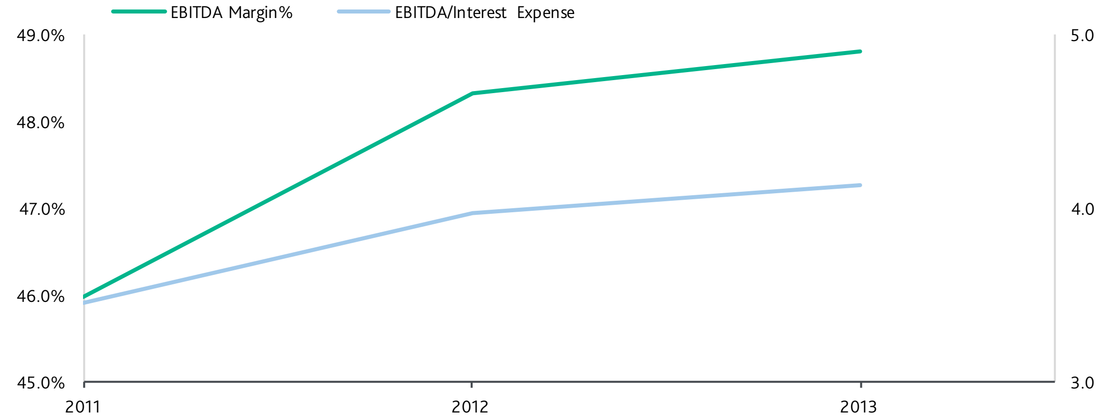
American Water Works Company, Inc.

(in USD Million)	31-Dec-13	31-Dec-12	31-Dec-11
INCOME STATEMENT			
Revenue/Sales	2,902	2,877	2,666
Gross Profit	1,625	1,576	1,407
EBITDA	1,417	1,390	1,226
EBIT	993	990	852
Interest Expense	342	350	355
Net Income	397	380	274
BALANCE SHEET			
Cash & Cash Equivalents	27	24	14
Current Assets	550	499	1,398
Net Property, Plant & Equipment (PP&E)	12,537	11,908	11,218
Total Assets	15,215	14,888	14,973
Current Liabilities	1,246	1,006	1,503
Total Debt	6,131	6,228	6,522
Total Liabilities	10,488	10,443	10,733
Shareholders' Equity	4,728	4,445	4,240
CASH FLOW			
Funds from Operations (FFO)	1,069	978	938
Cash Flow from Operations (CFO)	944	1,040	956
Capital Expenditures (CAPEX)	(996)	(947)	(947)
Cash from Investing Activities	(1,069)	(401)	(934)
Dividends	(149)	(213)	(158)
Retained Cash Flow (RCF)	920	764	780
Cash from Financing Activities	128	(628)	(21)

Source: Moody's Financial Metrics

EXHIBIT 4

EBITDA Margin% & EBITDA/Interest Expense (Adjusted)

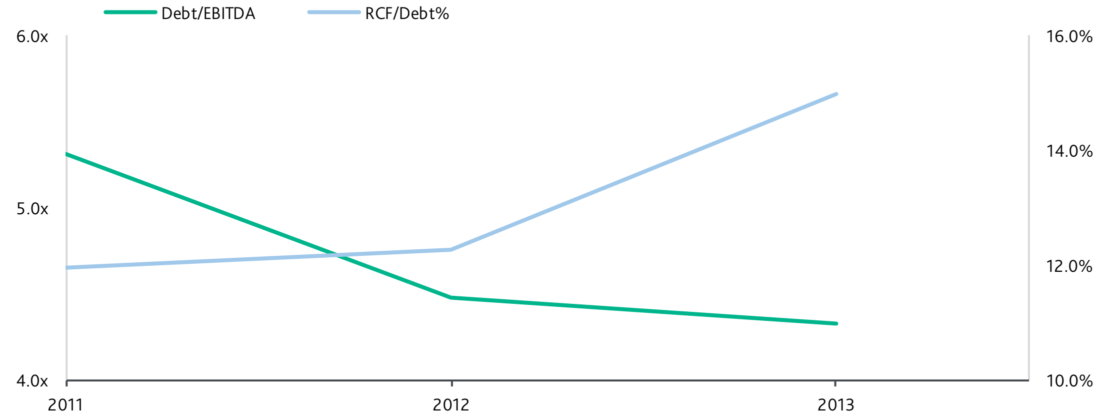


As of 31 Dec 2013

Source: Moody's Financial Metrics

EXHIBIT 5

Debt/EBITDA & RCF/Debt% (Adjusted)



As of 31 Dec 2013

Source: Moody's Financial Metrics

Capital Structure and Debt Maturity Schedule

Note: Some financials presented below have been adjusted for Moody's analytic purposes. To see how adjustments have been made, please see Moody's Financial Metrics, a fundamental financial data and analytics platform that offers insight into the drivers of Moody's Corporate ratings.

EXHIBIT 6

Capital Structure

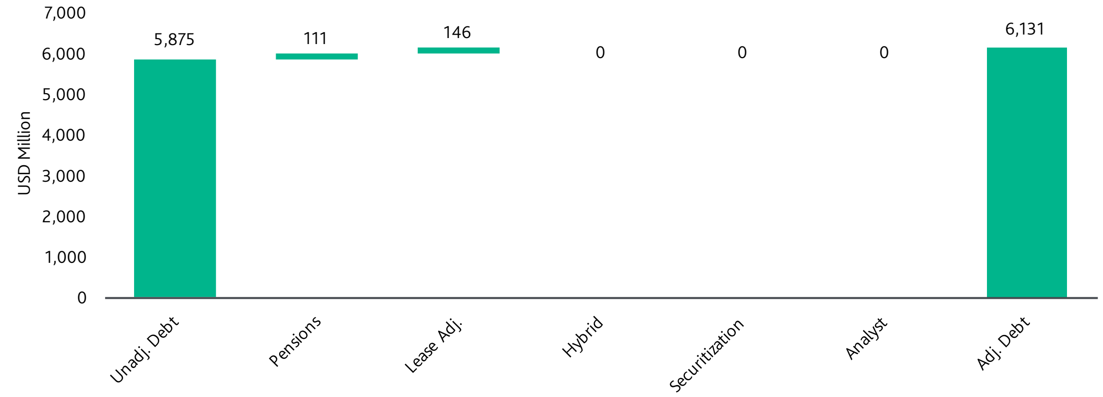
American Water Works Company, Inc.

(in USD Million)	31-Dec-13	31-Dec-12	31-Dec-11
SHORT-TERM DEBT			
Short-Term Debt	630	270	515
Current Portion of Long-Term Debt	14	116	29
Total Short-Term Debt	**644**	**386**	**544**
LONG-TERM DEBT			
Equipment Trust	–	–	–
Secured Debt	1,467	1,478	1,848
Senior Debt	3,757	3,826	3,519
Subordinated Debt	–	–	–
Mandatorily Redeemable Pref. Secur.	19	21	22
Capitalized Leases	1	1	1
Gross Long-Term Debt	**5,244**	**5,325**	**5,390**
Less Current Maturities	(14)	(116)	(29)
Net Long-Term Debt	**5,230**	**5,209**	**5,361**
Total Debt	**5,875**	**5,595**	**5,905**
Total Adjusted Debt	**6,131**	**6,228**	**6,522**
SHAREHOLDERS' EQUITY			
Preferred Stock	–	2	5
Common Stock & Paid-In Capital	6,258	6,224	6,182
Retained Earnings	(1,496)	(1,665)	(1,849)
Accumulated Other Comprehensive Income	(35)	(116)	(98)
Total Equity	**4,728**	**4,445**	**4,240**
Total Adjusted Equity	**4,728**	**4,445**	**4,240**
Adjusted Book Capitalization	**12,681**	**12,218**	**12,005**
Adjusted Market Capitalization	**7,960**	**7,782**	**7,774**
Adjusted Debt/Adjusted Book Capital (%)	**48.35**	**50.97**	**54.33**
Holding Company Debt/Total Debt (%)	–	–	–
Secured Debt/Total Debt (%)	**24.98**	**26.41**	**31.29**

Source: Moody's Financial Metrics

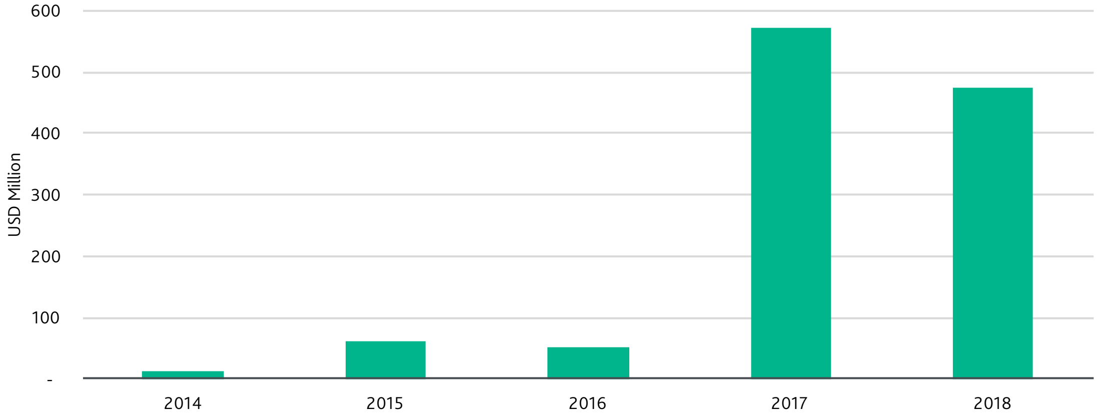
Of American Water's total adjusted debt in 2013, the largest components were those related to pension and lease adjustments.

EXHIBIT 7
Components of Debt



As of 31 Dec 2013
Source: Moody's Financial Metrics

EXHIBIT 8
Upcoming Long-Term Debt Maturities



As of 31 Dec 2013
Source: Moody's Financial Metrics

Company Management

Company Management	Current Title	Age*	Previous Roles
Jeffry E. Sterba	President, Chief Executive Officer and Director	58	PNM Resources, Inc.: Chairman and Chief Executive Officer; PNM Resources, Inc.: Non-Executive Chairman; PNM Resources, Inc.: Executive Vice President and Chief Operating Officer
Walter Lynch	President and Chief Operating Officer of Regulated Operations	51	American Water: President of Regulated Operations; American Water: Executive Vice President of Business Operations, Eastern Division; American Water: President, Northeast Region
Susan N. Story**	Senior Vice President and Chief Financial Officer	54	Southern Company: Executive Vice President; Southern Company Services Inc.: President and Chief Executive Officer; Gulf Power Company: President and Chief Executive Officer
Mark S. Smith	Vice President and Chief Information Officer	54	American Water: ITS Senior Director, Business Application Development & Project Management Office; Siemens Medical Solutions: Group Manager of Management Information Systems and Director of the Shared Services Office; Siemens: Director of the Siebel Competency Center
William D. Rogers	Vice President and Treasurer	53	NV Energy: Chief Financial Officer; NV Energy: Vice President of Finance, Risk and Tax, and Corporate Treasurer; Merrill Lynch and JPMorgan Chase: Managing Director of Capital Markets
Mark Chesla	Vice President and Controller	54	Oglethorpe Power Corporation: Vice President and Controller; SouthStar Energy Services LLC: Vice President, Administration/Controller

Notes: * As of 31 Dec 2013

** Linda G. Sullivan will succeed Susan N. Story as Senior Vice President and Chief Financial Officer from 9 May 2014.

As of 13 Mar 2014

Board of Directors	Age*	Affiliation
George MacKenzie	64	American Water: Non-Executive Chairman; Safeguard Scientifics, Inc., Tractor Supply Co., and C&D Technologies, Inc.: Director; Medical Center of Delaware: Member of the Board of Trustees; University of Delaware: Member of the Investment Committee
Julia L. Johnson	50	American Water: Director; NetCommunications, LLC: President; Allegheny Energy, Inc., MasTec, Inc. and Northwestern Corporation: Director
William J. Marrazzo	63	American Water: Director; WHYY, Inc.: Chief Executive Officer and President
Martha Clark Goss	63	American Water: Director; Amwell Holdings/Hopewell Holdings LLC: Chief Operating Officer and Chief Financial Officer; Ocwen Financial Corporation, Neuberger Berman Mutual Fund Complex and Allianz Life of New York: Member of the Board; Channel Reinsurance Ltd.: Chairwoman of the Board; Brown University: Trustee Emerita

Board of Directors	Age*	Affiliation
Julie A. Dobson	56	American Water: Director; PNM Resources, Inc., Safeguard Scientifics, Inc. and LCC International, Inc.: Member of the Board
Paul J. Evanson	71	American Water: Director; St. John's University and Westmoreland Museum of American Art: Member of the Board of Trustees; Columbia Law School: Member of the Dean's Council
Richard R. Grigg	64	American Water: Director; FirstEnergy Corp.: Executive Vice President; FirstEnergy Utilities Group: President; Akron Children's Hospital, Northeast Ohio Council on Higher Education and Milwaukee Boys and Girls Club: Member of the Board of Trustees; The President's Council, Cleveland, Ohio: Associate Member; Association of Edison Illuminating Companies: President and Member of the Board; American Society of Mechanical Engineers: Member
Stephen P. Adik	69	American Water: Director; Northwestern Energy, Beacon Power Corporation, Dearborn Midwest Conveyor Company, SouthShore and South Bend Railroad, and Regional Bus Authority of Northwest Indiana: Member of the Board
Jeffry E. Sterba	58**	American Water: Director, President and Chief Executive Officer; PNM Resources: Non-Executive Chairman; Meridian Institute: Member of the Board of Directors

As of 13 Mar 2014

*As of 28 Mar 2013

**As of 31 Dec 2013

Source: Company Reports (form 10 K Dec 2013, proxy statement 2013), Company data

Ownership Structure

As of 31 December 2013, American Water's largest shareholder was as follows:

EXHIBIT 9

American Water Works Company, Inc.

Shareholder	Number of Ordinary Shares	% of Shares Held
Vanguard Group Inc.	10,014,690	5.61

Source: Company Report (form 10K Dec 2013), NASDAQ

Subsidiaries

As of 21 February 2014, American Water's subsidiaries were as follows:

EXHIBIT 10

American Water Works Company, Inc.

Subsidiary	Place of Jurisdiction
AAET, Inc.	Delaware
American Lake Water Company	Illinois
American Water – Acciona Agua LLC	Delaware
American Water (USA), Inc.	Delaware
American Water Canada Corp.	Ontario
American Water Capital Corp.	Delaware
American Water Carbon Services Corp.	Ontario
American Water Engineering, Inc.	New Jersey
American Water Enterprises Holding, Inc.	Delaware
American Water Enterprises, Inc.	Delaware
American Water Industrials, Inc.	Delaware
American Water Operations and Maintenance, Inc.	Texas
American Water Resources Holdings, Inc.	Delaware
American Water Resources of Florida, Inc.	Delaware
American Water Resources of Texas, Inc.	Delaware
American Water Resources, Inc.	Virginia
American Water Services CDM, Inc.	Washington
American Water Services Underground Infrastructure Corp.	Ontario
American Water Services, LLC	Delaware
American Water Works Company, Inc.	Delaware
American Water Works Service Company, Inc.	Delaware
AW Contract Services (Canada), Inc.	Federally Chartered
AW Contract Services (USA), Inc.	Delaware
AW Contract Services Holding, Inc.	Delaware
AW Technologies Incorporated	Delaware
Bluefield Valley Water Works Company	Virginia
Braemar Acres Limited	Ontario
California-American Water Company	California
Dale Service Corporation	Virginia
Edison Water Company	New Jersey
EMC American Water Canada, Inc.	Federally Chartered
EMC Batesille, LLC	Missouri
EMC of St. Charles County, LLC	Missouri
Environmental Management Corporation	Missouri
E'Town Properties, Inc.	Delaware
E'Town Services, LLC	New Jersey

EXHIBIT 10

American Water Works Company, Inc.

Subsidiary	Place of Jurisdiction
Hawaii-American Water Company	Nevada
Illinois-American Water Company	Illinois
Indiana-American Water Company, Inc.	Indiana
Iowa-American Water Company	Delaware
Kentucky-American Water Company	Kentucky
Laurel Oak Properties Corporation	Delaware
Liberty Water Company	New Jersey
Maryland-American Water Company	Maryland
Michigan-American Water Company	Michigan
Missouri-American Water Company	Missouri
Mobile Residuals Management (USA), Inc.	Delaware
Mobile Residuals Management, Inc.	Ontario
New Jersey-American Water Company, Inc.	New Jersey
New York American Water Company, Inc.	New York
OMI/Thames Water Stockton, Inc.	Delaware
Pennsylvania-American Water Company	Pennsylvania
Philip Automated Management Controls, Inc.	Georgia
Prism-Berlie (Windsor) Limited	Ontario
Rialto Water Services, LP	Delaware
Tennessee-American Water Company	Tennessee
Terratec Environmental Ltd.	Ontario
Texas-American Water Company	Texas
TWH LLC	Delaware
TWNA, Inc.	Delaware
Virginia-American Water Company	Virginia
West Virginia-American Water Company	West Virginia

Source: Company Report (form 10K Dec 2013)

Sector/Industry Peer Group

- Golden State Water Company
- Aquarion Water Company of Connecticut

Subsidiaries Rated by Moody's

- Pennsylvania-American Water Company
- New Jersey-American Water Company
- American Water Capital Corp.

Related Websites and Information Sources

For additional information, please see:

- The company's website: www.amwater.com

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Moody's Related Research

Credit Opinion:

- American Water Works Company, Inc.

Rating Methodology:

- Global Regulated Water Utilities, December 2009 (121311)

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available on the issuer's page. All research may not be available to all clients.

Report Number: 167784

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MOODY'S
INVESTORS SERVICE

KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2015-00418
ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

Witness: **Scott W. Rungren**

19. Reference the Kentucky American Water application. Provide the corporate credit and bond ratings assigned to American Water and/or Kentucky American Water and the other operating utilities of American Water since the year 2010 by S&P, Moody's, and Fitch. For any change in the credit and/or bond rating, provide a copy of the associated report.

Response:

Kentucky-American Water is not rated. Please see the table below for the American Water credit ratings since 2010. Please see the attachments for the associated reports for rating changes in 2013 (reports on rating changes in 2015 are provided as attachments to Item No. 18 of this request).

American Water Credit Ratings
2010 to 2015

	2010	**2011**	**2012**	**2013***	**2014**	**2015****
American Water						
Standard and Poor's Corporate Credit Rating	BBB+	BBB+	BBB+	A-	A-	A
Moody's Issuer Rating	Baa2	Baa2	Baa2	Baa1	Baa1	A3

* Rating Upgraded on 5/24/13 by S&P and on 5/29/13 by Moody's
** Rating Upgraded on 5/7/15 by S&P and on 8/7/15 by Moody's

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Research Update:

American Water Works Co. Inc. And Subsidiaries Corporate Credit Ratings Raised To 'A-'

Primary Credit Analyst:
Matthew L O'Neill, New York (1) 212-438-4295; matthew.oneill@standardandpoors.com

Secondary Contact:
Barbara A Eiseman, New York 212-438-7666; barbara.eiseman@standardandpoors.com

Table Of Contents

Overview

Rating Action

Rationale

Outlook

Related Criteria And Research

Ratings List

Research Update:

American Water Works Co. Inc. And Subsidiaries Corporate Credit Ratings Raised To 'A-'

Overview

- American Water Works Co. Inc.'s financial measures continue to gradually improve, primarily reflecting the company's improved effective management of regulatory risk.
- We are raising our corporate credit rating on the company and its subsidiaries, American Water Capital Corp., New Jersey-American Water Co., and Pennsylvania-American Water Co., to 'A-' from 'BBB+'. The outlook is stable.
- The stable outlook reflects our expectation that the company will continue to effectively manage its regulatory risk, enabling the regulated business to, on average, earn its allowed return on equity. Under our baseline forecast, we expect funds from operations (FFO) to debt of more than 16% and debt to EBITDA of about 4.5x.

Rating Action

On May 24, 2013, Standard & Poor's Ratings Services raised its corporate credit rating on regulated water utility company American Water Works Co Inc. (AWW) and subsidiaries American Water Capital Corp. (AWCC), New Jersey-American Water Co., and Pennsylvania-American Water Co. to 'A-' from 'BBB+'. The outlook is stable.

Rationale

The upgrade reflects sustained improvements in cash flow and leverage measures, which reflect the company's improved management of regulatory risk and the continued execution of its cost management initiative. We expect that the company will continue its relatively conservative financial policies to maintain its credit measures.

Standard & Poor's ratings on AWW and its subsidiaries reflect its "excellent" business risk profile and "significant" financial risk profile. The excellent business risk profile reflects the company's mostly monopolistic businesses that provide an essential service in regulatory jurisdictions that we generally view as credit supportive. In addition, the company's geographic diversity, reliability, and efficiency further support its business risk profile. We currently view the company as consisting of 95% regulated businesses and 5% unregulated businesses on an EBITDA basis. The unregulated businesses only marginally affect the company's business risk profile because of its modest expected capital requirements, affiliation with company's regulated service jurisdictions, and its lower risk service contracts.

AWW's regulatory framework includes reasonably allowed returns on equity and various cost-recovery mechanisms, including incentives for infrastructure improvements, which we view as supportive of credit quality. In a number of jurisdictions, which represent about 50% of consolidated revenues, the utility recovers replacement capital spending between rate cases up to a stated percentage. The importance of infrastructure surcharge mechanisms has increased, given AWW's large capital program. Certain states also allow for surcharges related to the cost of power, chemicals, and purchased water. We generally expect that AWW will continue to request additional recovery mechanisms to cover its rising operating costs, capital spending, and pension and other postretirement obligations.

The company's geographic reach provides it with market, cash flow, and regulatory diversification. AWW provides regulated water and wastewater services to about 3.2 million customers in 16 states. AWW's elevated capital-spending requirements for infrastructure replacement, increased costs of compliance with water quality standards, and reliance on acquisitions to provide growth partly offset these strengths.

AWW's reliability of supply is high, as the company owns a substantial number of treatment facilities for surface and groundwater treatment, and the majority of supply comes from surface and groundwater. In 2012, surface water provided 66% of supply, groundwater 27%, and purchased water about 7%.

AWW's consolidated financial risk profile is significant under our criteria and reflects our baseline forecast that consolidated FFO to debt and debt to EBITDA will approximate 16% and 4.5x, respectively, over the medium term. As of year-end 2012, AWW's adjusted debt, including capitalized operating leases and tax-affected pension and postretirement obligations, was about $6.2 billion, for a debt-to-capital ratio of about 58% and a debt to EBITDA ratio of 4.5x. AWW's consolidated FFO were about $1 billion, for an FFO to total debt ratio of about 16.4% and FFO to interest of 4.1x. We consider these credit measures to be sufficient for the significant financial risk profile.

We expect that the company will continue to have negative discretionary cash flow, primarily reflecting continued high capital spending. AWW estimates that it will spend about $800 million to $1 billion annually in each of the next three years to replace infrastructure, build new facilities to comply with water quality standards, and initiate projects to enhance reliability, quality of service, and efficiency. We expect that the company will finance its cash needs in a manner that preserves its credit quality.

Liquidity

The short-term rating on AWW and AWCC is 'A-2' and largely reflects the long-term corporate credit ratings and our view of the company's "adequate" liquidity under Standard & Poor's corporate liquidity methodology. We base our liquidity assessment on the following factors and assumptions:

- AWW's liquidity sources during the next 12 months, including cash, FFO, and credit facility availability, should exceed uses by more than 1.2x.
- Debt maturities are manageable during the next 12 months, with no substantial maturities coming due until 2017.
- Liquidity sources would exceed uses even if EBITDA decreases by 15%.
- AWW's ability to absorb high-impact, low-probability events with limited need for refinancing, its flexibility to lower capital spending or sell assets, its sound bank relationships, its solid standing in credit markets, and its generally prudent risk management.

In our analysis of liquidity during the next 12 months, we assume about $1.7 billion of liquidity sources, consisting primarily of FFO and credit facility availability. We estimate uses of $1.4 billion of liquidity for capital spending, maturing debt, and shareholder distributions.

The company maintains a bank credit facility totaling $1 billion that expires in October 2017. As of March 31, 2013, the company had $637 million available under the facility. The bank facilities require the parent and the utilities to maintain a minimum total funded debt to capitalization ratio of 70%, with which they comfortably comply.

Recovery analysis

We assign recovery ratings to first mortgage bonds (FMBs) issued by U.S. utilities, which can result in issue ratings being notched above a corporate credit rating (CCR) on a utility depending on the rating category and the extent of the collateral coverage. The FMBs issued by U.S. utilities are a form of "secured utility bond" (SUB) that qualify for a recovery rating as defined in our criteria (see "Collateral Coverage and Issue Notching Rules for '1+' and '1' Recovery Ratings on Senior Bonds Secured by Utility Real Property, Feb. 14, 2013). The recovery methodology is supported by the ample historical record of 100% recovery for secured bondholders in utility bankruptcies in the U.S. and our view that the factors that enhanced those recoveries (limited size of the creditor class and the durable value of utility rate-based assets during and after a reorganization given the essential service provided and the high replacement cost) will persist in the future. Under our SUB criteria, we calculate a ratio of our estimate of the value of the collateral pledged to bondholders relative to the amount of FMBs outstanding. FMB ratings can exceed a CCR on a utility by up to one notch in the 'A' category, two notches in the 'BBB' category, and three notches in speculative-grade categories, depending on the calculated ratio.

New Jersey American Water and Pennsylvania American Water's FMBs benefit from a first-priority lien on substantially all of the utility's real property owned or subsequently acquired. Collateral coverage of more than 1.5x supports a recovery rating of '1+' and an issue rating one notch above the CCR.

Outlook

The stable outlook reflects our expectation that the company will continue to effectively manage its regulatory risk, filing for timely rate relief, and be able to generally earn, on average, its allowed return on equity. Under our baseline forecast, we expect FFO to total debt of more than 16% and debt to EBITDA of about 4.5x. Key risks to our base case scenario include the company disproportionately expanding its unregulated businesses. We expect the company to finance acquisitions in a manner that supports credit quality, and continuing to effectively execute its cost-management initiative.

We could raise the ratings if FFO to total debt consistently remained more than 18% and debt to EBITDA were less than 4.5x. This could most probably occur if the company were able to manage its regulatory risk and achieve considerably higher-than-expected rate case outcomes.

We could lower the rating if regulatory risk increased or financial performance stalled or deteriorated, which could result from substantial debt financing of capital spending or acquisitions, such that FFO to debt fell to less than 14% and debt to EBITDA rose to more than 5x.

Related Criteria And Research

- Criteria - Corporates - Utilities: Collateral Coverage and Issue Notching Rules for ‘1+’ and ‘1’ Recovery Ratings on Senior Bonds Secured by Utility Real Property, Feb. 14, 2013
- Criteria - Corporates - Utilities: Assessing U.S. Utility Regulatory Environments, Nov. 7, 2007
- Criteria - Corporates - Utilities: Notching Of U.S. Investment-Grade Investor-Owned Utility Unsecured Debt Now Better Reflects Anticipated Absolute Recovery, Nov. 10, 2008
- Criteria: Key Credit Factors: Business And Financial Risks In The Investor-Owned Utilities Industry, Nov. 26, 2008.
- Criteria - Corporates - General: Methodology And Assumptions: Standard & Poor's Revises Key Ratios Used In Global Corporate Ratings Analysis, Dec. 28, 2011
- Criteria - Corporates - General: Methodology: Short-Term/Long-Term Ratings Linkage Criteria For Corporate And Sovereign Issuers, May 15, 2012
- Criteria - Corporates - General: 2008 Corporate Criteria: Commercial Paper , April 15, 2008
- Criteria - Corporates - General: 2008 Corporate Criteria: Rating Each Issue, April 15, 2008
- Criteria - Corporates - General: 2008 Corporate Ratings Criteria: Ratios And Adjustments, April 15, 2008

Ratings List

Upgraded; Outlook Action; Ratings Affirmed

	To	From
American Water Works Co. Inc.		
American Water Capital Corp.		
Corporate Credit Rating	A-/Stable/A-2	BBB+/Positive/A-2
American Water Capital Corp.		
Senior unsecured	A-	BBB+

Upgraded; Outlook Action

	To	From
New Jersey-American Water Co.		
Pennsylvania-American Water Co.		
Corporate Credit Rating	A-/Stable/--	BBB+/Positive/--

Ratings Affirmed

American Water Capital Corp.	
Commercial paper	A-2

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McGRAW-HILL

MOODY'S
INVESTORS SERVICE

Rating Action: Moody's upgrades American Water Works and subsidiaries

Global Credit Research - 29 May 2013

Approximately $5.3 billion of debt affected

New York, May 29, 2013 -- Moody's Investors Service, ("Moody's") upgraded the long-term ratings of American Water Works (AWK; issuer rating to Baa1 from Baa2) and its subsidiaries American Water Capital Corp's (AWCC; senior unsecured to Baa1 from Baa2), New Jersey American Water (NJ-AWC; issuer rating to A3 from Baa1) and Pennsylvania American Water (PA-AWC; issuer rating to A3 from Baa1). AWCC's P-2 commercial paper rating was affirmed and the rating outlook for AWK, AWCC, NJ-AWC and PA-AWC is stable.

RATINGS RATIONALE

"The upgrade of AWK reflects our expectation that the company will continue to make progress toward enhancing cost recovery throughout its broad base of regulated operations, which will improve financial metrics, including the ratio of funds from operations (FFO) to debt in the mid to high-teen's range" said Moody's Analyst Ryan Wobbrock.

AWK has shown significant improvement in financial performance since 2010, due to focused investment in supportive regulatory jurisdictions, greater use of interim cost recovery mechanisms and heightened attention toward operating efficiency.

"Recent regulatory provisions, such as ongoing rate relief through general rate cases in 16 states and the allowance of infrastructure recovery mechanisms in AWK's two largest service territories, New Jersey and Pennsylvania, are significant drivers for the upgrade" Wobbrock added. The strengthening of NJ-AWC and PA-AWC's financial metrics (e.g., FFO to debt in the high teens) has been a factor for the overall improvement in the credit profile.

The stable outlook for AWK reflects Moody's view that the company will continue to generate stable and predictable cash flow from its widely diversified regulated operations and growth in its market based, unregulated, business segment. The outlook also assumes that the company will manage a declining demand environment and capital intensive operations prudently through the maintenance of cooperative and supportive regulatory relationships and a conservative financing strategy.

Further upgrades could be considered if there are additional improvements in regulatory recovery processes, such as infrastructure recovery mechanisms being adopted in more jurisdictions; a material improvement in liquidity sources and if the consolidated entity were to generate FFO to debt in the high teens for a sustained period of time.

AWK's ratings would be negatively impacted by materially negative regulatory decisions, operational concerns such as supply or asset failure or increasing leverage to the point that FFO to debt declines to the low-teen's for an extended period.

AWCC's outlook corresponds with AWK, which provides credit enhancement through a support agreement for all of AWCC's debt obligations.

Headquartered in Voorhees, New Jersey, American Water is the largest investor-owned provider of water, wastewater and related services in North America.

The principal methodology used in this rating was Global Regulated Water Utilities published in December 2009. Please see the Credit Policy page on www.moodys.com for a copy of this methodology.

REGULATORY DISCLOSURES

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KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2015-00418
ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

Witness: Donald J. Petry

20. Reference the Kentucky American Water application. Provide the breakdown in the expected return on pension plan assets for American Water and/or Kentucky American Water. Specifically, provide the expected return on different assets classes (bonds, US stocks, international stocks, etc.) used in determining the expected return on plan assets. Provide all associated source documents and work papers.

Response:

Please see the attachment. The attachment contains confidential information and is subject to a petition for confidential treatment.

ATTACHMENT TO KAW_R_AGDR1_NUM020_032416 FILED UNDER SEAL PURSUANT TO PETITION FOR CONFIDENTIAL TREATMENT FILED ON MARCH 24, 2016

KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2015-00418
ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

Witness: **Linda C. Bridwell**

21. Reference the Kentucky American Water application generally. Provide all transcripts of American Water/Kentucky American Water shareholder calls for the past three years, where Kentucky American Water was mentioned.

Response:

Please see the attached.

Participants

CORPORATE PARTICIPANTS

Gregory S. Panagos
Vice President-Investor Relations, American Water Works Co., Inc.

Susan N. Story
President, Chief Executive Officer & Director, American Water Works Co., Inc.

Walter J. Lynch
President & COO of Regulated Operations, American Water Works Co., Inc.

Linda G. Sullivan
Chief Financial Officer & Senior Vice President, American Water Works Co., Inc.

OTHER PARTICIPANTS

Richard A. Verdi
Analyst, Ladenburg Thalmann & Co., Inc. (Broker)

Management Discussion Section

Operator

Good morning and welcome to American Water's Fourth Quarter and Year End 2015 Earnings Conference Call.

As a reminder, this call is being recorded and is also being webcast with an accompanying slide presentation through the company's Investor Relations website. Following the earnings conference call, an audio archive of the call will be available through March 3, 2016 by dialoging 412-317-0088 for U.S. and international callers. The access code for replay is 10079115. The online archive of the webcast will be available through March 25, 2016 by accessing the Investor Relations page of the company's website located at www.amwater.com. [Operator Instructions]

I would now like to introduce your host for today's call, Greg Panagos, Vice President of Investor Relations. Mr. Panagos, please go ahead.

Gregory S. Panagos
Vice President-Investor Relations, American Water Works Co., Inc.

Thank you, Kerry. Good morning, everyone. And thank you for joining us for today's call. We will keep the call to about an hour. At the end of our prepared remarks, we will open the call up for your questions.

During the course of this conference call, in both our prepared remarks and in answer to your questions, we may make forward-looking statements to represent our expectations regarding our future performance or other future events.

These statements are predictions based upon our current expectations, estimates and assumptions. However, since these statements deal with future events, they are subject to numerous known and unknown risks, uncertainties and other factors that may cause actual results to be materially different from the results indicated or implied by such statements. Additional information regarding these risks, uncertainties and factors is provided in the earnings release and in our 2015 Form 10-K each as filed with the SEC.

I encourage you to read our Form 10-K for a more detailed analysis of our financials and other important information. Also reconciliation tables for non-GAAP financial information discussed on this conference call including adjusted EPS and our O&M efficiency ratio can be found in the appendix of the slide deck for this call which is located at the investor relations page of the company website as well as our earnings release.

We will be happy to answer any questions or provide further clarification if needed during our question-and-answer session. All statements in this call related to earnings and earnings per share refer to diluted earnings per share from continuing operations.

Before I turn the call over to Susan, I would like to take this opportunity to introduce you all to Melissa Schwarzell. Our new Director of Investor Relations. Melissa has been a member of American Water's finance team in Lexington, Kentucky since 2009. Her experience includes supporting rate cases, infrastructure filings and other regulatory matters in seven of American Waters regulated states.

She has worked on most of the company's cost components and she has tackled challenging recovery issues. She's also provided rates related financing – excuse me, financial planning support throughout the American Water footprint. I know you will all find Melissa to be very helpful and a pleasure to work with.

And now, I will turn the call over to American Water's President and CEO, Susan Story.

Susan N. Story
President, Chief Executive Officer & Director, American Water Works Co., Inc.

Thanks, Greg. Good morning, everyone and thanks for joining us.

With me today are Linda Sullivan, our CFO, who will go over the fourth quarter and full year financial results; and Walter Lynch, our COO, who will give key updates on our regulated business.

On January, the 1st, Walter assumed additional responsibility for operational and safety best practices across our AWE market-based businesses. So periodically, he will give you an update on those efforts as well.

The employees of American Water delivered strong results in 2015 for both the fourth quarter and the full year. We invested significant capital into needed upgrade for our system to provide reliable and safe water and wastewater services. We continued our focus on managing costs and deploying technology so that our services remain affordable for our customers and we treated and delivered water that consistently met and surpassed EPA drinking water standards. This includes the lead and copper rule, which has generated a lot of news recently, due to the crisis in Flint, Michigan.

American Water samples for lead on a routine basis and our water systems continue to be incompliance with that rule. We expanded our regulated customer base in 2015 by nearly 42,000 metered customers; about 9,000 customers resulted from organic growth in our existing footprint. 24,000 customers joined our system from acquisitions that closed during the year, and additional 9,000 are from acquisitions, where we have written agreements in place and are just awaiting regulatory approval.

We also continue to grow our market-based businesses through new contracts and new customers. As you can see on slide seven, we reported operating revenues of $783 million, a 7% increase above fourth quarter 2014. For the full year, operating revenues were nearly $3.2 billion, an increase of about 5% over 2014. Earnings from continuing operations were $0.55 per share for the fourth quarter, a 5.8% increase above fourth quarter 2014.

Annual earnings were $2.64 per share, up 8.6% over 2014 adjusted EPS. The fourth quarter includes a $5 million contribution to the American Water Foundation whose work I will discuss briefly before our Q&A session.

Turning now to slide eight; you can see that we delivered on our strategies in both the regulated and market-based businesses in 2015. We made about $1.4 billion in total annual investment, the highest in our company's history. We invested $1.2 billion in our regulated system, which improved our long-term service reliability and water quality for our customers.

We're able to increase our investment at this level because of the expertise of our hardworking employees and our continuous improvement in both O&M and capital deployment efficiency. We're proud of our ability to deliver on our growth goals and effectively manage every dollar to deliver excellent customer service while we keep our customer bills affordable.

Even more importantly, we know that our customers need to be able to trust that the water we provide is clean and safe. So while consistently meeting and surpassing all EPA requirements in 2015, we continued our focus on further strengthening our critical assets.

Let me give you a couple of examples. We upgraded two of our company's largest water treatment plants, which serve over 300,000 customers in St. Louis County, Missouri. In Champaign, Illinois, we upgraded chemical treatment facilities nearing the end of their useful life with improvements that included replacing gas coring facilities with safer technology.

In addition to these regulated system investments in 2015, we also grew our customer base organically and through regulated acquisitions. Our market-based businesses continue to grow as well. In December, our Contract Services Group was awarded a 10-year O&M contract in Camden, New Jersey with revenue of approximately $125 million.

Our Military Services Group expanded to 12 bases with a successful 50-year contract bid for Vandenberg Air Force Base with revenue of approximately $300 million. Our Homeowner Services Group expanded to 1.6 million service warranty contracts and we grew our utility partnerships by adding Rialto, California and the Orlando Utilities Commission. As you know, we expanded our business through the acquisition of Keystone Clearwater Solutions.

So, in summary, we produced excellent results for the year through our ongoing customer growth, highest annual capital investment in our history, and we continued our O&M and capital efficiency. This continues our progress toward achieving our goal of 7% to 10% EPS growth through 2020. Based on our performance, our board declared a cash dividend of $0.34 per share during the fourth quarter, and we are affirming our 2016 earnings guidance range of $2.75 per share to $2.85 per share.

And with that, Walter will now give you his update.

Walter J. Lynch

President & COO of Regulated Operations, American Water Works Co., Inc.

Thanks Susan. Good morning, everyone.

As Susan mentioned, our regulated businesses had a strong year all around with historic capital investment, smart and strategic acquisitions and continued O&M efficiency gains while balancing customer bill impacts.

As you can see on slide 10, 2015 was a good year for growth. Through acquisitions and organic growth, we added in our pending regulatory approval, nearly 42,000 customers in our regulated businesses. In 2015, we completed 14 acquisitions adding nearly 24,000 customers to our existing footprint. Seven of these transactions closed in the fourth quarter including our purchase of the municipal wastewater system in Fairview Township, Pennsylvania. This newly acquired system provides wastewater service to approximately 4,000 customers including more than 200 businesses in commercial accounts, and it's a perfect fit and as Pennsylvania American Water already owns the water system.

This acquisition provides a long-term wastewater solution and a financial relief for the local community. According to the Township's board of supervisors because of the sale, Township residential received a 50% reduction in real estate taxes in 2016. The proceeds of this sale will also help payoff approximately $21 million in sewer debt and avoid an anticipated $14 million in additional debt that would have been required to complete planned projects.

Again this is a great example of how we can bring solution to municipalities struggling to finance the water and wastewater improvements while improving their service and keeping rates affordable for our customers.

At the end of 2015, we have 12 pending acquisition agreements that were signed and waiting for regulatory approval. These acquisitions would add approximately 9,000 customers to our customer base if approved and completed. In 2016, we completed a purchase of four of these acquisitions, one of which was Environmental Disposal Corporation in New Jersey. This investor-owned wastewater utility provides service to more than 5,300 customers as well as bulk wastewater treatment services for several nearby communities. Additionally in December, Pennsylvania American Water signed a memorandum of understanding for the potential acquisition of the wastewater assets of the [ph] Scranton authority (12:00), which serves approximately 31,000 customers. This MOU commits the parties to negotiate in good faith toward executing a final purchase agreement.

On the regulatory front, you can see a snapshot of our current activity on slide 11. Our Illinois and Kentucky subsidiaries fought rate request in the first month of 2016. In both space, we're seeking to recover a significant amount of needed capital investment, offset by reduced or flat O&M expenses.

In Illinois, we requested $40 million in additional revenues based on a projected total of $342 million of capital investment between October 2013, and the end of 2017. Our team in Illinois reduced their O&M expenses by about 3% since the last rate case in 2012, continuing the great work by our employees to keep those affordable for our customers.

In Kentucky, we request $13.5 million in additional revenues, primarily driven by $79 million of capital investment while keeping operating expenses flat since 2012. Again, this focus on expenses allows us to make critical infrastructure investment continuing the trend of keeping bills affordable for our customers.

In Missouri, our case is moving along to the process, and we expect the decision sometime before mid year. In West Virginia, we have not yet received the rate order, so it will stay at a high level and base my comments from the press release sent out last night by the West Virginia Public Service Commission.

The order provides an increase of $18.17 million in water rates and $151,000 in sewer rates. The Commission recognizes that the company reduced its O&M expenses from its last rate case, and the adjustment to base rate is driven primarily by the increased investment we made to ensure reliable water service for our customers. And consistent with our normal process, West Virginia American water will show a press release, once they've had a chance to review the order.

Moving to California, on February 1st, we received approval from the California Public Utility Commission to extend our cost of capital filing by one year. This will keep our authorized return on equity at 9.99% through 2017 for our California subsidiary. Meanwhile, despite some rainfall from the effects of El Niño, the drought continues in California. Our team continues to demonstrate leadership in dealing with the drought and we're certainly proud of all other efforts to help our customers during this time.

We also continue to make progress on the Monterey Peninsula Water Supply Project. Our test plant well is operational and the results are positive. The project is undergoing environmental and regulatory review by the California Public Utility Commission, and this review is scheduled to be completed by the end of the year.

Moving to slide 12; we ended the year with a 35.9% O&M efficiency ratio and we're on track to meet our 34% target by 2020. I know, we've talked a lot about this, most recently, at our Investor Day in December, but I think it's worth repeating, we've really made tremendous progress here. As you can see, the progress is evident by the amount of revenue requirement attributed to capital expenditures versus operating expenses.

For the general rate cases, we filed last year, we reduced our O&M expenses by $10 million or 17%. This reduction allowed us to invest approximately $65 million into needed infrastructure upgrades without affecting our customers' bills. Our employees are doing a great job in this area through leveraging best practices, improved efficiencies, technology and innovation, and this produces results for our customers as well as our company.

So, with that, I'll turn the call over to Linda for more detail on our financial performance.

Linda G. Sullivan
Chief Financial Officer & Senior Vice President, American Water Works Co., Inc.

Thank you, Walter, and good morning, everyone.

In the fourth quarter and for the full year of 2015, American Water continued to deliver strong financial results. As shown on slide 14, earnings per share from continuing operations for the fourth quarter was $0.55, up $0.03 or 5.8% over the same period last year.

This slide shows the contribution by business line to our quarterly and annual results. Let me walk through the numbers then I'll discuss the drivers of the key variances on the next few pages. For the quarter, the regulated businesses contributed $0.54 up $0.01, the market-based businesses contributed $0.06 flat to the fourth quarter of last year and the parent which is primarily interest expense on parent debt was $0.02 better than the fourth quarter of last year.

For the full year 2015, earnings per share from continuing operations was $2.64 per share, an increase of $0.21 or 8.6% increase compared to adjusted 2014. The contribution from our regulated businesses was $2.63 per share, up $0.18 or 7.3% over adjusted 2014. The market-based businesses contribution was $0.24, up $0.02 or about 9% over last year. And the parent improved $0.01 per share. These annual increases are consistent with our long-term growth triangle.

Turning to slide 15, let me walk through the components of our quarter-over-quarter increase in earnings per share. The primary driver was higher regulated revenue of $0.09 per share from infrastructure surcharges and other rate increases to support our regulated system investments. This was partially offset by higher O&M expense of $0.03 mainly from the timing of maintenance-related work as well as higher claims and pension-related costs.

Depreciation, taxes and other increased $0.05 per share driven mainly by our investment growth. The improvement at the parent of $0.02 per share was mainly due to lower taxes from state tax [ph] proportionate (17:49) benefit, partially offset by the $5 million contribution to the American Water Foundation that Susan mentioned. Also, please note that the market-based businesses were flat for the quarter as higher growth in our Military and Homeowner Services Groups was offset by a 2014 tax benefit.

Turning to slide 16, let me walk through to the elements of our $0.21 increase in year-over-year adjusted earnings per share from continuing operations. The regulated businesses benefited from higher revenue of $0.18 per share from authorized rate increases to support investment growth as well as increases from acquisitions and organic growth. In addition, there was a $0.05 increase due to mild weather during 2014 and an improvement in O&M costs of $0.02 per share offsetting these improvements, with higher depreciation and taxes of $0.07 per share, driven by our investment growth.

Overall, the regulated businesses increased $0.18 year-over-year. The market-based businesses were up $0.02, mainly due to additional construction projects under our military contracts and the addition of Hill Air Force Base and the Picatinny Arsenal in 2014, as well as geographic expansion and Homeowner Services. Parent and other was $0.01 better than 2014, due mainly the lower taxes from state tax [ph] proportionate (19:18) benefits, partially offset by the Foundation donation.

Now, let me cover the regulatory highlights on slide 17. As Walter mentioned, we should receive the rate order from the West Virginia rate case soon. And as such, we currently have four general rate cases in process: Missouri, Virginia, Illinois, and Kentucky for a combined annualized rate request of $87.4 million. For rates effective from January 1, 2015 through today and including the $18.3 million for West Virginia we received a total of $98.6 million in additional annualized revenue from general rate cases and infrastructure charges. We encourage you to review the footnotes in the appendix of this slide deck for more information.

Slide 18 highlights our improved financial performance across the board. During the fourth quarter of 2015, we made total investments of $386 million primarily for regulated system investments. For the year, we invested a total of $1.4 billion. This includes $1.2 billion for regulated system investments, $64 million for regulated acquisitions and $133 million for the acquisition of Keystone. Excluding the Keystone acquisition, capital investment increased about 27% from 2014. Going forward, we expect to invest $6.4 billion over the next five years of which about $5.5 billion will be to improve water and wastewater systems for our customers, $600 million for regulated acquisitions and $280 million for strategic capital.

For the full year, cash flow from operations increased $82 million or 7% to about $1.2 billion mainly due to the increase in net income and our adjusted return on equity for the past 12 months was 9.43%, an increase of 57 basis points compared to last year from continued execution of our strategies. We also announced in the fourth quarter of 2015, a $0.34 common stock cash dividend payable on March 1, 2016.

On slide 19, as many of you will recall, during our Investor Day in New York, we gave 2016 earnings guidance of $2.75 to $2.85 per share. Today, we affirm that guidance range. There are certain important factors that could impact our 2016 results. And as we have done in the past, slide 19 outlines those factors that we have included in our earnings guidance range. Swings outside of these ranges could cause results to differ from guidance. Weather is generally the largest variable impacting our earnings.

Our range of plus or minus $0.07 represents what we consider to be normal weather variation that we have included in our earnings guidance range. For our regulated businesses, we see variations of plus or minus $0.03 primarily from the timing and outcome of rate cases, the timing of completion of capital projects as well as variations in O&M and production costs.

American Water Enterprises variability is driven mostly from the timing of future capital upgrades in Military Services and realization of our expected growth as well as claims costs in Homeowner Services.

Variability for Keystone is primarily driven by natural gas prices and drilling activity in the Marcellus and Utica. I would also like to mention that our 2016 earnings guidance range includes estimated legal defense costs of about $0.03 per share related to the 2014 Freedom Industries' chemical spill in West Virginia. As you may recall, we included $0.02 per share of legal costs in 2015. And lastly, I would like to address the expected impact from the five-year extension of bonus deprecation.

From a cash perspective, we are in a federal tax net operating loss position. So, we do not receive a current cash benefit from bonus depreciation. We look at electing bonus depreciation on a state by state basis. In those cases, we're adopting bonus depreciation would be in our customers' best interest and where we expect to be able to utilize our NOL, we will do so. Assuming, we elect bonus depreciation in our regulated states, this would increase our NOLs and push out the expected timing of when we would become a cash tax payer by about one year to 2021.

From an earnings perspective, while this would be expected to reduce rate base and earnings, we do not see a significant impact to our 2016 earnings guidance range, nor do we see a significant impact to our 7% to 10% compounded annual EPS growth rate for 2016 through 2020 because the rate base impact is largely offset by lower financing needs in 2020.

We also have flexibility to mitigate some of the rate base impacts by redirecting a portion of our strategic capital already included in our five-year plan to our regulated businesses, as well as accelerating certain investments that continue to strengthen our critical assets for our customers.

And with that, I'll turn it back over to Susan.

Susan N. Story
President, Chief Executive Officer & Director, American Water Works Co., Inc.

Thanks, Linda.

Before taking your questions, let's review the American Water investment thesis we shared with you at our Investor Day and briefly discuss the American Water Foundation.

On growth, we affirm our EPS growth goal of 7% to 10% for the next five years. We talked about our unprecedented 2015 capital investments, our continued O&M and capital efficiency and our plans for 2016. We know that reputation, operational excellence, reliability, and dependable water quality are critical to our growth. Where and how we expanded our customer base in 2015 leverages these strengths, growing through tuck-in, adding wastewater customers where we are ready to serve water and growing our market-based businesses.

Our people have deep utility expertise and diversified experience and they are our biggest competitive advantage. They also care deeply about our customers in the communities in which they live and serve. This was clearly demonstrated about what our employees dealt with in both Missouri and Illinois during the last week in 2015. Record rainfall of up to 12-inches fell during a powerful three day storm across the Midwest, hitting the St. Louis area hard and causing record flooding. Homes and businesses were submerged, highways closed and water and sewer utilities faced extraordinary challenges.

Missouri American has two plants on the Merrimack River, supplying water to about 20% of our customers in the St. Louis County area. Thanks to early planning and the construction of a system of temporary pipes and pumps. Our customers never loss service and we maintained excellent water quality throughout the event.

Our wastewater teams also worked around the clock during the heavy rain to remove pumps and motors that otherwise would have been lost to flooding. But it's not just what our Missouri team did for our own customers; it's what they did for the surrounding communities in need.

A local public water district had a flooded plant and lost the ability to serve its 20,000 customers. By opening a connection between the systems, Missouri American was able to help the district, serve many of those without water. Additionally, they worked with the National Guard to fill more than 500 tanker trucks that delivered our water outside of our service area, which brings me to the American Water Foundation funded by American Water's parent company which keeps the communities we serve and have a better quality of life.

One key Foundation partnership is with the Union Sportsmen Alliance, where we have worked with local union members to build walking trails, public access areas and fishing facilities for communities, including projects for special needs kids. The Foundation also has a partnership with a National Recreation and Parks Association in support of building better communities. Here, we focus on building or enhancing nature-based playgrounds for children and educating people on water and environmental stewardship practices. The Foundation also matches employee donations to qualified charitable organizations up to $1,000 per year per employee.

Earlier this month, the Foundation made a $50,000 donation to the Flint Child Health & Development Fund to help the children of Flint, Michigan, get the resources they need to deal with the lead exposure many have experienced. These examples of doing good as we do well, demonstrate the dedication, expertise, strong character and the work ethic of the 6,700 people I get the privilege of working with every day.

Certainly, our employees' commitment translates into our strong financial performance, but it also let you know as our investors that we are a company, whose people believe not just in what we do, clean water for life, but also in how we do it. And we believe that it is critical for a company, who wants to be as successful in the coming decades as we are today.

So, with that, we're happy to take your questions.

Question And Answer Section

Operator

We will begin the question-and-answer session. [Operator Instructions] Our first question comes from Richard Verdi of Ladenburg. Please go ahead.

Richard A. Verdi
Analyst, Ladenburg Thalmann & Co., Inc. (Broker)

Good morning, everyone, very nice quarter and thank you for taking my call here. Just a couple quick and easy questions; first, I guess Susan can you please speak to the strategy for capital raises the next few years to fund your program and how you think about raising the dividend versus buying back stock versus issuing equity?

Susan N. Story
President, Chief Executive Officer & Director, American Water Works Co., Inc.

Sure, Rich, and thanks for the question. I will start, and then Linda may want to jump in.

So, when we look at all of the different uses of our capital in terms of growth, in terms of raising our dividend, in terms of regulated investment, all of those different things, we look at a balance in optimizing those and also where we get the biggest value from every dollar that we spend. So, we look at growth and the returns we get there. We look at regulated investment and let me be clear that in our investment plan, the first thing we do, is we invest whatever is needed in every one of our state to ensure that we provide safe clean water that meets all EPA standards. So, then beyond that is what we refer to as discretionary. But there is a base amount which is significant well over half of our capital that we spend to ensure that we provide those services.

Then beyond that, we look at our dividend growth, which is, we have said, we want to keep consistent with our EPS growth. So, we want those to be correlated, so that's the guidance we've given and we have a 50% to 60% payout ratio and currently we're at the lower end of that range. So, there is room there.

When we look at things like debt and I'll let Linda talk about this more, the question we ask is what is best for our customers and our shareholders with the next dollar that we invest or whether we pay down debt or whether we're able to provide dividend. So, as you know, to have a – to be in a strong financial position as we are, we have a lot of optionality and we're always looking at how we optimize that optionality.

Linda G. Sullivan
Chief Financial Officer & Senior Vice President, American Water Works Co., Inc.

And Rich, I would add to that that as we look and as we outlined in our Investor Day, when we look at the capital structure over the next five years, we continue to look at about 45%-55% equity to debt capital structure.

Richard A. Verdi
Analyst, Ladenburg Thalmann & Co., Inc. (Broker)

Okay, excellent. Thank you. And next on the O&M and efficiency ratio, clearly, this has been a great part of the story very successful, excuse me, couple of years back the stretch target was 35% for 2018, now the stretch target is 34% for 2020. It's 100 basis points lower in three years. I know a portion of these stretch targets were based on the ERP program a while back. Now they are predicated upon automation technology such as the Badger Meter contract recently announced. Without holding you to it, just trying to get a grasp on what lies beyond 2020, how possible is it that American reduces the O&M efficiency ratio by another 100 basis points by 2022 to 33%. And would automation and technology be the driver of that reaction or is there something underneath the American umbrella that could drive the third phase of O&M efficiency reduction?

Walter J. Lynch
President & COO of Regulated Operations, American Water Works Co., Inc.

Hey, Rich; Walter. I'll take that question. Thanks for it.

We're not going to forecast beyond 2020 and a 34%, but I can tell you our teams are geared towards continuous improvement and that's what's driving this, and technology is going to be a big part of it. As you know, we are about 90% implemented with AMR. We're also looking at AMI and the technology that we're buying now is easily transitioned into AMI. So it's a long-term solution. But I'd tell you looking at the people in our business understand the why and why we are reducing expenses. So we can invest in our infrastructure and provide excellent customer service. So it's really throughout the business sharing best practices, leveraging our supply chain and reverse auctions and power and chemicals, so it's a mindset and it's a commitment by our employees that we're going to get to where we need to go and they understand the why, and I think that is the key to this whole things, and that's been the foundation for our success.

Richard A. Verdi
Analyst, Ladenburg Thalmann & Co., Inc. (Broker)

Okay. Great, thank you very much, and I appreciate it. And that's it for me, I'm going to jump in queue, but I just want to say thank you very much for slide 36 and that's very helpful.

Susan N. Story
President, Chief Executive Officer & Director, American Water Works Co., Inc.

Thanks, Rich. [Operator Instructions]

Operator

Seeing no further questions, this concludes our question-and-answer session. I would now like to turn the conference back over to Susan Story for any closing remarks.

Susan N. Story
President, Chief Executive Officer & Director, American Water Works Co., Inc.

Well, thank you, Kerry. And thank you all for participating in our call today. If you've got any questions, please call Greg and Melissa and they will be happy to help. I'd like to remind everyone that our 2016 first quarter earnings call will be on May, the 4, and our Annual Stockholders Meeting would take place on Friday, May, the 13. Thanks again for listening and we'll talk to you in May if not before then. Thanks.

Operator

The conference is now concluded. Thank you for attending today's presentation. You may now disconnect your lines. Have a great day.

MANAGEMENT DISCUSSION SECTION

Gregory S. Panagos, Vice President-Investor Relations

We really appreciate you coming out to spend half a day or so with us. Before we get into the presentation, let me just take a moment to walk you through the safety issues. There are three exits on this floor in the event that there is some sort of an alarm. You will hear the alarms going off. There will be verbal instructions over the alarm telling us where to go. There are three exits on this floor, one to the right, immediately out this door, you head to the right; the second exit would be just veering off slightly to the right; and the third exit, straight ahead as we go out. In the event that we need to evacuate the building, they will tell us that over the intercom system. Our collection point is the Intercontinental Hotel downstairs and next door.

Before we get into the presentation, I would like to take just a moment to thank everybody at American Water who help put this together, particularly Cathy DeMots who works with me. She worked tirelessly to get this whole thing organized; and then everybody here from American Water who worked tirelessly over the last months to put this presentation together; all the presenters, all the people that took time off from work to come and be with us all today.

So, with that, I'd like to turn the presentation over to Susan Story, our CEO.

I'm sorry.

Susan N. Story, President, Chief Executive Officer & Director

Safe Harbor, very important.

Gregory S. Panagos, Vice President-Investor Relations

Before we get into the presentation, don't want to forget the Safe Harbor statement. We will be making some forward-looking statements today. This – I won't read all of this to you. Basically, the message here is anything that we tell you that's forward-looking could change over time.

So, with that, I'll turn it over to Susan.

Susan N. Story, President, Chief Executive Officer & Director

But the lawyers would not let us just put on the screen. Good morning. It's great to have you here today. What I'd like to do first is introduce you to a few folks, and then we're going to launch right into the presentation of the materials that you have in the books in front of you, and some of you may have had a chance to look at last night.

I'd like to first of all let you know that our Chairman of the Board of American Water, George MacKenzie, is here. George, if you'll stand up and let everybody see. We appreciate him being here. He is the only one you have to clap for. He's my boss.

We also have the executive leadership team here. These are the folks who report to me directly, if you'll stand up to save time. I won't go through all of them, but this is the team that makes me look good. Thank you, all.

I also want to recognize for Keystone, Ned, if you will stay standing. Ned Wehler, the CEO of Keystone; and the COO of Keystone, Dan Dalton, if you guys will stand up. It's quite good to have these folks here. We have some of our finance team here that reports to Linda. We got our Treasurer and VP, Deb Degillio; Financial Planning and Analysis VP, Ed Vallejo, whom all of you know; and our Controller and Chief Accounting Officer, Mark Chesla.

Our VP of Communications, Maureen Duffy is here. Thank you, Maureen. And we also have two of the leads. Walter will talk about later the President of California American and Hawaii American, Rob MacLean; and the President of New Jersey American as well as over the division VP of New York and New Jersey, Will Varley. And we appreciate all of you being here.

So, what I want to do now is just talk a little bit about utility markets. Now, all of you spend most of your career looking at utility markets. What I want to do is talk a little bit about the challenges we face and the opportunities we have.

Charles Dickens wrote in the A Tale of Two Cities, it was the best of times, it was the worst of times. And I think as analysts and investors, you probably are living that every day right now. There are a lot of challenges that we have in the utility industry, not just water, not just American Water, not just the water utilities but electric and gas and to some degree, telcom. These are the things that we're all facing. You write this in your analyst reports, and those of you who are researchers on the buy side are also exploring this. First of all, you have supply issues. If you're in the electricity industry, you're looking at the clean power plant, you're looking at renewables. How are we going to provide the electricity supply for the future? If you're in the gas industry, you're looking at all of the shale wells you have in the northeast and the lack of takeaway capacity and the pipelines under construction. You have a supply issue. Whether it's a deficit or you have an abundance until you can get the gas where it needs to go. In water, clean water, our president of California-American is here where we've had the drought for several years. How do we have a consistent supply of water? Regardless of where you are in the utility space, issue of supply is a big deal.

The next issue we all face is infrastructure. In water, you've heard us talk about it. Walter will talk more about it, so I won't spend a lot of time in water. We're looking at decades and decades of immediate infrastructure replacement. We're losing almost 3 trillion gallons of treated water a year through [indiscernible] (04:57) breaks and through a system that's weak and it needs replacing pipes in some places in the country that are over 100 years old.

So, what are we going to do about replacing infrastructure or, for example, where we have supply issue such as California building desalination or looking for other options. If you're in electricity and you're having to close coal plants down, you replace them with gas. How do you get gas there? Renewables, as you're meeting renewables portfolio standards, how are you going to make sure that you have the transmission line to get the power where it needs to be to the population centers? We all struggle with supply. We all struggle with infrastructure.

We also have regulatory challenges. Whether they're federal, in the case of FERC or in the case of EPA and the clean power plant for the electric, whether you're looking at state regulatory, opportunities and challenges, we all are dealing with regulatory challenges, declining usage. We all have dealing with this for several years, renouncing electricity where the demand has at best slowed considerably and if worse, it's going negative for dams and utilities who are charging based on the volume metric formula that we've used for years in this country from a regulatory construct. So, regulatory challenges are there for all of us.

Customer expectations. How many of you in here have an iPhone or a smartphone? Raise your hands. This is where you participate. Okay. So, I keep you awake somehow this early morning. The fact is, our customers – you and our customers, they want what they want, when they want it, in the way that they want it. If they're interested all of the sudden, maybe once in six months of thinking about their water bill or their electricity bill, or the gas bill, they want to look and see how much they're using, where they can cut back, how they're doing on their budget, and what they need to do about it. We are all safe in customer expectations. And in our country, about 80% of utilities do not take credit cards directly but use a third party, because we can't recover credit card fees through commissions. Do you know what our customers tell us? I can go through a drive-through at McDonald's and buy $2 and use a credit card, but I can't pay my water bill or electricity bill or gas bill with a credit card.

We have increasing customer expectations. All of us in the utility industry have to deal with it. And a couple of more I'll just mention, Cyber. Cyber is something that whether you're electricity, gas, telecom, or in water specially. The issue of a potential contaminated water supply for example. How do we ensure that our networks are safe and pure? How do we have analog systems that can back up the digital systems? Now, I will tell you. This is where a lot of electricity, gas, and water is coming together. Because we're involved with the Department of Defense and the Department of Homeland Security as part of what's called the Dark Skies Initiatives that looks at what if there is a terrorism or something that takes out the electricity grid for more than 25 days? And a population of over 1 million people over 95% of the people. What do we do?

They first started with PJM in the electricity side and as they went through this, I said you know what our real concern is? If we also grid that long, it will be water and wastewater issues that cause people to do mass evacuations, people who can't flush their toilets or don't have water. So, then, this past year, we've been working with them on developing a [indiscernible] (08:07) plan for water and wastewater.

And then, the last one, that we're all seeing as we're here and it's 70 degrees in the middle of December climate, volatility, and resiliency efforts, whether you're water, electric and gas. In American Water, we have seen 10 extreme weather events in the past five years, which, for us, as we look back over the previous 20, we haven't had that much or it's very close to that. So, we are building a system that's more resilient.

So, our only position all this to say there are challenges out there that aren't just for American Water or the water industry. Whether you're electricity, gas or water or even telecom to a degree because we all need telecom to have the systems that help us communicate with our customers at smart water grids, smart electricity grids or the gas supply controls, how we do that is going to be very important.

But I will also tell you that there is [indiscernible] (09:04) said it's the best of times. And we think that's especially true of American Water because the fact is within challenges lie opportunities. And the best companies are those who take those challenges and make them opportunities and find a way to meet the needs of the customers, meet the needs of our communities, meet the needs of our regulators and our elected officials, while also making money for our shareholders. And the companies who can do that the best are the ones who are going to win. And I will just tell you, I'll go to the bottom line of today right now, we intend to be the biggest winner.

So, what I want to do, we've been talking about the best of times. We're just going to look briefly in the past because today is more about the future than the past. But looking from 2015 – 2010 through 2015 in terms of EPS growth and dividend growth, this is where American Water stacks up against the Dow Jones Utility average which we were added to in September of 2014 as one of the 15 utilities in that, as well as our water peers. And this is our leading total shareholder return in terms of us versus the Dow Utility average in the S&P 500.

But again, you're more interested in the future. So, one of the things we keep hearing from you is, okay, we'll look at your company. Great. Are you fully valued? No. I'm going to answer that one quickly. What is it about American Water that you should have confidence and not just because of what we've done in the past but where we're going in the future.

So, as I go through this briefly and I'm not going to cover all of these, what I would challenge you to do is this, all of you cover the utility universe, electrics, gas, water. What I would just like you to do as we go through this is take this list on the left and see how many utilities have a check mark all the way down. That's all I'm asking. Not going to tell you what the answers are. So, when you look at growth, EPS growth 7% to 10% over the next five years. You're going to hear today not only are we affirming that for the next five years, but we're going to give you more insight and transparency as to how we will achieve it. Multi-decade investment needs. Clear line of sight. You'll hear more about this from Walter. Fragmented market, it is an opportunity. Remember, I said, within challenges lie opportunities. Within challenges of a fragmented market where 84% of the population is served by municipals or governmental entities, and 98% of waste water is, we find opportunities in that.

And then under people and the business model. Churchill said one time that democracy is the worst form of government except for all others. Being highly matrix is the worst form of governance except for all others. And what I mean by that is at American Water, we're in 16 states regulated, 47 states in our market base plus regulated. We operate on a very strong local autonomy model, but also a strong central model. What we mean is if a decision affects the customer, the regulator or the state legislator, it is made of the president and a staff of that state.

California is very different from New Jersey which is very different from Tennessee which is very different from Missouri. We get that, and so, what we do is make sure that we have strong state leadership and state staff who are there engaged in their communities and their states making decisions for the customers. But we also leverage the fact we're the largest wastewater water utility in the nation, and we can buy pipe cheaper because we can buy it on a national scale.

We can buy meters on a national scale. Walter has one of his direct reports. We're looking at our AMI strategy versus AMR and how can that be more cost-effective, and how we do that in a way that allows customization in states that allows us to be able to do mass procurement and to be able to save money. So, this leverage, this balance is very important. And the companies who do it the best, are the best run companies out there.

Regulatory expertise, we have people and Walter, again, will mention this, we have people who've been in our states for decades. We have people who grew up in these areas. They know people. They know what the customers want. They know how to meet those needs. And then you've got the record of execution, I'm not going to read all of these broad and diversified experience.

We have deep water experience. We also have some of us that come from other utilities and some that come from other companies. Greg Panagos comes from the [ph] E&P (13:16) as well as the gold mining which kind of interesting. We have people throughout our organization who've been with our company for decades and others to come to make sure that we're looking more broadly at our markets.

And then a strong bench strength. BJ Holdnak is here. Dr. BJ Holdnak, she's our VP of HR. BJ please stand up just for a minute. BJ has retired from Babcock & Wilcox. She has worked for Black & Veatch, Medtronic. She has worked in New York. She was a consultant in Colorado, California, the South, the Northeast, and we were able to get her out of retirement in January of this year to come in and say, we've got great folks, but we want to really move it up another notch. We will take our training and development, our succession planning, moving people around, we basically have come in and said, how can we be the best utility out there? Not the best [ph] ward (14:04) of utility. The best utility out there and she's helping us get there. And then when you look at risk profile, you're going to hear about a lot of this from Walter and Linda today. And then financial strengths you will hear from Linda today.

So, what I want to do is just – when you take this list you will see this again at the end after you've heard. Today's session is focused on addressing each of these issues. We're not just going to put up a chart up here and say, trust us, we do this. We're going to show you the how. Not just the what. But if we're going to do this, how is American Water going to be able to deliver on this? And that's what's you're going to hear over the next couple of hours.

So, my last slide before Walter comes up, there's a few small differences and the triangles from last when we showed, mainly that regulated investment CapEx has gone from 3% to 6% to 4% to 6% for the next five years, showing a needed – an increase in the amount of CapEx we're putting in the regulated side of the business. Regulated acquisitions stays at 1% to 2%. American Water Enterprises is part of our market based business was 2% to 3%, it's now 1% to 2% because shale which was 0% to 2% is now around 1%.

We told you on the third quarter call that we have a risk profile and our target, while we're here, is that we will not, as long as I'm CEO, 15% to 20% of our net income will not come from – not more than that will come from the market-based businesses, Keystone and [ph] AWE (15:32) combined. And I want to be the upper part from the really strong regulated light businesses like Military Services. So, in order to do that, we've done as you've seen a little change in the triangle, but not too much. So, what you're going to hear today is about the investment opportunity, more about execution, and I'll tell you one thing you're going to hear to talk a lot about today is the best people in the industry, and we're going to give you example. So, anybody can stand up and say we had the best people. But I will tell you this, the only sustainable competitive advantage that any company has long term is its people. People can buy technology. People can go out there and buy computer programs. The only thing that we believe will keep our shoulders above in the coming years is how we develop our people and make sure that the people who follow us are better than we are. So, taking out better than we are, welcome, Walter.

Walter J. Lynch, President & COO-Regulated Operations

Thank you, Sue. Okay. Hello, everyone. I'm Walter Lynch, Head of Regulated Operations for American Water, and I'm going to be talking about the drivers that enable our success for the future, and I'm drinking some water because I lost my voice. I'm a West Point graduate and we lost again to Navy but I lost my voice along the way.

Okay. So, I'm first going to give you an overview on regulated operations. We provide water and wastewater services to 11.7 million people and 1,500 communities and 16 states. We own a significant amount of assets. You can see them listed here, 81 surface water treatment plants, 100 wastewater facilities, 89 dams, most of them in Pennsylvania, and 48,000 miles of mains and collection pipes, and again, that's enough to go around the world twice. We treat and deliver 1 billion gallons of water every day for our customers, and in 2014, we delivered 89% of the operating revenues for American Water.

You can see in this map, this is the map of our service territories in 16 states. We operate from coast to coast. From New York to California and Hawaii, and this geographic diversity helps us to mitigate both weather and regulatory risks. So, on the weather side, it could be hot and dry on one part of the country and wet and cool in another. And we saw that actually this year where it was hot and dry in the Northeast, then it was cool and they experienced a lot more rain in the Midwest. But because of our geographic diversity, they were able to offset each other. So, there's no net material impact on our business. From a regulatory side, since we operate in 16 phases, it helps to mitigate the regulatory risk. And we think that's very, very important as well.

You can see this box here on the right, nearly half of our revenue is in our two largest states, New Jersey and Pennsylvania. And our top seven states accounted for about 88% of our operating revenue in 2014. So, we think a competitive advantage that we have is the strength of our leaders and the quality of our bench strength. This is my favorite slide. This shows the senior leaders in our business that are out every day delivering service for our customers. These are senior vice presidents of regions, large state presidents, head of our customer service, head of our operational excellence. Together, they have over, and you can see that on the bottom, combined over 200 years of experience in the water industry, tremendous expertise in which to build.

Two of those leaders are here today, again, Bill Varley and Rob MacLean. Bill Varley is Senior Vice President of the Northeast Region and the President of New Jersey American Water. And Rob MacLean is President of California American Water and Hawaii American Water. And I'll talk more about them in a second. Being able to leverage these folks on a day-to-day basis, just amazing to me. And I have the privilege of being able to lead this group.

So, we talked about geographic diversity as a way to mitigate regulatory and weather risk, but it also affords us an opportunity to develop the leaders that we have. We've got challenges across the business, and every one of these leaders have taken on different assignments to grow as leaders in our organization. We think that's very important as we develop these leaders to deliver the quality of service that our customers expect.

Just to give you some examples. Bill Varley. Bill who's the President of New York American Water, did such a great job I asked him to run New Jersey American and become Senior Vice President of the Northeast region.

Rob Maclean, he and I were in the market-based business together before we both came in to the regulated side. And I asked Rob to go into New Jersey, took a senior operating role in New Jersey American Water, and then six-and-a-half years ago went out to California to take on the challenge of running a California American Water Company. He's done a tremendous job.

If you look at up in the upper left, Alan DeBoy. Alan has recently taken a job, Vice President of Operational Excellence. Prior to that, Alan was President of Indiana American Water. Before that, he was Vice President of Operations, Indiana American, and also led our engineering growth. So, he comes into that job with a fresh perspective and what the important things are in the business, and he's going to a fantastic job in leveraging best practices across our business.

Karla Teasley. Karla is now Vice President of Customer Service in American Water. Before that, she was President at Illinois American Water for eight years; did a tremendous job, growing the business, developing relationships, building a strong team. And now she goes into that role with a whole different perspective on what customer service means having been a state president out there.

And one more to highlight, Cheryl Norton, in the upper right. Cheryl just recently became President of Missouri American Water, our third largest state. Before that, she was President of Kentucky American Water for five-and-a-half years, did a tremendous job. We asked her to take on additional responsibility. Before that, she was Vice President of Operations for Illinois American Water for three years. And prior to that, she led our national lab for 20 years.

So, talk about breadth of experience and different challenges along the way. And we're all better leaders as we're able to develop, getting outside our comfort zones, moving around, taking on just different challenges and different responsibilities. So, that's what we have here at American Water. It's not just at our senior levels but it's all throughout our business as we grow leaders. So these are the folks that are delivering the quality of service everyday for our customers.

Okay, so let's talk about the drivers for growth. And before I do that, I just want to give you an overview on the water and wastewater industry. There are 1 million miles of pipes in the United States and we experience a main break, a major main break every two minutes. We lose 2 trillion gallons of treated water every year at a cost of $2.5 billion, $2.5 billion, right? That's 20% of all treated water in the United States. And just to put that in perspective, that's enough to provide the annual household usage for 22 million homes.

On the wastewater side, that's 800,000 miles of collection pipes. Many of them were put in years ago or in dire need of repair and are posing a challenge to ground water. Every year, 900 billion gallons of untreated sewages discharge into our rivers and streams.

From a pipe perspective, by 2020, 44% of all pipe in the United States is going to be classified as poor, very poor or life elapsed and that's up from just 10% in 1980. So it shows the lack of investment that we've been making as a country in our infrastructure over the last four decades.

It's one of the reasons that the American Society of Civil Engineers gave the water and wastewater infrastructure a D rating in its most recent survey and that was the lowest of any infrastructure in the United States.

And there have been many estimates but most of them center on about $1 trillion is needed over the next 20 years to upgrade our water and wastewater infrastructure, just tremendous challenges in the business.

Now American Water with strong cash flows, access to capital markets, we are going to be making investments for decades to come. And so one of the things obviously is the infrastructure challenge, another one is meeting the water supply challenges.

One of the things we are doing and we have done as a company is provide solutions for our customers. There is no perfect, more perfect example on that than what we are doing in California with the Monterey Peninsula Water Supply Project. That's a desalination facility that we're working towards getting permitted and hopefully be in place in the next three to four years. Rob has been out in California as I've said for six and a half years. He's been really leading the effort to get to that point, but what it really illustrates is our ability to provide solutions for our customers.

What are we doing to address the infrastructure challenges and to be able to provide reliable service for our customers? We continue to invest significantly in our infrastructure, particularly on the pipe replacement. So, the pie chart on the left illustrates the age of our pipes. Hold on here. Illustrates the age of our pipes. You can see that 25% of our pipes are 70 years or older and 4% are 100 years or older. So, we've got significant investment to make. But you could see the impact of our investment on the chart on the right. The chart illustrates from 2010 and 2011, we had a replacement rate that was in excess of 250 years.

Now, how many people here think that our pipes in the United States are going to last 250 years? Anybody? You can see the investment that we were making to address that challenge. And in 2015, our replacement rate is about 125 years. So, we made tremendous progress. You can see the red line, that's the national average of pipe replacement. So, doing much better, but our goal is to get down to 100-year replacement rate, but we've got to balance that with the impact on our customer bills. And for the five-year plan from 2016 to 2020, we project that price increase on customer bills of our top five states is going to be about 2.6%.

You can see our long-term view on capital expenditures on the left. We plan to invest $6.4 billion from 2016 to 2020 across American Water, not just in the regulated segment across American Water, and you can see the categories of investments that we have here: regulated investments, regulated acquisitions, and strategic investments. Let me start with regulated investments. This is our core of business. We're going to be investing about $5.5 billion over the next five years. Average around $1.1 billion to replace pipe infrastructure, to upgrade water and wastewater facilities, to put in new water and wastewater facilities to investment in our core business.

Next category, regulated acquisitions. This is the capital necessary for us to complete the acquisitions in our business plan. And lastly, Strategic Capital. That's the capital necessary to grow our competitive businesses or market-based businesses, shale and other strategic investments.

All told, $6.4 billion, but the vast majority, $5.5 billion is in our regulated investments. You can then see the average regulated capital expenditure by purpose in the chart on the right. Asset renewal is the biggest category. Almost two-thirds of – about two-thirds of our spend is in asset renewal, and what does that include?

That, again, includes pipe replacement, typically around 350 miles per year, and upgrading our water and wastewater infrastructure. The next largest category is capacity expansion. And that's expanding the capacity within our existing franchise area. So, that includes main extension, meters, valves, hydrants, those kind of things. And lastly is the regulatory compliance. And we're required to replace meters every 10 to 20 years based on the requirements in the state. We typically replace anywhere from 200,000 to 300,000 meters per year based on that and in this category also includes regulatory investment or investment in our infrastructure to meet regulatory requirements. The Monterey Peninsula Water Supply Project is in this category as well. But down the bottom, $3.6 billion towards asset renewal, two-thirds of our investment is in asset renewal.

This slide shows the progress that we're making on regulatory mechanisms across our footprint. Five different categories. We've made progress in every one of these categories. So, from 2010 to 2015 we've added 15 new regulatory mechanisms across our footprint. This just doesn't happen. We work with the state legislators and the state regulators to make this happen because it's all around getting timely recovery in our investment.

When we invest, we want to get a timely recovery that provides an incentive and allows us to address infrastructure challenges for our customers. I just want to talk about a few of them. On the left, infrastructure programs. This is the DSIC mechanisms, [indiscernible] (28:11) known by different things but we're able to add two new infrastructure surcharge mechanisms in the space where we operate.

The biggest one by far is New Jersey. We're able to get that about four years ago and Bill and his team have been investing significantly in infrastructure to address this challenge. Just in New Jersey alone, they've replaced 160 miles of mains over the last three years. And we've done that because we have the mechanisms to allow us to do that and incentivize us to continue to invest and get a timely recovery on investment.

The next category, forward-looking test years, again, minimizes regulatory lag. We're able to get this in two states, two of our biggest states, Pennsylvania and Indiana. And to the far right, the revenue or declining usage adjustments. We've gone from two up to nine, so we were able to add seven states to give us recognition of declining usage.

Tremendous progress. We have state leaders that have teams that are working with the legislatures and working with the regulators to deliver on this, and we're really proud of this achievement. This is one of the things that's helped us close the gap in our earned ROE.

So, this is a slide that we're very, very proud of. You can see the progress that we've made as a company in operating as efficiently as possible. We've gone from 44.2% in O&M efficiency, down to 35.8% for the last 12 months ending September of this year. That doesn't just happen as well. That takes a concerted effort from the leadership and all through the business for that to happen. So, a tremendous progress.

We realize that when we make smart O&M reductions, we're able to create headroom for investment. And we simply put it to our employees. And once they understand why we're reducing cost, that's what really enabled us to drive this. For every $1 in O&M efficiency, we can invest $6 in the infrastructure without impacting customer rates. That's pretty powerful. So for every dollar. And I'm going to talk more about that.

But that's really, I think, what's provided – the catalyst for us to continue to reduce our cost is that our employees understand what that means. And it's just taken off throughout the business. And now, it's part of our culture to operate as efficiently as we can.

You can see the chart on the right. It tells a pretty compelling story. We're very proud of this as well. If you look at 2010, 44% of our revenue requirement and rate filing back then was due to recovery of operating expenses. As we've gone on, you can see how we've reduced that down to zero. So 100% of our revenue requirement rate filings is now due to recovery of capital. And the last two years, our cost reductions have actually helped us fund capital investments in our systems.

Our rate filings in 2014 and 2015 reflect this, but there's no more perfect example than in New Jersey. And I'm going to spotlight New Jersey again. It was three years from the last rate case we filed back in January of this year. It was three years since the last rate case which is longer than what we normally take, particularly New Jersey, it was every 18 or 24 months. We invested $775 million in capital, the most we've ever invested in New Jersey. It will replace 160 miles of [indiscernible] (31:30) as I said. During that same period we reduced our O&M expenses by $19 million. That $19 million on that 6:1 ratio helped us fund about $125 million worth of capital investment.

So, when we went in we asked for less than 10% over a 3-year period. That's just a win for everybody. It's a win for our customers. It's a win for our company. It's a win for regulators and municipal officials. And there's no more clear example than that in New Jersey, but we have other examples across our footprint. Just tremendous progress.

And again, it just doesn't happen with us talking about it. Our employees have to understand why. And since they've understood why, this has become part of our culture.

Okay. So, now, I'm going to talk about growth. And you can see in the growth triangle, it's going to provide 1% to 2% of our EPS growth in the growth triangle. It's something that's very, very important to us. So, I want you to understand how we look at it and what we're doing to enable this to happen within our company.

First on the overall industry, and Susan mentioned this, 84% of the population served on the water side are served by municipal water systems. 98% of the population in the United States are served by wastewater system. It's a very highly fragmented market. 53,000 community water systems and 27,000 approximately community wastewater systems.

Just to give you perspective on the size. 83% of the water systems served a population of 3,300 or less. 92% of the water systems served a population of 10,000 or less. So, highly fragmented many, many small systems. When we go out talking to mayors and municipal officials, we know that they're under a lot of strain. There's budgetary issues. They've got to deal with pension obligations, increasing regulatory standards. So, they're looking at options.

One of the options, obviously, to a mayor is the opportunity to sell their water and wastewater system. Since we operate in 16 states, and in those 16 states we operate pretty much throughout the state. We're able to have discussions not just with the mayors where we serve, but the mayors in adjoining communities and in the mayors where we serve the water we're talking to them about buying their wastewater systems. And these mayors are looking for options. And then I want to talk a little bit more about that.

So, we look back three, four, or five years ago, and we said what's holding us back from being able to acquire systems? A lot of it was enabling legislation, things that allowed us to integrate acquisitions and do things more effectively. You can see the list here. There's eight states listed here. They all have enabling legislation that allow us to acquire systems and do it in a smart way, and do it where it makes sense for the municipal system selling.

But I want to spotlight the top two, Pennsylvania and New Jersey. Pennsylvania back in 2012 and acted Act 11. Act 11 did a lot of things, lot of great things, disc on the wastewater side, forward-looking [ph] test years (34:32). We think the biggest thing was the ability to integrate the wastewater rates into the water rates. We had a stand-alone acquisition many years ago. We bought it. We invested in the system, and because it was on its own and weren't able to integrate that into the overall American Water side, we had asked for a significant increase. We took that as a learning. We went to the legislature. We said, we want to play a role in the wastewater but the way it's currently structured is going to be very, very difficult and use that as an example.

What we're able to do now through Act 11 is to buy a system and integrate those rates into 670,000 water customers. So, the impact on the acquiring system is very minimal. We're able to spread those costs across. Opens up a lot more opportunity. So, if you're a mayor and you're looking at options, you can either invest in your system to meet regulatory requirements and a lot of it needs significant investment and put it on the backs of those customers, your resident or have the American Water come in, buy the system and spread those cost across an entire customer base with 670, 000 customers which just makes great sense, and those are the discussions were having now in Pennsylvania with a number of municipal leaders.

The Water Infrastructure Protection Act in New Jersey. [ph] Bill Volume (35:48) and his team worked with the legislature to do a couple of things. We look at it and we took legislation from Illinois and others to say how can we really move acquisition to head in New Jersey. So, this act us two things. One, it allows a municipal official to avoid a referendum and streamline the acquisition process but that's at their view on it. We don't have any say on it. They can avoid the referendum if it's deemed emergent condition, and emergent condition means the significant investment needed in the system. So, that's a big thing. Avoiding a referendum, so they can move this through a lot more quickly. Second is being able to pay and appraise value for the system. As long as the board of public utilities deemed that it is reasonable. So, that's what this allows New Jersey to do, and I know Bill and his team were talking to a number of municipal leaders around this and it's really a spearhead to continue to grow our business in New Jersey.

Many other examples here and you can see from California, Illinois, Kentucky, other examples on where we work with the legislatures or work with the commissions to advance this, so we can grow the business. So, this shows our renewed focus on growth. Three different categories here. It's the first time we've broken out the organic growth. The organic growth is growth within our existing service territories, new metered customers. You can see over the last three years, we've added an average about 8, 000 customers a year through organic growth. The other two in yellow and blue are water and wastewater acquisitions. So, prior to 2013, we were acquiring about 5,000 customers a year, doing a lot of small acquisitions. And during that time, what we do was work on legislation to enable acquisitions, and we also work with our teams, gearing them up to pursue acquisitions that we deem now in our sweet spot to be 5,000 to 30,000 customers. And I think you're seeing the impact of what we were doing prior to 2013.

In 2013, we closed a significant acquisition on the wastewater side, Dale Services. Since then, we have been working on a number of opportunities and talking with mayors. It does take some time. But you can see in 2015, those numbers indicate deals that we've closed in 2015 and deals that where we have a definitive agreement pending regulatory approval, significant increase, and our focus has been both on the water and wastewater side. On the wastewater side, we serve the water customers. 95% of our customer base are water customers. We have the relationships, we have the trust, we have the employees in the area. It just makes great sense for us to pursue the wastewater opportunity and be able to provide those synergies per customer. And you're seeing that, all right?

So, looking to the right, these are targets that we're actually working on in American Water. These are real targets rather a footprint, within the size of the sweet spot we identified as 5,000 to 30,000 customers. The first one, Target A. I'll talk briefly about that. Target A is the City of Scranton Sewer Authority. So, Scranton Sewer Authority, we've been operating on the water side there for decades, perfect example of our strategy and action of going out and convincing the city that it's a good deal for us to buy the wastewater system and be able to take advantage of the synergies there.

So, we are the preferred bidder. We're working to get a memorandum of understanding approved, and from then on, we're going to follow the Scranton Sewer Authority's process, and hopefully, we'll be closing on that deal sometime. But, again, there's a number of things that have to get done before then. The first being the memorandum of understanding. But again, it's right to the heart of our strategy: find ways for our systems where we own the water systems.

The others are spread throughout American Water, Indiana, Illinois, Missouri, Pennsylvania, and represent just significant opportunities for us to continue to grow the business. You can see the targets, there are over 100,000 identified customers there. That's significant when you look at our history of acquisitions and what our focus is in the business, right.

So, in summary, I know I've talked about a lot – I've covered a lot of material, let me just summarize by saying we're going to continue to invest in our infrastructure and we're really poised to grow our regulated business. We're going to continue to invest significantly in our infrastructure, as I've said, $5.5 billion, roughly $1.1 billion a year. We're going to be investing in our infrastructure. We're going to reduce – continue to reduce regulatory lag by the mechanisms we have in place.

And also, our focus on costs, we can continue to reduce our cost so that we impact customers around 2.5%. We're going to leverage technology. A lot of what Alan DeBoy is going to do is leverage the technology improvements that we're putting in our business, particularly AMI and AMR across our footprint, as an example, among many other things. We're leveraging technology to continue to drive our cost structure down.

And lastly, continue to work on growth. Our state teams have mandates to grow the business. That 1% to 2% that you see on there, just simply put, 30,000 to 60,000 customers per year. That's what we have to add and that's what you should be looking for us. 30,000 to 60,000 customers a year to add to our company. We're going to do that in a number of ways, but we're also going to continue to work in constructive regulatory mechanisms and acquisition legislation to enable these acquisitions to happen.

We've made a lot of progress over the last five years. We've got a great team in place. We've got – we talked about one of our values is high performance. That's one of the things we've driven in this business over the last five years is high performance.

And I'm proud to be in the role but I am proud to be leading such a great team. And with that, I'm going to turn it over to Sharon Cameron who will talk about the market-based businesses.

Sharon C. Cameron, President-American Water Enterprises

Good morning, everybody. I'm Sharon Cameron from the market-based business. And Walter just and Susan both spoke about the tremendous growth trajectory for the regulated business, continued infrastructure investment needed for decades. We talked about the highly fragmented water industry, tremendous momentum and opportunity for regulated acquisitions.

So, why do you need me? Why do we need American Water Enterprises and why do we need market-based businesses? The market-based businesses or the AWE portfolio, we benefit from the regulated business. We are able to leverage their core competencies and strengths. But American Water Enterprises also really adds significant value to American Water.

Financially, AWE has more than doubled over the past five years in net income with a CAGR of 27.8% for the past five years. So, financially, we're contributing. But beyond the financial contribution, AWE really adds qualitative for American Water.

One of the ways we do this is we increase customer satisfaction. Walter mentioned our two largest states, New Jersey and Pennsylvania. 50% of our residential customers for American Water. We launched the water line and sewer line programs back in 2001 and 2002 in those two states. Today, over a third of the homeowners in Pennsylvania and New Jersey are in enrolled in at least two of our warranty programs. So, we have helped thousands of our American Water homeowners with millions of dollars in repairs and replacements of their water lines and sewer lines. That increases customer satisfaction.

We also developed a lot of emerging technologies through our contract services group. We helped rehabilitate, and we run the Tampa Bay desal plant, large seawater desalination plant in Florida. And when Rob MacLean was looking to start the development of the Monterey desal plant, we were able to harness the expertise and also some of the employees from our Tampa Bay facility and share them with Rob to really help leverage that strength and experience that we have.

And as Walter and Susan had hit on quiet dramatically here, we have unbelievable talent in our organization, and I would like to say that I think AWE helped support that. Because of our competitive businesses and the very varied aspects of the businesses that we're in, we attract talent from a wide array of industries. We bring in people who are very entrepreneurial minded, and we've been very successful in sharing folks from AWE with the regulated business. Rob MacLean, Walter Lynch come out of AWE. Some of our other state presidents do as well. And so, it's really a great opportunity to bring people in from outside of the utility sector.

And finally, I would like to think as well that we helped build the American Water brand. Susan mentioned we're in 47 states and in Canada in our market space portfolio. And we also served a really wide array of customer groups. So through this broad reach, we think we've been able to build and help support growing the American Water brand. So now that I've talked a little bit about why we have AWE, let me just take a moment to talk to you a little bit about how we operate this portfolio. So, our objective at AWE is to develop and build profitable businesses that focus on meeting customer needs but to do so in a very regulated-like way that align with the values that our shareholders expects from American Water.

And so, we have three businesses today, Military Services, Homeowner Service, and Contract Services. And our focus is to build long-term customer relationships or customer contracts that deliver stable, predictable earnings. We also look for businesses that have the opportunity to grow there in growing markets.

We seek businesses that have moderate competition and also businesses that are geographically diverse. Other points that Walter made really helped mitigate risks. But beyond geographical diversity, I think what's very unique about AWE, as well, is we serve a very wide array of customer segments.

Obviously our military business serves the Federal Government. Our homeowner business serves residential customers but also has municipality partnerships. And our Contract Services business serves municipal, industrial, and commercial customers. So that customer diversity and geographic diversity really helps mitigate risks as well. And finally, we complement the regulated business because of what we call capital light as you saw in the pie chart Walter showed a little bit earlier in the presentation, as we know the regulated business demands very high levels of capital investment. But this is as an AWE, we really require very moderate levels of capital.

Let me start with our Military Services Group. Give you a little bit of background about that. And then talk about what we see going forward. The Military Services business really came out of a congress mandate that came out in the late 1990s. Congress mandated that all military installations must evaluate utility privatization, which basically means they must consider whether they should privatize water, wastewater, electricity and gas and steam in some bases as an alternative to self performing. And when this came about, American Water initially felt this is a great opportunity because it seem that it was so aligned with what we do.

The utility privatization model which makes it so regulated like. It's really a 50-year contract with the Department of Defense to operate and support infrastructure upgrades as well on military bases for water and wastewater. So, we entered this business back in 2003. Today, we have 12 bases where we provide the service, which is the largest number of any provider in this space. This is very predictable revenue. It's not consumption based. It also offers us the opportunity to adjust prices. After the initial contract, the third year following, we can make a price redetermination adjustments. And then, every two years, thereafter, we can do that as well. And so, with those fluctuations in the economies of the chemicals and such that we're dealing with, we can make those adjustments. If the base have changed their assets, we can make adjustments as well to our contract.

Again, very geographically diverse. The 12 bases we have go from New Jersey, Picatinny Arsenal, out to Vandenberg in California. We're in Kansas, and we go down to Texas. So, very geographically diversed as well.

There's something that's very unique about this business. I come from a marketing background, but I've never worked for a business that only had one customer. And so, as a result of that, we do have one customer, the Department of Defense. We have to be laser-focused on delivering customer excellence. We have three unbelievably talented employees who make up this business.

And every single one of them is a customer-service-excellent champion. As result of that are some of the awards that we've won. We won four American Water Association Directors awards for system optimization for water systems. It just goes to show the continuous improvement mindset of the MSG team.

And with that, let's talk a little bit about what we've accomplished and what we're going to accomplish going forward. As you can see from the chart on the left, pretty dramatic increase in net income for this business especially in the more recent couple of years. As I said, we launched this business back in 2003, won our first base, and we now have eight.

When you're awarded a military base, you're awarded a 50-year O&M contract that has fixed fee for 50 years. But, in addition to that, at the time of the award, you're also awarded a capital budget for something called ISDC, and that's Initial System Deficiency Correction. And it's actually what it is.

When you initially acquire the system, there are certain deficiencies that have been identified and we have to correct them. And so, there's usually a significant capital award that's given as well at the time of when you start or initiate that contract.

The O&M fee, the 50-year O&M fee has tended to be over the history of our business about 65% of our revenue. The [ph] ISTC (51:33) is about 10%, but if you noticed the growth that you see in those most recent years, that's come from future capital upgrades or infrastructure investments, and what's come about it after we were in this business for the initial years, we realized that there was really a tremendous opportunity to work with our customer, to improve and rehabilitate the water and wastewater infrastructure on basis.

Our infrastructure systems are underground and so, they're out of sight. And they really have been ignored on the military service installation. What's unique as well is that because we have a utility privatization contract, the base can get funding for all of these projects through their funding mechanism.

And so, what we do is we work with our bases every year, and we pretty much put together a menu of projects that we jointly identify as things that the base wants to work on and then through this funding mechanism, some of those are granted. And so, we've really generated really significant revenue increments through these future capital upgrade projects.

So when we think about going forward, where will the growth come from? When we have 33 additional bases that are in our sites that we will send proposals to. Now, they're going to happen over a period of 10 years. We are in active proposals now between – for six bases. And of course, the award cycle is anywhere from the first proposals usually about two to three years out. The 33 days as we have identified or what we call our sweet spot. There are a lot more than 33 bases that will come up for water and wastewater utility privatization. But our sweet spot are the larger bases. These are bases with a 50-year O&M value of $250 million or greater. And that also the basis that has significant assets on base, because as I spoke about earlier, this capital upgrade and rehab program is where we generate a significant part of our income and so that's part of what makes it a good opportunity for us.

The other opportunity that is really growing and will continue to grow coming – going forward is what we see in helping our bases meet their net zero targets. An example of this is, this year, in 2015, there was in executive order, all military bases must reduce their potable water use by 2% a year for the next decade. And so, we're working with Fort Sill in Oklahoma, we got the permit in August, and we go building the first reuse facility in the state of Oklahoma on Forth Sill. They're going to rebuilding pipes and pumps that will take about half of the wastewater on that base. It will recycle it, and they will reuse that to water the golf course, which all military bases have. And they'll also use that to wash tanks, and other non-potable uses at the base.

So, that's a great project for us and it helps them meet their net zero targets. But there is also an opportunity for us to help to meet their net zero targets in the energy reduction area. Bill Varley is here. We call him Dr. Bill because he is leading our geothermal. It's a pilot that we're doing with an elementary school in New York, and for the properties of water, we can actually heat and cool buildings. So, when you think of Fortville, where building needs this infrastructure for reuse, we now already have something prebuilt that we can then apply geothermal to, and potentially heat and cool all of the buildings at Fortville. We're developing that proposal for them now. So, again, that's an opportunity where we can help the bases meet their net zero energy efficiency targets. Geothermal can reduce energy usage by as much as 40%, so a lot of opportunities, and again, these net zero projects can fall under utility privatization, so we already have the mechanism in place to get the funding to deliver these projects.

Let me switch now to homeowner services. I came to American Water about 14 years go to start this business and it has been so exciting to watch this business grow. This business came out of a regulated customer needs. American Water customers, we heard this from our call center reps, and they would say, the customer calls me because their bill is really high, I send out a technician, he gets to their house and he says, Mrs. Jones you have a leak in your water line. She goes, okay, fix, exit. Now, it's your water line. We don't own the water line. You're responsible for the water line on your property, and she says, what am I going to do, he says, well you're going to have to find a contractor. In the meantime, we have to shut your water off. So, this was not the best experience for a residential customers. So, out of this need grew this business. And what we do is first we educate customers that they're responsible for their service lines. And then we offer them a moderately-priced warranty. So, in the case that they are to have a water line leak or break, we will come out, fix it, repair it, and they won't have to pay for it. Peace of mind.

Today, we have 780,000 customers and 1.6 million contracts. These are annual contracts, but we have over 90% retention. Those customers that we brought in back in 2001 and 2002 in Pennsylvania and New Jersey, we probably have the majority of them today, unless they've moved out of our footprint. And even they've moved out of our footprint, we still serve them if they're in one of our general areas.

We've grown this business through geographical expansion. We started in New Jersey and PA. In the first couple of the years of the program, we went to the entire American Water footprint, and now, we are in 43 states and Washington D.C.

In addition to a high retention rate, we have a very high customer satisfaction rating of 97%. The significance of that, of course, we always want to serve our customers well. But why that's really important is because as you see the color bars changing, we continue to introduce new warranty products.

And if we have high levels of customer satisfaction, customers will buy more products from us. And so, we've been able to very successfully increase wallet share through the introduction of additional warranty programs, and due to our rising high customer satisfaction levels, customers are willing to take those products.

So, let's talk about going forward. How do we continue to grow this business? Geographic expansion. That, basically, is how we direct market to customers across the country under the American Water Resources brand. We do that with a very sophisticated regression model. We've gotten pretty good at it. We know what attributes have to be combined to identify people who are prospective customers for warranty products.

And once we enroll one of these very warranty-minded, risk-averse homeowners, we then are able to upsell them through all of the new products we're developing to take many other warranty products. We have a tremendous pipeline of new product offerings that are in the mix today.

Currently, every customer we have takes a little more than two products, and it also affords us an opportunity to reach out to new customer segments through some of these new products, like our well and septic program which our traditional water line and sewer line protection programs would not have reached out to.

There are 75 million homeowners today in the United States that are not offered this program through a partner. So, let me talk a little bit about partnerships which you see on the right. The partnership opportunity is really the most significant growth channel for homeowner services in the coming years. Three years ago, we partnered with New York City, the Department of Environmental Protection, and in that partnership we were able to use the logo of the DEP and the endorsement of the DEP on our marketing materials. We got their customer list, and then very importantly, we got to charge for our services on the New York City water bill.

And with the combination of those three attributes, in three years, more than a third of all of the homeowners in New York City have our product.

In addition, 97% of those take both of the products we offer. We offer both water line and sewer line in New York City. It's a very, very powerful mix, whether we're coming as New York City to a homeowner or as New Jersey American is the same. So, the same successful results we had in our own footprint, we are now duplicating with partnerships.

Just earlier this year, we launched with Orlando Utilities Commission, and it's early in that process, so we don't have all of our response rates in, but what's really compelling about that partnership is that they asked us to provide five products to their customers: water line, sewer line, in-home electric, in-home plumbing, and surge protection. So, great portfolio of products, again, on bill with a customer list in Orlando, Florida.

Additionally, outside of municipalities, we are starting to build partnerships with what we call affinity partners. We are in pilot test today with AAA Mid-Atlantic, American Automobile Association, which certainly makes sense for us. We are using their customer list and their logo, and we also just developed the partnership with the UCLA Alumni Association. So, again very significant opportunity for partnerships.

Today, 70 of the top 100 cities do not have a partnership for these warranty offerings, we are in a lot of talks with a lot of cities where I think we have a much better opportunity than our competitors especially with the larger cities, is that we are the only person in this space that is a water utility.

Our competitors are warranty companies, and when we are talking to people like New York City, they like the fact that we are experienced when it comes to water and wastewater. It gives them greater confidence and comfort about who they're partnering with. So, we feel that homeowner services, although it had great growth still has a tremendous runway ahead.

When Linda gets up to speak following our break a little later, she's going to give you an example for both military services and homeowner services of what winning a new military base award or winning a new homeowner services partnership means in terms of driving future earnings.

So, let me just talk a moment about our contract services business. This is the business that serve the municipal, commercial, and industrial customer segment. Contract services really is – really provides American Water with very significant strategic value. Some of our key clients today are the city of Phoenix. We're in the eighth year of a 20-year operations contract with the city of Phoenix. We have a drinking water facility there. And then, also for the city of Seattle, we provide 40% of the potable water to the city of Seattle through our Tolt plant. So, we have a lot of really high profile, significant contracts in our contract services portfolio. We have 53 contracts today, 30 municipal, 10 industrial and 13 commercial.

But one of the big values that I talked about earlier when I spoke about Tampa Bay is our ability to leverage the technical experience that we have from some of these very innovative contracts that we provide today in the services we provide. One of the – apart from Tampa Bay, we have an award-winning reuse facility in Fillmore, California. So, the city of Fillmore, we beneficially reuse 100% of the wastewater from that city. We recycle it, and it is used to irrigate parks and the many orchards that are in that part of the country. We also have a reuse water system at Gillette Stadium up in Foxboro, Massachusetts. Now, I don't want anybody coming after me to say that I over inflated this story about the Patriots stadium, but I've been told they serve more beer there than any other stadium, and that puts a lot of pressure on our reuse system on game day.

And through the time we've had that contract, we have reused 100% of the wastewater. It's not only for the stadium but it's for the surrounding hotels and restaurants as well. So, it's really a very high profile green story for the New England organization.

Apart from the strategic benefit around emerging technologies, there's another very important strategic benefit that Contract Services provides. Walter spoke about the tremendous momentum we see for privatization of municipal systems. But we're also seeing that's different today is the system wants options even in for Scranton that we spoke about. We always prefer to privatize or acquire a system. But we need to meet municipalities and show them that American Water is a solution provider. So, if the city said, I also want to propose a [indiscernible] (01:06:40) concession or I also want to propose for O&M in addition to what your acquisition proposal would be. We're one of the few water companies that can provide all three. And that really has helped us tremendously because we come to the table not someone who just wants to buy you, but someone who wants to help you solve your needs and so contract services really does provide that platform to provide not only responses to the bids but to provide those services as well.

And so going forward. We want to continue to serve our customers with excellence that will sustain our growth. We see AWE doubling again over the next five years. We have clear line of sight, two new UP awards. We have clear line of sight to partnerships with large cities for homeowner services. In addition, we will continue to expand our services and our products to meet the growing needs of our customers to increase revenue per customer and to sustain our growth over the coming years.

With that, we are going to take a break. There's going to be refreshment served outside and we're going to meet back here in approximately 15 minutes. Thanks.

[Break] (01:08:13-01:08:20)

Sharon C. Cameron, President-American Water Enterprises

So, we'll go ahead and get started. As all of you know or most of you know, back in July, we closed on the acquisition of Keystone Clearwater Solutions. There were a lot of questions on the second and third quarter earnings call once we made that public. What we wanted to do over the next few minutes is bring the CEO of Keystone Clearwater, Ned Wehler, here to talk about the business from his perspective, to give you insights on the market and to talk about this issue of water services and how it fits in. The one thing I want to tell you before I bring Ned up here is when we were approached, it was an auction sale, we really debated internally as to whether this was a business we wanted to get into. We had lots of great discussions inside. We very disciplined and robustly looked at the pros and cons. And we said, it's what we do. I mean, we treat water, we pump water, we serve water. But we still were thinking, let's just kind of see, this may or may not be what we want to get involved in.

And then, the turning point for us was when there were management presentations, and our team got to hear Ned Wehler and Dan Dawson whom I introduced to you before at the beginning of this program. The cultural fit, their focus on the environment, their background in this industry, their care, for example, Ned has 30 years as a geologist doing environmental remediation in different areas then working in [ph] E&Ps (01:09:40). Dan, right out of school came to work, grew up with this business. It's just an incredible organization.

And I went out and spent a day with them. And I have to tell you, from a safety perspective, walking out on the site where every person has to look at a job safety plan, ever visitor has to sign, everybody is looking out for each other, I was so impressed. So to hear more about this, and after

Ned finishes and Linda comes up, we will have, hopefully, 30, 40 [audio gap] (01:10:08) have at the end of this. So I'm sure you're writing down [audio gap] (01:10:11) questions that you didn't get to ask in the break.

So with that, I'd like for Ned to come up and talk about Keystone Clearwater and water services [audio gap] (01:10:19) basin.

Ned E. Wehler, Chief Executive Officer, Keystone Clearwater

Thank you, Susan. It's a pleasure to be here. My name is Ned Wehler. I'm the CEO of Keystone Clearwater. You've seen the triangle. It's been a privilege to be perched at the top of the triangle. We – when our company went through the auction process that Susan just described. And we had a lot of interest in our company. And from the very beginning, we were very pleased about the interest of American Water, and I want to tell everyone and make it clear that the relationship has been truly outstanding. The resources and support, the reputation, the financial strength, the ideas, the leadership team have all added value to our organization going forward. So, it makes it easy to be successful at the top of the pyramid when you're supported by such an outstanding organization.

Keystone Clearwater Solutions is a water management company serving the exploration and production industry, the energy industry, the shale gas production community in the Northeast United States and what is known as the Appalachian basin.

Our company was founded in 2009 with ownership principally by an energy company. So, through the background that I had and others in our organization in environmental engineering, water supply sourcing, pumping, pipeline projects, we leveraged that skillset in the Appalachian basin to serve the exploration and production marketplace throughout the Appalachian basin beginning in 2009.

We had the opportunity to roll out water supply, water pumping, water transmission services to the energy industry and gradually expand those service offerings to other companies in the play. At this time, the company served about 25 active exploration and production companies in the basin. Overall, in the Appalachian basin, there are about 50 active exploration and production companies, so we have current business relationships with about half of them.

This past year has been challenging, as you know, and I'll talk about that in just a moment. But the activity in the Appalachian Basin this past year has involved about 1,500 new wells in the basin. So, we're very engaged with that process.

Now, how do I advance the slides? Like that? Okay. I'd like to just give you a basic overview of the industry, the technology, and I'm sure many of you are somewhat familiar with this. The emergence of the growth momentum in energy production in North America has been driven by new technologies.

Principally, directional drilling technology was the primary technology driving the success of what is now known as unconventional drilling technology. The well completion technology has combined hydraulic fracturing to produce the large yields of natural gas, natural gas liquids and oils from unconventional wells.

This well-completion technology is enabled by water and it depends on water, and it depends on large quantities of water. And because of that dependency and because of that the importance of water to the success of energy development by unconventional methods.

This is aligned ideally with the skill set that we've developed in our company, and that together with American Water we have the core competencies in place to serve the full spectrum, the full water cycle that serves the well completion technology. We're working in the Appalachian Basin with two formations that I think you're all probably aware of the Marcellus formation which has proven its efficiency, its natural gas productivity throughout the basin, and also, now the emergence of the deeper Utica Shale.

These two geologic formations have proven reserves well in excess of 500 trillion cubic feet of natural gas. And because of the yield, because of the improvements and efficiencies, we know that this actuation production potential was here to stay. We have every reason to believe that there's 50 years of business opportunity here in Appalachia, and based on current production rates which are about 18 billion cubic feet per day growing incrementally over the next three years to about 30 billion cubic feet per day from the Appalachian basin, sustainable from these formations, we know that there is decades of business opportunity in place for the company here in Appalachia, and in addition, there is of course geographic expansion potential as well throughout North America. So, that's kind of the marketplace that we're working in.

I would like to give you a brief overview of short-term and long-term prospects here in the Appalachian Basin. Those of you that are following energy prices surely know the challenging time that we've had this year. The momentum of growth in the industry has slowed, has basically stalled at this point in time, but besides supply issues, storage issues, the primary constraint in the Appalachian Basin here in the Northeast has been the takeaway capacity. The developed infrastructure to take gas from the basin and deliver to markets in the East Coast, in above Midwest, through the Gulf Coast has been constrained by current pipeline capacity.

Fortunately, there are about 15 new takeaway projects that have reached construction stage. There are roughly four new takeaway projects coming online late in 2016. There are another 11 projects expected to become active in 2017, and early 2018, and we're anticipating that the increase in takeaway capacity will gain roughly 23 billion cubic feet per day over the next two years.

Currently, and for the 2016 year, we're expecting between 20% and 30% declines in completion activity by our customers. Fortunately, we have offset those declines with gains and customer counts, and continued opportunities with new customers.

Through the winter period, there will be some drawdown of excess storage. Current storage of natural gas in the United States is roughly 4 trillion cubic feet. The El Niño weather pattern, warm weather as we've experienced the last couple of days, but actually the last couple of months here in the northeast has also been a negative factor in pricing of natural gas. But one of the bright spots that we're experiencing with our customers at present is the customers are readying their lease hold, acreage holdings to take advantage of growing takeaway capacity. And they're funding water pipeline infrastructure project, water sourcing, water pump stations, water pipelines, and water storage facilities. So, these are bright spots, these are revenue areas of growth for our company at this time.

And just to put this into perspective, growing rig counts in the northeast United States have declined from about 110 drilling rigs active in the basin in January of this year to a current rig count of roughly 59. So, we've seen nearly a 50% decline in rig counts, yet the revenues of Keystone, Clearwater have declined by only about 5% this year. And the reason that we've been able to hold our revenues is because we've expanded our customer base, we diversified our services, we brought in services into the pipeline realm, and we've added storage services to our customer base.

In terms of the long-term 2017 and beyond, because increase takeaway capacity is coming online, and because we're anticipating growth in demand, throughout the United States, and in particular, in the east, as power generation conversions from coal to natural gas occur, as industrial conversions and new industrial manufacturing occurs, depending upon natural gas. As LNG facilities are built and exports begin and as further exports through pipeline project from the United States occur, we expect demand to increase, we expect the beginning in 2017. Our completion activity will increase by between 10% and 20%. We are looking at a basin that has lowest cost gas production in the nation with estimated ultimate recovery cost of less than $0.40 per thousand cubic feet.

So, we situated in a basin with tremendous potential situated in the right location, in a place where substantial new takeaway capacity is being built and where our lowest cost gas exists [ph] being in and (01:21:33) along and accessible to the East Coast.

So, what we are expecting is that later in 2016, and then as takeaway capacity takes hold in 2017, we will begin to see natural gas prices begin to inch up.

I want to give you a briefing of what the company does and how it relates to the total water management cycle that the exploration production companies use to produce and complete natural gas wells in the Appalachian Basin.

Beginning at the top of this circle and I'll go through this quickly, hydraulic fracturing depends upon water as I mentioned. So, the process begins with fresh water sourcing. It perceives them to transfers from sources by means of pump stations and pipelines. Pipelines feed to temporary storage or and on budding well pads where wells are drilled and wells are completed. There is on-pad water services where water is pumped to and from storage to blenders and fed to pressure pumping operations that serve the hydraulic fracturing operation in the whole well completion activity. Once wells are completed, there is flowback. There is blending of flowback. There is filtration of flowback and recycling and reuse of flowback water. In addition, flowback water is stored. Sometimes flowback water is transferred to other local pads. And to some degree, those transfers are occurring with temporary water pipelines and/or by trucking services.

So, what we've built in our company serving 25 active customers at present is a business that specializes in water sourcing, water pipeline design and construction, pump station construction, water and equipment hauling, on-pad and off-pad water transfer services. We employ personnel that provides of all the operation and maintenance services to operate pumping systems, pipeline systems, and storage systems. We provide water storage solutions, water storage tanks, large above-ground storage tanks.

And in earlier this year, the company initiated a new line of service that's driven by interest in the producers to have the company provide capital and do design, build, own, operate projects for pipeline systems to serve water to the acreage of our E&P customers. As Susan mentioned, the company was acquired in July of this year. At that time, we were serving about 20 E&P customers. Since then, we have added seven new customers, and at present, as I mentioned, we're serving roughly 25 active E&P customers. The two that make the difference are currently inactive. One of the things that we're very pleased about in terms of our company's performance, the high performance team and the core values is that once the company has established a relationship with a new customer, it has held that customer. We have never lost a customer.

So, fortunately, we're holding and building our wallet share of business with customers. We continue to add customers. And through those dynamic, we are able to hold steady revenues. And this approach and I'll describe a little further will support our five-year growth plan. In this water cycle, just very quickly, the pieces of business that are under pressure, that are under certain declines are the sourcing and the on-pad completion related services. But the services of this cycle that are continuing to grow and that represent revenue growth opportunities for our company include the pump station business, the pipeline construction business, the ownership of pipeline business, the operation and maintenance services of that business, services related to blending of flowback & produced water, the storage, and the reuse of produced water, and finally, the transportation of reused water.

So, even in the market downturn, we are seeing significant growth of several of the water cycle business lines. I mentioned that we've been successful in gaining and holding our customers. What is our competitive advantage? Why are we able to do this?

Hopefully through the water's cycle discussion that I just walk through, you can gain an understanding that the company has a fully integrated range of services. We do it all. We supply it. We pump it. We build it. We transmit it. We store it. We move it. We filter it. So, everything related to that water cycle is a service that the company provides. And at this time, while, the company is seeking efficiencies in every scale, we have the opportunity to bundle services, provide every servers, limit the number of transaction with our customer, and the appeal of a total water management solution delivered by the company throughout the region by workforce that is based locally is very appealing to our customers.

I'd like to elaborate very briefly on this. The Appalachian Basin is a large region from Northeast Pennsylvania to South Central West Virginia to all of Eastern Ohio. Our company has regional [ph] alliances (01:28:08) deployment of its workforce, so that our employees are based close to and near our customer well pad locations. This has translated into allowing us to compete effectively against competitors and it's been very appealing to our customers. This explained our background in terms of environmental engineering and permitting and regulatory knowledge throughout Appalachia through years of experience in environmental engineering work. That basin-wide experience has been tremendously valuable in our customer relationships.

If you're familiar with the region, you know that our market involves roughly 100 different counties. It involves roughly 2,500 different municipalities. These localities are governed by state regulations, county regulations, local regulations, subdivision regulations, land development regulations. The knowledge base that our personnel have has been tremendously valuable to our customers in that we know how to get things done. We're very successful at meeting time lines and meeting project schedules.

The next discriminator that use very successfully and that is very appealing to our customers is the strong technical knowledge that we have. We take an engineered solutions approach to everything that we do. That means that we have very formal standard operating procedures to how we do things. We bring advanced technology to bear on our solutions, level controls, flow controls, pressure monitors, pump controllers, pump automation. This type of approach, coupled with a very strong construction quality assurance approach to assuring the quality and the performance characteristics of our systems brings technical knowledge to bear. And this, too, is very appealing to our customers.

We've been successful in maintaining our position as a low-cost, competitive provider in a challenging marketplace, the success of this comes in large part from the fact that we own nearly all of the assets required to deliver these services.

The company owns roughly $40 million of assets that it uses to supply water, pump water, pipe water, store water, and the like. The fact that we own these resources allows us to maintain a competitive cost advantage. Besides this, we can bundle services when [ph] employ automation (01:31:01) technology and we maintained a very low overhead structure in the company. Roughly 6% – 5% to 6% of our revenues is our general and administrative overhead, which is low compared to our peer group.

Finally, we've built a very strong reputation in the marketplace evidenced by the fact that we've kept every customer. We've grown our market share. Current market share has increased to somewhere north of 25% of the market. This year, our peer group named our company the 2015 North East United States water management company of the year. In 2014 and 2015, we were named the fastest-growing company in all of Central Pennsylvania.

And finally, our reputation has even been further enhanced by the American Water acquisition. Up until that time, there were some headwinds in our markets in some cases because of the knowledge of certain E&Ps that we were owned by a exploration and production company. That has gone away. The financial strength, the reputation, the resources, the skill set of American Water has been very appealing to our customers.

So, the ownership model, the resources that supported has joined to be one of the very important competitive advantages that we have as a company with broad appeal to our customers.

Going forward, we've presented and we have a five-year growth plan, which has the company's revenues growing by more than 50% over five years. Our basic strategy for growth is to hold our current customers and to grow our wallet share with them.

As I mentioned, we have 25 current customers. We hold anywhere from 5% to 100% of their work. In the whole mix, we might have 30% to 35% of the business of those current customers, so there's tremendous opportunity to increase our wallet share with current customers. The universe of customers in the Appalachian Basin is about 50 customers.

We have an active business development program with calling assignments on sales personnel, our managing directors, our company officers, all have a role in identifying, calling-on and developing new customers. So, we're expecting that we will be able to increase our revenues through expansion of our customer base.

And, finally, one of the strategies that we're employing to improve the predictability, the stability and the sustainability of revenues is to add to our mix of services the design, build, own and operate solution, whereby, E&P companies that have more interest in deploying their capital to exploration and production can allow an American-Water-owned enterprise to build and own and operate water pipeline infrastructure and even water storage infrastructure to support their water management needs, so that their moneys can be invested in the exploration, the completion, the drilling and other infrastructure projects related to gas sales to the marketplace. So, that's our primary strategy for growth.

Important risks that we concern ourselves with related to revenue, fluctuation, margin volatility, declining completion counts, and even actions by certain companies to build their own water infrastructure or their own water storage infrastructure.

So what are we doing to mitigate these risks? Number one, I want to make this very clear. The company has done an outstanding job through all of the issues that are described going on this year to hold its margin. We have learned very well how to hold margin and we've been very successful at holding margin, and our margins are consistent with margins earned by the company in prior years.

We're employing longer term contracts on the ownership opportunities. We're anticipating that the design-build own pipeline projects will involve five-year contracts with three- to five-year renewal term options. We have a variable cost structure. Only about 20% of our costs are fixed, the other 80% of our costs are variable, those related to labor, subcontracting rental equipment, hotels, per diem expenses, supplies, materials and the like. So, as completion levels change. We do not experience much in the way of cost as those changes occur. And finally, we're continuing to grow wallet share and make customer additions to overcome revenue fluctuations and declining well counts.

Lastly, I want to mention that the company is beginning the process of working closely with American Water to support it with services outside of the shale gas industry, such as bypass type pumping services, such as emergency response services. We're optimistic that we will be successful in broadening the use of our rental pumps, our rental pipes, our valves, our fleet of equipment, transport equipment, to serve markets that include municipal markets and industrial markets, providing services such as emergency pumping, flood response, bypass pumping, as water and wastewater facilities take outage and maintenance events.

So going forward, we'll continue to leverage our strengths, our core competencies with the synergies of our partnership with American Water to serve our current customers, our new customers. The financial strength of the enterprise is very attractive to our customers. It's added a considerable underpinning of the business at this time. We're working harder to build a more predictable business model that's tied closely to pipelines, permanent pipelines, tied closely to storage facilities, and tied closely to the ownership of water supply sources that we have.

In this manner, we believe that we will have more predictable, more stable and growing revenue going forward. As I mentioned, we're launching and we're beginning the process of offering and closing design, build, own, operate projects for pipelines. We're talking to customers about similar proposals for water storage facilities. These offers will tend to lower the water supply risk that our companies have and will provide attractive return on investment to the company. And finally, we're going to continue to grow our wallet share, hold our customer base, and continue to add customers. So, that's what Keystone Clearwater is doing at this time.

Linda?

Linda G. Sullivan, Chief Financial Officer & Senior Vice President

Great.

Ned E. Wehler, Chief Executive Officer, Keystone Clearwater

Okay.

Linda G. Sullivan, Chief Financial Officer & Senior Vice President

Thank you, Ned. Great to see all of you. Testing. One, two, three, better? Okay. I said it was great to see all of you. So, thank you for coming out. You've heard a lot so far today. So, you've heard Susan talk about some of the key elements that make us a unique investment in the utility space with our growth profile, our people, our risk profile, and our financial strengths.

You've heard Walter talk about the multi-decade-long investment need that we have in our regulated business, combined with some of the enabling legislations that we are seeing that helps us to expand our footprint in terms of regulated acquisitions and customers. And you've heard Sharon and Ned talk about the complementary market-based businesses that we have that really leveraged the core competencies of American Water and provides a strategic platform for us for future growth.

What I'm going to do now is really kind of wrap all of that up into our financial plans and talk about how we're going to finance our growth going forward. But before I do that, I have been with American Water for well over a year-and-a-half now. So, it's home to me now and I have heard many of you thank us for the transparency that we give with regard to our growth in the business. And I've also heard many of you ask for additional detail about what gives us the confidence that we can grow 7% to 10% over the next five years.

And so, what I plan to do today is to really dive a bit deeper into each element of our growth triangle and provide you a look at what gives us that confidence, what is the total market potential in many of the areas of our business and then how do we plan for that over the next five years.

So, let me start with the shorter term. So, we are looking at continued long-term diluted earnings per share compound annual growth rate at 7% to 10% over the next five years and this is anchored on our 2014 adjusted earnings per share.

Many of you that have followed us for a long period of time have seen this wedged chart. And the change here is that we've changed the anchor point from 2013 to 2014. Today, we are reaffirming our 2015 earnings guidance and we are setting forth our 2016 earnings guidance in the range of $2.75 to $2.85 per share. I've put that on the wedge here as you can see that the guidance ranges are consistent with our 7% to 10% EPS growth.

Let me dig a little bit deeper into the numbers. So, walking over from 2015 to 2016, in our third quarter earnings conference call, we narrowed our earnings guidance to the upper end of the range to $2.60 to $2.65 per share. We are reaffirming that guidance range today. And then, we are setting for 2016 earnings guidance in the range of $2.75 to $2.85 per share.

Now, let me walk through some of the major components of the growth from 2015 to 2016. I'll start with the first two bars which are our regulated business. The first bar, $0.12 to $0.14 of our growth is coming from the regulated business, and this is primarily driven by our capital investment plan at the business, as well as the constructive regulatory mechanisms that Walter talked about that we put into place and the cost management philosophy that we continue to drive in the regulated business.

Our regulated acquisitions are the next bar which are expected to contribute $0.02 to $0.04 to our year-over-year growth. And this is being enabled by the legislation that Walter talked about earlier. When you combine those two bars together, the regulated business represents $0.14 to $0.18 of our 2015 to 2016 growth. On a stand-alone basis for the regulated company, that represents 5% to 7% growth in our regulated businesses.

For our market-based businesses, we look at growth of $0.03 to $0.04 year-over-year, and this represents growth associated with the items that Sharon and Ned talked about: growth in our military service contract business, growth in our homeowner service contract business, and the first full year of operation of Keystone Clearwater Solutions. On a standalone basis, our market-based businesses are expected to grow in the range of 12% to 17% year-over-year. And then finally, we have for the parent company, we expect that the parent company drag will increase a couple of pennies on a year-over-year basis and this is primarily because of some state-tax apportionment benefit that we're expecting in 2015 that we do not expect to reoccur in 2016.

And so that's how we walk over to our earnings guidance. Our earnings guidance of $2.75 to $2.85, we have confidence in this guidance but there is variability in our business. And so, I want to walk through some of the items that we have included in our earnings guidance range. As many of you are aware, weather is the largest variable of our business. We look at plus or minus $ 0.07 of weather represents normal weather variation and that is what we've included in our earnings guidance range.

For our regulated business, we see variations in the business primarily due to the timing and outcome of rate case and other proceedings with regard to the timing of our capital expenditures as well as O&M and production expenses. At the AWE companies, American Water Enterprises, we see variability that's associated with the timing of the future capital upgrades on the military contracts. We see fluctuations associated with our homeowners service business in terms of the penetration rates for new customer as well as claims costs.

And then in the shale industry, as Ned mentioned, we see variations primarily associated with market conditions. So, those are the [ph] tax variability (01:46:14) that we've included in our 2016 earnings guidance range. Any variations outside of these ranges could make our results differ.

Let me now move to a look at our long-term growth. As I mentioned, we have 7% to 10% long-term EPS growth over the next five years, 2016 through 2020. The way I've set up this slide is really to look at our last five-year plan compared to this five-year plan.

And some of the key items that I would like to point out is that we have really narrowed the growth range in this five-year plan to provide additional clarity to you of how we intend to grow our business. So, if you look at our last plan and added up all of the numbers, the range were 6% to 13%. Under our current growth triangle, the range is 7% to 11%. Again, providing additional clarity.

Importantly is that our regulated investments or CapEx has moved from 3% to 6% of our future growth. We've moved the bottom end up to 4% to 6% of our future growth and this is primarily driven by the capital investment program, which I'll review in more detail. For the total regulated business, which includes the regulated acquisitions, we are looking at the regulated business providing 5% to 8% of our future growth. Really the foundation of the growth of American Water.

In our market-based businesses, we've also tightened the range, as we've gone through our planning process. Now, these businesses, as you heard from Sharon and Ned, they continue to grow at very robust rates. As I mentioned, growing from 15% to 16%, we're looking at 12% to 17% growth in these businesses on a stand-alone basis. As we've gone through our planning process, we look at the risk profile, the overall risk profile of our company. And as Susan mentioned, we know that our investors are looking at investing at American Water because we are primarily a regulated entity.

And so when we go through our capital allocation process and our financial planning process, we make sure that we are allocating our time and our resources within that risk profile. What we have said is that we're comfortable with the market-based businesses, representing about 15% to 20% of our earnings per share. And only at the upper end of that range, if it is more of a regulated-like risk profile. Our current plan falls within that targeted range.

Now, what I'd like to do over the next few pages is to dig in a little deeper to each area of the growth triangle. And I'll start with the regulated system investments. They're primarily driven by our capital plans. And as Walter mentioned, our capital plan is about $6.4 billion over the next five years. That's a $380 million increase over our last plan. The bulk of that increase is associated with the regulated system investments that Walter talked about.

In addition, we have $600 million that we have set aside for regulated acquisitions. And what's important to note here is one of the things that really makes American Water a unique investment is the predictable and stable way that we deploy our capital. We don't have a lot of large multi-year projects in our industry – in the water industry. Typical large project in our renewal work is about $20 million, $20 million $25 million. And so, that's important because as all regulated acquisition kind of ebb and flow from a timing perspective, we are able to better manage our capital through the flexible nature of the deployment of our capital.

And then, finally, we have strategic capital of $280 million. This is associated with the opportunities that Sharon and Ed talked about. And behind the strategic capital is a very disciplined process that we go through to make our capital allocation decisions. We have a strategic filter that we go through. We also have clear financial filters that we go through and hurdle rates.

The next piece is again with our regulated business. And this is a look at rate base growth. Many of you have asked for additional clarity on rate base growth. So, I hope you really like this slide. This shows where we have been and a projection of where we are going.

2014, our year-end, our rate base was $9.4 billion. In 2015, we estimate that the year-end will be $9.9 billion; and 2016, we are estimating rate base of $10.5 billion. And this includes rate base for all components of the growth triangle for the regulated business, both the CapEx and the regulated acquisition. And then we intend to grow that rate base consistent with our growth profile going forward.

Now this next slide is to dig a little bit deeper into the 1% to 2% growth from regulated acquisition. And the way that we've set up the next series of slides is to look at, where are we today? What is our total opportunity? On the right-hand side and then what is the current activity and Walter covered a lot of this in his slides. We have 3.26 million metered customers at American Water. 2015 activity, we have added about 33,000 customers either through closed acquisitions or pending acquisitions that will close in 2015 or 2016. But if we step back and, say, well, what is the total opportunity? What we wanted to do is to provide you an idea of the total market here. So, what we looked at was we looked at our regulated states where we currently operate. And then we looked at those target opportunities, the systems that are in the 5,000 to 30,000 customer connection footprint, and we said, what type of opportunity is that for American Water? And it would be a 13 million water customers and 11.5 million wastewater customers would be the total opportunity within our existing states, or 24.4 million customers.

Now, within our five-year plan, as Walter mentioned earlier, we're looking at adding 30,000 to 60,000 customers per year, or 150,000 to 300,000 customers over this timeframe. And that is how we get to the 1% to 2% growth in the regulated acquisitions.

The other thing to note here – and Walter mentioned it – is the enabling legislation. One of the things that is really core to the enabling legislation is providing municipalities to this and other the incentive to sell. And seeing this momentum as we move to more of a fair value or appraised value approach from a historical cost-type approach really provides more of that incentive.

Let me now move to market-based businesses, and I'll start with AWE. I will cover two areas here, military and then homeowner services, and we'll set this up at the same way. So, what is our current portfolio, what are we currently pursuing, and then what is the total market opportunity to help give you confidence throughout our growth plan? What is really important to know that's on the slide is when we've given you these numbers before, they have been in growth revenue numbers, and we've heard many of you say, we really want to help better understand how we make money in these businesses. The numbers that are on the slide today are net income numbers, so the bottom line numbers.

We currently have a portfolio of 12 military bases and under those military bases, what we look at was there's two ways we make money, there is the O&M services contract and then there is the future capital upgrade. And so, we looked, based on our experience, on these bases. What do we think is the total opportunity throughout the remaining term of the contract. We look at the O&M piece without escalation and then we estimated the future capital upgrades based on our historical experience working on the bases. And we see that the opportunity is about $300 million over the remaining life of these contracts.

Now, if we take that to the next set, we are currently pursuing eight military bases, wherein RFCs with eight military bases. We looked at this opportunity the same way. We set based on the size and scale of the military bases that we're pursuing, what is the O&M opportunity on escalated, and then, what do we see as the future capital upgrades that would be more of a steady state. And we believe that opportunity is in the range of $260 million to $380 million over the 50-year contract term for this basis, to the extent that we would be successful.

And the total opportunity for this business is 33 basis that would be of the size and scale that we would be interested in pursuing. And that opportunity, calculated in the same fashion, is $1.1 billion to $1.6 billion in net income over the remaining – over the 50-year life of the contract.

So, then, at the bottom is how high you think about a typical addition of a military base, and what that will do to our net income? So, typically, after we get through the startup period of a base, what you could expect is a net income contribution range of about 650,000 to 950,000 after the second year of operation.

For homeowner services, Sharon talks a lot about homeowner services and the market opportunity here. We have a current portfolio of 1.6 million contracts. Our projections through 2020, these are the projections that we have included in our 5-year plan, are to increase our contracts by 800,000 to 1.3 million. But – and the total target market opportunity, as Sharon mentioned, this is a market that is very underpenetrated. And so, if we look at the 75 million households that do not have these services is the total market opportunity.

Typically, what we have seen is that you have two contracts for household, which would make the total opportunity 150 million contracts. And then if we assume a 20% penetration rate of this market, that will be 30 million contracts would be the total opportunity. And you can see that that large opportunity is really what provides us the confidence that we have in the projections through 2020. That, combined with our past experience, and as Sharon mentioned, we have doubled this business over the last five years.

So, what does that mean to net income for homeowner services? And there's many variables that we have in this business. I've highlighted a few of the key variables. So, when we enter into a new contract with a municipality, or a city, or another utility, what we look at are three key variables. So, the penetration rates. These are, once we have access to the customers, how many customers will sign on for our services. And in our history, what we have found is that if we are on-bill, we generally see a penetration rate of 15% to 40%. If we're off-bill, it's lower than that. It's 1% to 15%.

The other variable, the next variable, is the number of contracts per home, which I mentioned earlier, is typically two contracts per homeowner. And then what does that mean from a net income perspective? The net income per contract that we believe, looking forward, going forward, is $8 to $12 per contract. So, what does mean? When we announced that we have, for example, a hypothetical customer, exclusive agreement with one of our cities or municipalities, let's say that they have access to 200,000 customers, the hypothetical calculation will be 200,000 customers, let's say it's on-bill, we would expect the penetration rate, I'm going to use the lower end of the range, of 15%. Two contract per household, net income per contract of $8 to $12 annually that would result in $480,000 to $720,000 in net income for that contract.

Let me move to Keystone. Keystone, the current portfolio of Keystone and the top number you see here is the gross revenue number. So for Keystone, in 2015 they project $70 million in gross revenue. And as outlined here, where that revenue is really coming from in the Keystone business and it's primarily from the water transfer and construction services that leverage the competencies that we have at American Water.

What does that mean from a net income perspective? As you know, we've owned Keystone since July of this year. We have said that we would be EPS neutral. This year we continue to see Keystone being EPS neutral in 2015.

In terms of active development, we currently have active development for $25 million to $30 million of incremental annual revenue that we are currently pursuing. We – in terms of 2016, what does that mean from a net income perspective? We continue to see even with the downturn in the market that Keystone will be EPS accretive in its full year of operations with American Water.

And then if we look at the total opportunity for Keystone, the total annual revenue in the Appalachian region, the opportunity is about $250 million to $300 million in gross revenue. And we believe reasonable market penetration rates in this business are in the range of 35% to 50% and that is how we get the confidence of Keystone and our shale businesses contributing approximately a 1% compound annual growth rate over the next five years.

Now, as Ned mentioned, Keystone's business has a more volatile earnings profile than some of our other businesses. It has shorter-term contracts in nature. The costs are highly variable costs. 80% of costs are variable. And it is a relatively asset-light business today which provides a lot of flexibility of this business to be able to manage their costs through these downturns. That's the current model.

We are working with Keystone to build a more predictable and more stable business model as Ned talked about. And the types of things that we are looking at are entering into longer-term contracts with our customers to where they would pay a rent or a lease-type agreement which would be similar to a take-or-pay type contract. It would provide or meet the needs of the customers in this region as well as providing additional revenue stability for our business.

A couple of other points on Keystone, and we're really excited to have Keystone as part of the American Water family. One of the things that – Ned did not tell the story about the interaction between Keystone and our West Virginia American Water subsidiary. We had an issue where there was an algae bloom coming down the river, and we needed to have a temporary pipeline built as an alternative. And Keystone was really the best resource that we had to be able to come in and build the pipeline, a temporary pipeline to be able to address this issue as quickly as possible and get through all of the permitting requirements in a very safe and efficient and effective manner. So, it's a very good partnership between the two companies. The other item that I'd like to point out on Keystone is that we do, do some trucking in this business, but what we do not do is truck for deep well injection.

So now let me, that's a deep dive into each area of the growth triangle and I hope this provided information that is helpful to you to understand the confidence that we have in our long-term growth over the next five years.

Now, let me talk about our financial plans underlying that. American Water has excellent credit quality. We are an A-rated utility company from S&P. We're A3 by Moody's which puts us in the top quartile of our utility peers. We are very proud of that and we've had a long history of improvement in our FFO to debt as you can see here. And as we look out over the next five years in terms of our debt maturity, we do have some debt maturities that are coming due. It's about $1.3 billion over that timeframe. In 2017, in 2018, are the timeframe for most of the maturities. Some of that is the higher cost debt that we've left over from the RWE transaction. And we consistently look at economic ways to refinance or hedge that higher cost debt as we move forward. But these debt maturities are manageable by the American Water Company.

We also have a very strong balance sheet. From a cash flow perspective, we expect that we will be cash flow positive in 2018 and that is putting together all of our $6.3 billion capital. It's included in

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that number or poking our head above water, if you will in 2018. From a capital structure perspective, we are currently at 55% debt, 45% equity. We continue to be within that range over the next five years and we do not see any need to issue new equity to meet our growth program.

Those of you who've followed us for a long period of time know that we have a long history of consistent dividend growth, we have had a dividend growth CAGR of 9.1% over – from 2010 to 2015, which represents top quartile dividend growth when compared to the Dow Jones' utility average and our water industry peers.

Going forward, we look at growing our dividend commensurate with our 7% to 10% earnings per share growth. We have a target payout ratio of 50% to 60%. We are currently in the lower end of that payout ratio to have headroom to grow. And when we add all of these up, really, what we are looking at is total shareholder returns that when you add our long-term expected growth rate at the midpoint, our dividend yield, which is about 2.5%, we're looking at total shareholder returns that are well-above the [ph] Dow Jones' utility average. Well above our water utility peers and our lower-double digits with a five-year average beta of 0.8.

So, in summary, when we look at our targets, we look to grow our earnings per share compound annual growth rate and earnings per share of 7% to 10% over the next five years with the regulated business serving as the foundation of that growth. We look to increase our dividend in line with our earnings per share growth with the target payout ratio of 50% to 60%. We look at maintaining our conservative risk profile with the majority of our business being the regulated business, and delivering leading total shareholder returns.

With that, before I hand it over back to Susan, I just want to say a few things. You can come on up, Susan. You heard a lot of discussions today about the people of American Water. And the tone at the top and the heart and the soul of the company is really – it's created by the CEO. And Susan said earlier she wants to be the best utility. And every single day, Susan works to make American Water the best utility in the nation. And she motivates and inspires her team of leaders and the 6,800 people across the American Water footprint to be the best that we can be. We are extremely fortunate to have Susan Story as the head of American Water.

Susan Story, President, Chief Executive Officer & Director

Thank you. If I was smart, I would sit down right now, and [ph] don't say another (02:09:05) word. But – so what I do want to do is [audio gap] (02:09:09-02:09:12) remember when we started, showed this and I said, okay, why American Water. And here is [audio gap] (02:09:17-02:09:18) factors. And I said, those of you who are the buy-side [audio gap] (02:09:21-02:09:48)

Okay. How do you start back in that? So, let's go back to the investment basis.

I was talking about go back, look at all of the utilities in the utility universe and just use this checklist. I mean, we put what we believe is the compelling story for American Water. Growth, you've heard all about this. I'm not going to go back through this. You heard starting this morning with Walter, and then Sharon, and then Ned, and then Linda.

You've looked at all the things we're doing. So, here are the things we think differentiate us. Not won by itself, but the aggregation of all of them. And we believe that this stands out to any other utility out there in the utility universe. But I do want to close with just a couple of comments, to be quick, and then we'll go to Q&A.

We've talked about this a lot, and I know a lot of you are analysts and you're financial driven, and you may be asking so, why are you putting so much emphasis on the people. Well, you know, the fact is this company today, tomorrow, next year, 3 years, 5 years, 10 years down the road will only continue to be the best in the industry if we have the right people leading it.

We have the best technical people running it, and we have people who give their heart and souls and not just their hands every day to what we do and who believe in what we do not just as a job but as a calling. And that may sound cheesy, but we really believe it.

So, what I want to do just in a couple of minutes, I'm going to tell you a couple of stories about not the executives you see in here, but some of our folks in the frontline and what they do that make the different. Not that they're all great in what they do, which most of them are tremendously great at what they do.

So, Victor Munguia, California American works for Rob. You noticed the little kids in the background, he coaches a peewee team, but what I want to mention is that he is a customer service representative and he's out in the field and he's doing work. So, he's finishing up a job one day and he's driving his truck. And at the corner of his eye, he saw this little thing on a side road moving. And Victor goes, there's just something kind of strange about that. So, Victor backed up in this instant, had crawled out the front door of his house into the street, into the busy street.

Victor, by turning his truck around jumped out, ran, picked this infant up, took it back to the home. The mother was just terrified, because she didn't know that the baby had crawled out. I was able to be in California, who we presented him something, Rob and I few months ago, the most humble person who said anybody would have done what I did. But anybody didn't do it, Victor did it.

Herbie Sims, that's the person I want to highlight. So, Herbie's at Pennsylvania American Water. He's a backhoe operator. So, every day, he goes down Wyoming Avenue and you can hear the backhoe coming. There's a little three-year-old named, Connor, who stands out on the front porch and Herbie, beeped his horn and waves at Connor. Every morning he did it. His mother, Connor's mother, Katie , was so moved, she called his Pennsylvania American office and she said, you need to understand Connor is autistic, and he doesn't like to be touched and every morning is a battle because we start out and it's so tough. But he hears that backhoe start down the street and he runs to the front porch just to see Herbie come and beep at him and wave at him.

So, Herbie set it up through Pennsylvania American – his mom called the office, set it up and Herbie and his wife went. The company bought a couple of trucks for Connor and his brother, Logan. And Herbie went and his wife and played with these two little boys for hours. And when he got it to leave, Connor, the little boy who's mom and the therapist said he didn't like to be touched, just grabbed himself around Herbie's leg and hugged him and didn't want to let go. Herbie's mom said, you know, I couldn't wait to tell the therapist about the progress that Connor had made. Because of Herbie Sims of Pennsylvania American Water driving his backhoe down the street, everyday beeping at this little boy standing on the porch.

Now, why are we talking about this at a conference about financials? If you know, in a regulated business, that highly-satisfied customers lead to the fact that you can get reasonable regulatory outcomes because you're running your company well, you're running it efficiently, you're running it with people who care about those customers who live those communities.

You don't think that translates into financial performance? That's not why these guys do it. They do it because they love our customers. But that's the difference in having a company where people believe in what you do, and not just what you do but how you do it.

So, summarize in two minutes and then we'll have the speakers come up and answer your questions. So, what did we talk about that's new today? Number one, we hope we have provided you more clarity as to how we will achieve 7% to 10% growth over the next five years.

Number two, we shared with you that we have increased our regulated CapEx budget. Some of you have been asking, you have the financial capacity, why don't you do it. A part of us being able to do that was finding ways to be more efficient so that we don't impact our customer bills too much because that's at the forefront of what we're thinking about.

Third thing we did was we gave you more line of sight into regulated acquisition. What's out there, what's our focus, how are we doing. Walter shared with you without names except for the one that has been public, the MOU in Scranton will be voted on at 1:00 today, in fact. So, we showed you line of sight's regulated acquisition.

You heard from Sharon in American Water Enterprises and from Ned on Keystone a lot more clarity into those businesses, which many of you have been asking about. On one hand, we told you that regulated investments and regulated acquisitions remained the foundation of our growth, and that's true but we've spent a lot of time on the market-based businesses of Keystone and AWE because you said you didn't understand them and to be able to model or to see where the opportunities are. So we try to do that today.

So that's what's new. So what's the same? What's the same is who we are and what we do. Who we are, is we are a regulated utility. At our core, our heart and soul, and our market base businesses are only going to be those that we know the business, that play off our core competencies. It's about water sourcing. It's about pumping. It's about water storage. It's treatment. It's delivery. It's customer service. It's regulatory expertise. The things that made us great this 1886 that we're going to continue to build on.

Also , what we do. When we look at who we are as a water company, and having been in the electricity industry for 31 years, and I love that industry. I think the electricity industry is incredible, and economic growth that depends on it. I think that the energy, broader energy industry is incredible. But you know what, at the end of the day, without water, there's nothing. You can survive without electricity for days, you can't without water or flushing your toilet, or things that people don't talk about a lot but are the fundamental of what we have to have everyday to live our lives.

So, we told you some new things, but at the end of the day, we are a company about making sure that our customers have water, that they have it for their lifetime, that it's clean, that it's safe, it is affordable and it's there when they need it.

So with that, I will ask Walter and Linda and Sharon and Ned to come up here, and we are going to have about 30 minutes for Q&A. And by the way, when we finish Q&A, we will stop the webcast. But if you can stay three extra minutes, we have a special gift, surprise for those of you who will stay three minutes after the meeting is over. We are going to celebrate the diversity that is American Water and how we prepare for an earnings call caught in a short video. But before then, we've got Q&A. Yes. Oh, and if you would wait for the microphone so that we can pick this up on the webcast.

QUESTION AND ANSWER SECTION

<Q – Richard Verdi>: Thanks. Hi. Good morning, guys. And, first, thank you for today. A lot of great information. My question is for Ned. Ned, I'm Rich Verdi with Ladenburg Thalmann. I asked this on the Q3 call and I'm still not quite clear today. When I look at Halliburton and Schlumberger, they throw their arms up in the air as to when a turnaround will be. Some say it's 2016. Some say it's 2017. Same with the frac guys, U.S. Silica, Hi-Crush. But at the same time, you guys are citing accretion next year and such a favorable outlook. So, I'm wondering what is it that differentiates Keystone from all of these other major players in that space.

<A – Ned Wehler>: Well, let me try to answer that as simply as I can. I talked about the growth of takeaway capacity. Projects being built today coming online will add 23 billion cubic feet per day of takeaway capacity in 2016, 2017, and 2018. Our customers have entered into agreements to supply gas to those projects. Our customers have obligations to supply gas to those projects. We believe those projects will be driven by demands that are growing in the East, that are growing throughout the U.S. from the sources that I cited.

Another point, even [ph] flat (02:19:22) production because of decaying flow rates from wells requires new wells. The increased takeaway capacity is another demand for new wells. The net growth of demand is a case for new wells. So, there's quite a number of drivers affecting the opportunity in the Northeast United States, which has the ability to produce gas at lowest EUR costs of all basins nationwide.

Schlumberger, Halliburton operate globally. They're very tied to the oil patch. They're very tied to offshore. I don't think it's all that analogous but naturally many of the headwinds affecting those enterprises affect us as well.

But for the reasons I've given in general and because of forecasts for demand growth from current production of about 17 billion cubic feet per day to about 30 billion cubic feet per day from the Northeast, which is a takeaway business in and of itself in the Northeast compared to other production areas nationwide, those factors will drive the growth that we are talking about.

<Q – Richard Verdi>: That's perfect. Thank you. And if I may, just one follow-up, too, Ned. You guys have mentioned about the future of, I guess, it was renting and leasing the equipment and how it would be somewhat equivalent to take or pay. So, I'm wondering what the customer base looks like because when I think of take or pay for a lot of these other players in this energy space the past year, it actually didn't pan out so well for them. So, I'm wondering how you guys enforce it? What is the customer base? Are they sizeable enough, customers where you can pressure them to enforce it? Just some color would be really helpful on that.

<A – Ned Wehler>: The customers that we're talking to and that we consider prospects are those with water pipeline infrastructure needs. So, they're faced with a need to either invest their own capital and incur those costs or consider use of their own capital for E&P and allowing a company such as an American Water subsidiary to provide the capital and own the asset as an alternative. That alternative source of funding is very attractive to the companies. And the take-or-pay elements, so to speak, is really an appropriate level of lease payment in return for the capital investment and the construction of that asset basically financed and funded over five years.

Besides the internal or the after-tax return that is attractive in these deals, we also have the opportunity to build these projects and earn our ordinary margins on construction. We have the opportunity to operate and maintain the pump stations and the pumping operations for five years or more. And because these artery systems and limited [ph] storage (02:22:51) are operated by our personnel, we sit in an ideal position to further our water transfer business and our water storage business with those same customers. So, it's truly a significant method of securing and stabilizing increased margins, increased revenues with these customers.

<A>: And as we continue to look at this, what we look at is the financial strength of those customers is a big piece of that equation as well, Rich.

<Q – Richard Verdi>: Thank you, guys.

<Q – Ryan Connors>: Good morning. Thanks for hosting. This is Ryan Connors with Boenning & Scattergood. I want to talk about the five-year plan for the regulated business and specifically the portion that targets a 2.6% CAGR and rates customer bills. And presumably, that acts as a bit of a governor on the growth and the rate base and the earnings and maybe limit some potentially worthwhile projects. And yet if you look at the government data, that's only about half of what water rates are growing nationally, and that's been going on for a decade or more and shows no sign of letting up. So, the question is as the industry leader, why not use that air cover, so to speak, to go for a little more aggressive number on rate base growth and bill growth?

<A>: It's a great question, Ryan. Yeah, we constantly look at this, and we try to gauge what's right for our customers. And we know that some other segments are growing at a faster pace, but we think that 2.6%, given where we are right now in the economy, is the right investment level to make at this point. But again, it's something we constantly look at, reassess. We do have the added capacity. We can invest more. But again, the driving factor in those states are how much do we want to increase bills. And as we were able to reduce cost even more, then maybe we can invest more. And that's the challenge that we have to our teams in the states.

<A>: And the fact that we couple that, well, this is a decade-long basis, is that you don't rush and do that and then hurt yourself down the road. If we can be very good stewards of our customers' money, then long term, we think it's better not just for the customers but for the financial integrity of the company.

<Q – Steve Percoco>: Hi. Steve Percoco, Lark Research. I'm sorry. I was not on the past two conference calls. So, Ned, how much environmental risk is there in your existing business model and in the new one that you're contemplating? And is it appropriate for you take on any environmental risk given that it's a different business than what American Water is traditionally in?

<A>: The primary environmental risk I would describe related to our business concerns the handling, the storage, the transmitting of produced water and flowback water, these are waters containing brine and other constituents. We're very careful about primary containment, secondary containment, very strong standard operating procedures, very strong, rigorous HSE program that overlies all of our operations with active inspections of every job site every week, daily job safety assessments that are done each day per shift to identify each and every environmental and safety hazard associated with the activity.

And I mentioned during my talk the orientation of the business towards engineered solutions, everything we build, everything we do is technically driven, technically specified, written in an SOP with our personnel fully trained. Besides that, we have very durable, very environmentally appropriate materials that are used for storage, for secondary containment, for operations to keep environmental exposures to a minimum.

I would say that our exposures concern risk of spills. We've had an excellent no spill history, not that we have not had a spill. Spills we've had have been very minimal, have been very low, low risk, low issue. And because of the procedures, we've been very successful at keeping that to a minimum.

Finally, we've kept the company away from the business of deep well disposal. It's a long-term liability issue. It's a seismic issue of concern that we've chosen to steer clear of. We've been leaders with our customers in fostering reuse methodology, reuse technology, water filtration, blending and automation tools, all of which we believe leads to reduced environmental risk.

<A>: A couple of three things to add to that, on the recycling/reuse, the National Governors Association actually passed a resolution actually encouraging and promoting 100% recycling/reuse, which is a goal that we share. Number two – and that we do in our own services, and are pushing it for the entire industry.

Number two, the 300 employees who work for Keystone Clearwater, unlike several of the competitors who bring people in, they live in hotels and they leave when the job's gone, they all live in this community. These folks have been there. They're locals, and that really makes the difference culturally. The third thing is from a legal standpoint, we're doing everything we can at Keystone Clearwater to mitigate environmental liability. However, the corporation, when we brought Keystone on, it is ringfenced legally.

And there was actually a Supreme Court case that almost laid out a primer as to how to do that to insulate the parent company from activity on well side. We followed that. It is – while they were subsidiary, it is a basically a pull rather than a push, for example, we don't automatically push all the services that the service company [indiscernible] (02:28:58). They can ask for what they want, too, or go outside. Their auditors are different audits firm for example, but our company auditors audit their auditors. So, not only are we doing everything operationally, but we're also looking culturally and legally.

<Q – Brian Chin>: Hi. Brian Chin with Merrill Lynch. According to the growth pyramid, obviously, the regulated investment CapEx piece, the bottom end of the range has been lifted a little bit. Just to clarify, has that increased the bottom end come from the inclusion more of wastewater potential opportunities? And did you have wastewater to the same degree that you had in the prior growth pyramid or is it that you had wastewater and basic water services together in the old pyramid and simply just the growth of opportunities has expanded?

<A>: Or other, right?

<A>: Yeah. The regulated investment, really, is just, as I said, it's upgrading our water and wastewater facilities. It's investing in our pipe infrastructure. A portion of that is wastewater. And as we continue to grow the wastewater, obviously that'll become a bigger part of our investment. But at this point, it's 95% water. But again, the focus on wastewater will become a bigger part. Does that answer your question?

<Q – Brian Chin>: That does. So, the incremental amount to think about here is that the wastewater opportunity is growing faster than the water piece. You're now feeling more comfortable to include that in the definition here of where the trajectory could be.

<A>: Absolutely.

<A>: And wastewater, there are a lot of consent decrees out there and it's more expensive. And there are more requirements, typically, for distressed wastewater system than in water system when it's sold.

<Q – Brian Chin>: And then, one last question on this and I'll go back in queue. You mentioned that there was some legislation that was passed a few years ago in Pennsylvania where you would combine wastewater and water together in the same tariff. Based on that experience, did you find that the combination of the tariff provided a greater degree of opportunity capture in Pennsylvania? And can you talk about that vis-à-vis other states, is there an opportunity there?

<A>: Absolutely. And I've been mentioning a whole lot [indiscernible] (02:31:04). But it's [indiscernible] (02:31:06) onto the MOU. That was a perfect example. We have the water system for decades. We were going to – we're moving forward to wastewater system. The ability to combine those rates provides tremendous opportunities for us in Pennsylvania, where before it was a stand-alone. And if we invested a significant amount of money to buy it and then upgrade it, it will just be on those customers. Now, because we have 670,000 customers in Pennsylvania. We are able to share those costs across the entire customer base on the water side and the wastewater side. So it just provides tremendous I think choice for the municipality to stay and instead of doing this on our own, we can sell through American Water and they can integrate it into their systems.

<A>: Brian, if I could add to that, that really is what Act 11 was about. It's to address issues like Scranton is facing right now, to where if you have capital upgrades that or you're under a consent decree to where you cannot address those with the existing customer base. This makes it an affordable solution for customers going forward. And if you look at our growth in the 2015 activity, call them about two-thirds of the acquisitions are wastewater acquisition.

<Q – Michael Lapides>: I'm Michael Lapides of Goldman Sachs. Just curious, what's in the guidance for 2016, for rate release and what's in guidance for the year-over-year change in O&M?

<A>: In O&M?

<Q – Michael Lapides>: Yes.

<A>: Okay. So, what we do is we step back and we look at our rate case strategy and we factor that into our 2015 guidance. And so that is based on a lot of different factors but it's where we are on the district mechanisms in states, where we are, how long it's been since the last rate case. But what we have been seeing, if you've followed us over time is that, there was a time when we were doing 10 rate cases per year.

The last couple – this year, 2015 we were looking at three to four rate cases. And going forward, we would expect to see a smaller amount like that of rate cases going forward. But the timing is going to depend upon each particular state and the financial condition of that state in terms of the timing.

<Q – Michael Lapides>: Can you quantify? I'm just kind of looking for a number simplistically.

<A>: [indiscernible] (02:33:31)

<Q – Michael Lapides>: Is there a – hey, we make an assumption of X to Y amount in rate [indiscernible] (02:33:39). And then on the O&M side, we assume flat, down, up directional.

<A>: It's embedded in the 12 to 14 [indiscernible] (02:33:49) that we have in the regulated business. But [indiscernible] (02:33:54) will be disappointed if you didn't ask it four different ways.

<Q – Michael Lapides>: Yeah. Okay.

<A>: That's just [indiscernible] (02:33:57). And then, on the O&M savings, what we are really doing is we are managing the business to keep our costs flat to the extent that we can, which means that as we have escalation in our cost of 3% or 2%, 3% per year, we are managing the cost flat, and that is really what we work to bake into our plans. As you know, we have a target O&M payout –

target O&M ratio of 34% by 2020. At the end of the third quarter, we're at 35.8%, so we're working our way towards our goal.

<Q – Michael Lapides>: Got it.

<A>: And when we say we, looking at Bill Varley and Rob MacLean over there, they're the ones driving the cost reductions in the state. We play a big role in the service company and putting the guidance out there. But it's really delivered by these guys right here and the people in the field that I spotlighted before.

<Q – Michael Lapides>: Okay. And one follow-up really on Ned's – on Keystone business, but this probably a joint Ned and Linda question. If I assume the purchase price as the main invested capital, what is the return on capital you're expecting to earn out of that business?

<A – Linda Sullivan>: So, that's a fantastic question. The way that we look at it – and I'm not going to be able to give you specific numbers. But what we do when we make investments is we look at the risk-adjusted return of the business. And so, we have, as I mentioned earlier, we go through our capital allocation. We go through a strategic filter first. Keystone passes that. Then we go through financial filters, and they would include filters that you would typically see in terms of hurdle rates. We would look at the risk associated with the business, and we would adjust the hurdle rate based on that. And that's the way that we look at our investment in Keystone. And then again, we have EPS neutral 2015. We do expect to be EPS accretive in 2016.

<Q – Dan Eggers>: Dan Eggers, Credit Suisse. I guess, just maybe on the M&A slide, it's like, for those many years we've covered the stock, there's always been the M&A opportunity in the fragmented business and all that sort of stuff. You said that's great prospect and the conversion of that into it. A lot of growth has not been as linear. What do you guys have seen in the market today that give you more confidence to continue to sustain that 1% to 2%? And what's the change in receptivity at the local level to make those deals more viable now?

<A>: As I covered in my talk, the municipalities, the mayors, they're looking for options, and many of them sold everything they can sell, and the remaining is their water systems and wastewater systems. I think the legislation that we helped pass in each of the states is enabling those acquisitions because to give you an example, in Illinois, before the water systems liability act took place, that was about three years ago, all we could pay was the original cost minus depreciation. So, the system may be valued on the books $1 million, but as a appraised value of $10 million, we couldn't pay $10 million. If we did, we'd have $9 million of premium in that. So, now, we're able to get an appraised value of that system, be able to pay $10 million and put $10 million in the rate base. That's a significant change in the landscape. In Illinois, we have similar legislation across our footprint. So, that's where municipalities, mayors, have now options, where before they didn't because they couldn't even look to sell that. And that's what's contributing to a lot of the discussions going on. I think Scranton is another perfect example of that.

So, it's a combination of they are facing challenges, and now they have options and they're exploring options. And in our discussions with them, we believe that a viable option for them is to sell their water and their wastewater system. We weren't pursuing wastewater like we are now three years ago. But now we are.

<Q – Dan Eggers>: So, I mean, the slides shows big potential sample set of customers you could acquire. Can you quantify maybe how many are in advance talks versus prospective talks where kind of saying what is the backlog of real identified opportunity rather than the big picture number?

<A>: Yes and no. They're all real opportunities. They're all in our footprint, within our states. I wouldn't have put them on there if I didn't think they were viable opportunities, but they're anywhere for the next one to two years that we feel like they're real opportunities. But a lot of things have to happen along the way to really close those deals. But I just wanted to give you an indication. These are the size opportunities and the real opportunities, and we're working on them, and the majority are wastewater.

<A>: And Dan, I mean, you're exactly right. So, it's not like we think the flood gates are going to open and people are going to be knocking on our doors. There's two things. One is there's a reason our sweet spot is [ph] 5,000 to 30,000 (02:38:51), for example. Really large municipalities, tend to have more resources, for example.

When you look at where communities are constrained, and you look at where they have pension obligations, or they need to build parks, or there's schools, or there's roads, the first part of the equation is there's a need for them to have capital. But the second part is, when you're talking about water, wastewater, fundamental services, they've got to trust that their citizens are going to be taken care of. So, as Walter said, it's [indiscernible] (02:39:22) need there? And if the need is there, is there a trust there? And that's why not just having the best price, but where we can demonstrate that we treat our customers well, that our service is excellent, that our reliability is excellent. So that they know not only can I get money to solve my financial problems, but I'm not going to have more headache dealing with a new water or wastewater company.

So, it is very tactical. It is not broad-brush effort and that's why our team in each state, to state president, their staff, we have leaders in every community. They are involve in the community. They coach little league. They coach whatever. It's not going to somebody I don't know where the headquarters at Voorhees, New Jersey. These are the people that my kids go to school with. So, this is not a short-term big broad-brush effort. And we get that.

<Q – Dan Eggers>: Just one more on the homeowners services business, the kind of rate of customer growth looks like? What it has been the last five years but more large numbers gets harder over time where you can't grow the same rate forever? What do you see that's helping to sustain the law of large numbers? Is the affinity group kind of has signed off of NYC and things like that that's driving the opportunity or is there something you're seeing that's kind of change in customer interest?

<A>: I really think it's around the municipal partnership with the larger cities. Just last week, we were in Los Angeles, a week before we were in San Francisco. And next week, we were in Chicago. These large cities are interested. They're looking at New York. They're seeing how it's helped their customer satisfaction just like it helped the customer satisfaction in our own utility. Not only can we bring in the excellence of how we run the program, but there's a revenue share opportunity for the city. So, that's certainly interesting to them as well. And the really large cities have yet to park. And again, as I mentioned earlier, I feel we're really well-positioned because we are the only water utility offering this. And they look to our experience in the utility sector and it gives them, even though it's a warranty program, it gives them more confidence, and we have a little more credibility than we think our competitors do especially at the larger cities. And when you look at the success we had in New York that we can do the same thing in those cities I mentioned, it has a huge impact on that trajectory that you saw especially in the past three years since we introduced New York. That's driven a lot of that growth that you see in that contract over the past three years.

And one thing we bring that our competitors don't and Sharon alluded to this, so the R&D group we have with [ph] 20 scientists (02:41:55), when we're working on things, our municipal customers we partner with can have access to that. We had an innovation day with our R&D group, and we invited several of our municipal customers both from contract services and homeowner services to come and participate. So, they are dealing with some or the same issues from the water, wastewater utility as a municipality. So, with us, they not only get the warranty program, but they get an expertise from a leading company that leads the industry in research and development and product. And so we help them in their base business also. That's something that most of our competitors who weren't water utilities can't do.

<Q>: Hi. [ph] Phil (02:42:36) [indiscernible] (02:42:36) Asset Management. Can you just give us some perspective on the homeowner services? What is a typical contract cost to a homeowner, if you're going to have two contracts employed? If you can just give us some sense on what the dollar amount is in retrospect to some of the other utility bills they might be paying.

<A>: Yeah. So, the range is really very broad in New York City. New York City wanted to keep the price of the contract well. So, they and their partnership said, we don't want any revenue share. We don't want anything out of this. We want customers to enroll on this program. So, in New York City, water line protection is $3.99 a month. You can go into some other markets where it's probably up to $5.99 a month. So, that's sort of the range for water line. Sewer line is probably $2 more approximately. And we sell those products often in what we call a sort of a combination program. So, if you take two, the customer gets a reduced cost. And those can range anywhere from $7.99 to $12.99 depending on which market we're in. But the claims expense might be in certain geographies so there is sort of a broader range.

<A>: And I think that's a really important point because when we go into a new area, what we do is we look at that area from a risk management perspective. And that plays into how we price that project or process.

<A>: Yeah. We have a pretty – we have a very sophisticated claims model that looks – that I talked before about our model to how we market. We also do that on how we, from a due diligence perspective, look at a geographical area to get an idea of what the claims cost might be in the market. And that, of course, helps dictate what we might charge for the programs in that particular marketplace.

<Q>: And then you talked about potentially adding another 1 million contracts for the next five years. Can you just talk about the scalability and the leverage of that business? Are you able to add 1 million new customers and keep the O&M growing at a store rate how – can you describe kind of how much – what the capacity is of adding 1 million contracts? Will you see [ph] this in the future (02:44:42)?

<A>: We think we – we definitely think we have the capacity to do that. Just in the fourth quarter, and [indiscernible] (02:44:47) on one of slides. We just added another 150 seats at our call center. We sub-contract. So, it's not like we have to go out and hire contractors to service those contracts or claims. We go out and we sub-contract with contractors. So, it's really pretty easy for us to open up a new geography and to be able to support the claims. But we do a very good job with keeping those contractors, in line, in managing their cost. So, we really feel we have a lot of opportunity and runway to scale that business.

<Q>: And then just one last final question, you mentioned you have 10 industrial clients. And if you look at the customers, they are pretty high-profile clients and customers. Can you just kind of discuss that market opportunity there? It seems like there's a couple of large pockets where industrial growth is picking up in this country, and it seems like based on the full suite of services that we offer, that that can present a good opportunity that we can go out there. And so, can you just talk about how that plays a little bit into your growth? I believe the majority of the focus was on the military side and on the homeowners side, but how about the industrial aspect of it?

<A>: So, the industrial customer is very interesting but what we've learned is that [audio gap] (02:46:00-02:46:03) smaller, say as opposed to a municipal opportunity. Just because of the scale or size of those opportunities tends to be a little smaller where we're seeing the momentum there is more around the emerging technologies.

So, Frito-Lay for example, they wanted to build a green plant. We have a full reuse system that we did at their SunChips plants, where they wanted to be able to sort of profile that we're very green as a company.

So, that's more on – we're seeing more opportunity from a profitability standpoint with more serving industrial customers with emerging technologies. What we don't want to do is being an O&M business that's a race to the bottom, where we have to take all the risk. That's the business we don't want to be in. And so we're really very smart and focused about the clients and the customers that we're going after. And again, we think the opportunity is probably more around the technology space, serving industrial customers than the pure O&M space.

<Q>: Thank you.

<A>: [ph] Steve (02:47:00)?

<Q>: Yeah, just if we could have bonus depreciation extension how would that impact 2016 plan if at all?

<A>: So, Steve, it depends. But I think if we just step back from bonus depreciation, the intent of bonus depreciation is really to allow companies to be able to invest additional capital. As you know, we're in a net operating loss position currently. So, to the extent that we could continue to utilize our net operating losses in the future, we think it could be a good thing for us. And then what we would do is we would look at each of our states and determine where we think it would be good for us to elect bonus depreciation. There are some states also that do require that we would elect bonus depreciation.

<Q>: Okay. And then just the – one thing we're seeing in the electric side is a lot more kind of big companies buying smaller companies, and why it can obviously – that's not a focus of your strategy at least as outlined today. Just curious, is that something you would look out within the water sector? You are the biggest of the group.

<A>: We, we do a lot of strategic analysis. We have executive leadership team strategy retreats every year. We look at all options always. And we put a disciplined process around those to determine what we need to focus our resources on each year.

But we don't have really anything off the table when it comes to the regulated side. Of course, we are very careful on market base that we don't get outside of our core competencies. But from the regulated side, we're always looking at everything.

<Q>: Lastly, just on Keystone, how are you going to provide disclosures on how the business is doing for 2016? Like are we going to able to track the accretion or not? And what's the plan there?

<A>: We will be reporting Keystone as part of our market-based business segment. And so, it will be included in that business segment. As I showed the growth revenue for Keystone for the full year of 2015 is expected to be $70 million. The total revenue before Keystone for the market-based businesses was about $350 million. So, it's a small piece of our market base business, and we will combine it in that business segment. But we will validate or invalidate what we have told you. Just like we affirmed that we felt the EPS for Keystone would be mutual this year, we affirm that during this presentation. We will do that next year also as we go through.

<Q>: I appreciate the hesitancy in revenue guidance and disclosing revenues, but from my perspective, from a longer term, there's the issue with the regulated side with customer growth far less than 1%. You've got 5% earnings growth assumption, let's say, taking the middle of the range. The question is if that's commensurate with revenue growth, you're talking about raising bills by 5% per year presumably going forward. And the question is how long can you press bills at that level especially now with inflation far below that?

<A>: Well, what – go ahead.

<A>: I was going to say one of the things that is really critical to our strategy is managing every dollar that we spend. Walter talked about the $1 to $6 equation. So, for every dollar that we can save in O&M, we can spend $6 in capital and have the same impact on our customer bills. And so, that is really how we manage the business going forward and how we manage the balance between the capital investment needs and the cost for our customers and the affordability for our customers.

<A>: We don't give revenue CAGR, everything you saw was EPS CAGR. And those savings that we get in O&M, they flow back to our customer in the next rate case.

<A>: And what they do is create a headroom for investments. As we can continue to invest $1.1 billion a year on average, it only increase customer built in those five states, about 2.5%.

<Q>: Just questions on the acquisitions in the regulated business. I understand all the footprint, the adjacent footprint and regulators and relationships with mayors and all that. What are the metrics? What do you pay per customer? What do you expect to – that customer to throw off in terms of cash flow? What sort of returns? How are you going to fund the acquisitions? You apparently want to maintain the 55/45 mix in the capital structure?

<A>: You want to start?

<A>: Sure. No firm metrics as far as what we pay. It all depends on what the system is comprised of, some wastewater treatment facilities or if systems have big water treatment plants, some have multiple facilities, some are just valued different than others. So, there's really no one metric that we look at. We value the systems based on unique characteristics of our systems.

<A>: And then we look at those investments being rate-based investments. So, ultimately in our next rate case, they would go into the rate base rate of return model for that particular state.

<A>: And when we do buy them, we look at what the market is paying. We look at for example, time, the rate day times and we do look around it, other type of acquisitions and ensure that we're in the market.

<Q>: One sort of unrelated question for Ned. On the – when you're building one of the systems, the build, design, own, operate things, what sort of rates of return are you looking at in terms of an unlevered rate of return?

<A>: So, we are not providing that information, but what we do is we look at it from a risk-adjusted standpoint. I think Michael would ask in a [indiscernible] (02:53:26) in a different way.

<Q>: I'm thinking of another way to ask that. A lot of the pipeline companies when they're building pipelines are looking at mid-teens return, cash and cash returns. Would you say, you're in line with those, better than those, worse than those?

<A>: So, let's say that this is a very competitive business. And we manage the returns in a very competitive way for this particular business. But that was a really good try. Yes. Yes, it was.

One last question I think from the webcast [indiscernible] (02:54:07) we're trying to wrap it up, okay?

<Q>: Can you guys just talk a little bit about your capital allocation back to shareholders? In 2018, you'd begin to become cash flow positive. Any thoughts on potential share buybacks, how do you guys think about that or do you have any other plans with the free cash as it comes available in 2018?

<A>: So, what we do is, we will look at – first of all, stepping back, what we do is we are in this business for the long term. And so, as we begin to throw out cash, we will look at what is the best and highest use for that investment. Generally, that has been growth in our business and then we also look at dividends to our shareholders, and then we balance that with stock buyback as well because in most utility, the holders are people who want to use it at retirement. They like the dividend. They also like the growth in our situation. So, as Linda said, our actions will be based on the long term not short term.

<Q>: Thank you.

Unverified Participant

And if we could wrap up the webcast, if you've got three minutes...

[Abrupt End]

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EDITED TRANSCRIPT

AWK - Q4 2013 American Water Works Company, Inc. Earnings Conference Call

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PRESENTATION

Operator

Good morning, and welcome to American Water's year-end 2013 earning conference call.

As a reminder, this call is being recorded and also has a webcast with accompanying slide presentation through the Company's website at www.amwater.com. Following the earnings call, an audio archive of the call will be available through March 6, 2014 by dialing 303-590-3030 for US and international callers. The access call for the replay is 4662798.

The online archive of the webcast will be available through March 28, 2014 by accessing the Investor Relations page of the Company's website located at www.amwater.com.

I would now like to introduce your host for today's call, Ed Vallejo, Vice President of Investor Relations. Mr. Vallejo, you may now begin.

Ed Vallejo - ***American Water Works Company Inc - VP IR***

Thank you. Good morning everyone, and thank you for joining us for today's call. As usual, we will keep our call to about an hour, and at the end of our prepared remarks we will have time for questions.

Before we begin, I would like to remind everyone that during the course of this conference call, both in our prepared remarks and in answers to your questions, we may make statements related to future performance. Our statements represent our most reasonable estimates; however, as these statements deal with future events, they are subject to numerous risks, uncertainties, and other factors that may cause the actual performance of American Water to be materially different from the performance indicated or implied by such segments. Such risk factors are set forth in the Company's SEC filings.

Now I would like to turn the call over to American Water's President and CEO, Jeff Sterba.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

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Thanks, Ed. Good morning to you all, and appreciate you joining us this morning.

Before going into the main topic for our call today, which is to discuss 2013 results, I think it would be useful to provide you some summary information on the Freedom Industries' chemical spill into the Elk River in West Virginia. Let me ask Walter Lynch, our President of Regulated Operations, to provide a brief summary of what happened, how West Virginia American Water responded, and the current state of the system. Walter?

Walter Lynch - ***American Water Works Company Inc - President of Regulated Operations***

Thank you Jeff, and good morning everyone.

As most of you have been following this event over the last month, I'm not going to go into the timeline and details of the Freedom Industries spill. But rather want to provide you a brief overview, as Jeff said, of how well West Virginia American Water responded and where we currently stand.

As you may know, this is a very complex system with over 175 pressure zones. The average water system has about two to five different zones.

We are extremely proud of how our people responded in a difficult situation. Throughout the period following the Freedom spill, while federal and state emergency declarations were in effect, we provided our approximately 95,000 customers, about 300,000 people in nine counties, with water for basic sanitation and fire protection. This was done while dealing with the impacts of the spill.

Being able to provide these critical services to our customers was one of the reasons that it was necessary to keep the plant up and running during the event. On January 9, the date of the Freedom Industries' chemical spill, we consulted with the West Virginia Bureau for Public Health, and together reached the joint decision to issue a Do Not Use Order for drinking, cooking, or washing to our customers in the Kanawha Valley system, again affecting approximately 95,000 customers, or about 300,000 people.

During this time, West Virginia American Water also consulted with state and local public health officials and the Centers for Disease Control. This quickly led to an interagency team being formed in West Virginia comprised of West Virginia American Water employees, National Guard members, and representatives from the West Virginia Bureau for Public Health, the Department of Environmental Protection, and Kanawha County officials. Now, internally in American Water we formed an event management team to leverage our scale, expertise, and resources from around the country.

To give an example of some of the things were able to do. We deployed water tankers and truckload's of bottled water to assist at the bulk water distribution sites. We also secured large quantities of activated charcoal and potassium permanganate for use in the treatment process in addressing the chemical spill in the chemical there at Freedom Industries.

We added resources at our two national customer service centers, and we gave our West Virginia American Water customers priority service during this time. We were able to get 40 water quality specialists from throughout American Water working with our customers to address the water quality questions that our customers in West Virginia had.

We conducted extensive and continuous testing of water in the impacted areas, and this included river's raw water, finished water leaving the Kanawha Valley Water Treatment Plant, and hundreds of points across our distribution system. Working closely with federal and state health agencies and regulators in this massive sampling and testing program, we were able to lift we Do Not Use Order in stages over a five-day period beginning on January 13.

As of today, all points of testing throughout the water distribution system showed a level of MCHM Freedom Industries' spill are below 10 parts per billion. Now, 10 parts per billion was established by the interagency team as a non-detect level of MCHM in the water distribution system.

This was based on the measurement capabilities of the multiple laboratories used during the event. This is 100 times below the 1 part per million standard established by the Centers for Disease Control that was used as the basis for the lifting of the Do Not Use restriction.

We continue sampling water in our distribution system, and since February 14, from working with laboratories to measure levels down to 2 parts per billion, as we help address remaining odor issues from the Freedom spill. We know that odor has added to customer concern, regardless of levels, and we are going to continue to test and flush our distribution system to address this issue.

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We have also decided to provide our residential customers with a 1,000-gallon credit to allow them to flush their water system without cost. This equates to approximately 10 days of normal water usage for our average residential customer in West Virginia. Additionally to aid small businesses in this difficult time, we're providing a financial credit equivalent to 2,000 gallons to approximately 5,300 commercial customers.

Throughout this event, our primary focus has been and remains the safety of our customers and our employees. We remain fully committed to working with the federal, state, and local officials to provide information, address concerns, and protect our customers' tap water.

I want to thank our West Virginia American Water team. They've worked around the clock since this event began on January 9, and they continue to do so because of their dedication and their commitment to our customers.

With that, I will turn it back to Jeff.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

The Freedom Industries chemical spill, as you all know, is a serious event and it placed the water supply to almost 300,000 people at risk. As Walter said, we are very proud of our folks at West Virginia American Water and how they responded to help ensure fire protection and basic sanitation, as well as bottled and bulk water for consumption starting the next morning and through the recovery period.

This incident should be used as a catalyst for public policy discussion about protecting source waters from contamination from fixed and mobile sites. As a water utility, we take our responsibilities to meet or exceed all regulations very seriously, and we are proud of our record doing such.

It is not our role to establish those regulations; that belongs to governmental agencies. But we do hope that constructive engagement can occur on increased tank safety, provision of greater information to water utilities on tank contents, and stronger communication linkages between regulators, tank operators, and water utilities.

As you may know, there is over 100 known contaminants that are regulated and that we protect customers from, and about the same number of what are called emerging contaminants, which are being evaluated and we are actively studying. But there are also about 85,000 unregulated chemicals in the EPA toxic inventory and hundreds of thousands of other compounds not registered, including one stored in fixed and mobile tanks like the MCHM and PPH involved in the Freedom Industries chemical spill.

Water systems cannot detect, much less protect customers from all of these. That protection must come from ensuring such leaks, if they ever do occur, cannot enter source waters.

With that as a kind of a brief summary, let's turn to our 2013 year-end results. If you go to Slide 6, you can see that we continue to advance not only our numbers, but our strategic growth initiatives, improve our operational efficiency, and generate strong financial performance despite cooler, wetter weather across much of our service areas.

You can see our operating revenue increased year over year to $2.9 billion, and our adjusted earnings from continuing operations, excluding a one-time charge of $0.14 per share, was $2.20 per diluted common share compared to $2.11 per share in 2012. If you take into account the weather differences between the states, 2012 earnings were benefit by hot, dry weather that was worth about $0.14 per share, while 2013 earnings per share was adverse due to cool and wet weather to the tune of about $0.05.

In addition, we reported cash flow from operating activities of almost $900 million compared to about $950 million in 2012. This decrease was primarily driven by some working capital changes, and Susan will cover this in more detail.

The adjusted ROE decreased slightly from 8.42% in 2012 to 8.29% due to the weather difference. If the difference in weather is taken into account that we talked about earlier, the 2013 ROE exceeded the earned 2012 ROE by about 56 basis points.

Turning to Slide 7, let me just speak briefly on how our results compare with the goals we set out to achieve at the start of the year. On the regulatory front, the Company received authorizations from general rate cases for an annualized revenue increase of approximately $41.5 million.

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We also received about $49 million in additional annualized revenues from infrastructure surcharges in several states. This is the first time that the amount of surcharge revenue has in fact exceeded the amount of rate case-related revenue, which ties, as we've talked before, to moving to a much higher percentage of our CapEx being recovered through infrastructure surcharges, looking at something in the 60% range as we move into this year.

As of now, we are awaiting final orders in three states in response to our request for additional revenues on an annualized basis. Those cases amount to about $58.4 million.

On the cost side, we achieved our O&M efficiency ratio goal of under 40% system-wide by 2015 two years early, with a ratio of 38.7% for the 12 months ending December 31. The commitment to continuous improvement and process excellence is really becoming ingrained in the fabric of our culture.

Just last year we had more than 400 employees applying new skills in more than 180 specific projects that were completed last year, generating savings of over $10 million annually. That doesn't include the $12 million of savings coming through supply chain initiatives. In fact, as we talked about in December, our five-year plan will generate operating cost savings of over $900 million in the five years from 2014 through 2018 compared to business as usual, and our goal is to further reduce the O&M efficiency ratio on average across our system to 35% by 2018.

Capital expenditures for the year totaled $950 million for needed system improvements to provide reliable service to our customers. We know that as we drive efficiency into our operations, we can enable more of the needed investment in the aging water infrastructure without putting undue burden on the water bills of our customers.

Lastly, 2013 was a year marked by growth, as evidenced by adding about 30,000 customers to our regulated customer base, through the acquisition of 10 water and 5 wastewater systems. It is also important to note that 20,000 of those customers were obtained through an acquisition of Dale Services Corporation wastewater business where we already provided water, and as we've talked about, that is one of our key strategies going forward. We also expanded our homeowners services business into 10 more states and launched our service line protection partnership with New York City, as well as announcing partnerships with Houston and Nashville.

As we look to 2014 on the next slide, we are reaffirming our annual earnings guidance that was provided on December 17 to be in the range of $2.35 to $2.45 per share, excluding the impact of the Freedom Industries chemical spill. The impact of that spill through earlier this week, February 26, 2014, is estimated to be $0.02 per share.

We remain confident in our ability to deliver on our long-term EPS growth goal of 7% to 10% through the execution of the growth strategies that we discussed in December and continued operational efficiency gains.

With that, let me turn the call over to Susan Story for a more detailed report on our financials.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Thank you Jeff, and good morning to you all. It is a pleasure to be here with you today to review the year-end 2013 results.

Jeff has already reviewed many of the key highlights. I'll just now take a few minutes to discuss the drivers of our 2013 results in more detail.

Turning to Slide 10. As Jeff mentioned, our 2013 results reflect the wetter, cooler weather conditions in 2013 as contrasted to the hot and dry weather we had in 2012. Despite the unfavorable weather conditions, 2013 was another year of solid financial results with increasing revenues, as well as continued progress in operating efficiency.

For the year ending December 31, 2013 we reported operating revenues of just over $2.9 billion, which is approximately $25 million higher than in 2012. The increase was mainly a result of rate case resolutions and infrastructure mechanisms in place, which allow more timely recovery of capital investments in infrastructure. As we mentioned previously, this was partially offset by decreased consumption which was significantly driven by the wet, cool weather the year.

This past year, we've recorded net income from continuing operations of $369.3 million, or diluted earnings per share from continuing operations of $2.06. This compares with net income from continuing operations of a little over $374 million, or diluted EPS from continuing operations of $2.11 in 2012.

As Jeff mentioned previously, net income for 2013 included a charge recorded in the fourth quarter for the execution of a debt tender offer that we had announced in September of 2013 and that we close on in October. Excluding this $24.8 million, or $0.14 loss per diluted share, for the tender, our adjusted EPS for 2013 was $2.20 per share.

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The main drivers for our growth in 2013 were increased revenues due to rate increases, including the surcharge mechanisms that Jeff described, and lower O&M expenses. This increased revenues were partially offset by higher depreciation and amortization expense, and general taxes.

For December 31, 2013 we reported cash flow from operating activities of approximately $896 million compared to $956 million in 2012. There are a few reasons for this reduction in cash flow from operations, given changes in working capital which can be viewed in more detail in the 10K.

However, a special note, with the ERP implementation in 2012, we were delayed in executing accounts payable at normal volume. This is contrasted with the CIS implementations in 2013 which had the opposite effect, and resulted in some delayed billing and receivables.

This was due to the intentional decision we made to hold and review some billings, in order to ensure the accuracy of the new system before sending these bills to our customers. We expect our billing operations to be more normal as we progress into 2014.

Now let's discuss the different components of our income from continuing operations, starting with revenues on Slide 11. Again, I encourage you to read our 10K on file with the SEC for a more detailed analysis of both revenues and expenses.

Overall, operating revenues increased $25 million, or 0.9%, with revenues from our regulated business increasing by $29.5 million, or 1.1% from 2012. Regulated revenues were lower by approximately $64.5 million associated with lower demand year over year, in large part due to the unseasonably hot weather of 2012 that both Jeff and I talked about.

However, revenues increased approximately $72.4 million, primarily from rate increases obtained through rate authorizations awarded for a number of our operating companies. Additionally, surcharge and balancing accounts increase revenues by another $16.4 million.

Revenues were also higher by almost $10 million, $9.9 million, as a result of regulated acquisitions. The most significant was our New York acquisition in the second quarter of 2012, which brought in additional four months of revenue in 2013. Additionally, the acquisition of Dale Services by our Virginia subsidiary in the fourth quarter of 2013 also contributed to this increase in revenue.

For our market-based businesses, revenues for 2013 decreased by $4.9 million, mainly due to lower revenues of $17.3 million related to the termination of certain municipal and industrial O&M contracts which mainly occurred in 2012. Most of these contracts were ended as a part of our business optimization effort, which we have designed specifically to optimize margins in our contract operations.

Additionally, revenues from capital project activity associated with military construction decreased $8.4 million compared to the prior year, resulting from delays in project work which we believe will resume in 2014. These decreases were offset by a net increase of $4 million from price predetermination for several of our military contracts, as well as an increase of $16.6 million in our homeowners services revenues associated with contract growth, mostly in New York City. Parent, Elimination and other was $4.3 million lower compared to 2012.

On slide 12, total operating expenses for 2013 increased by about $4.1 million from 2012, roughly flat compared with the prior year. Operation and maintenance expense in the regulated business decreased $24.5 million, or 2.2%.

Within the regulated O&M expense category, customer billing and accounting expenses increased $3.4 million. This increase is primarily due to uncollectible expenses associated with aging of receivables, most of which is due to our CIF implementation, and to a lesser extent to rate increases during the year.

Operating supplies and services and the other category increased $7.3 million. Operating supplies and services cost increased $4.8 million, mainly due to higher contracted temporary labor costs, associated with both stabilizing and leveraging efficiencies for our ERP system that we implemented in 2012. The other expenses include casualty and liability insurance premiums and regulatory costs, which increased $2.5 million, primarily due to higher casualty insurance costs as a result of historical claims experienced and retroactive adjustments.

Production expense decreased $3.6 million, or 1.3%, for the year as a result of lower water production and sales during 2013. Employee-related costs, including salaries and wages, group insurance and pension expense, decreased $16.4 million, or 3.5%, for 2013 compared with the prior year, primarily due to decreased pension expense. These employee-related costs represent approximately 41.2% of O&M expense for 2013.

Maintenance, materials, and supplies decreased $15.2 million, or 18.8%, for the full year 2013. This decrease is mainly attributable to increased preventative maintenance expenses throughout our regulated subsidiaries that we performed in 2012, and we realized the positive impact of those expenditures in 2014.

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The market-based business decrease in total operating expense is mainly due to the termination again of those certain municipal and industrial operations and maintenance contracts in 2012, as well as the release of the loss contracts reserve of $3.8 million in 2013. In 2013, we also reported a higher consolidated depreciation and amortization expense of $26.2 million and higher general tax, parent, and other of $12.8 million.

The increase in depreciation and amortization was principally as a result of additional utility plant placed in service, including Phase 1 and Phase 2 of our business transformation project. You will remember Phase 1, our ERP system, was placed into service during the third quarter of 2012 and Phase 2, our CIS, or customer information system, as well as our EAM, or enterprise asset management system, was placed into service in two waves during the second and fourth quarters of 2013. The increase in general tax expense, is primarily due to higher property taxes of $5.2 million, most of which is the result of incremental taxes associated with our New York acquisition.

Turning now to Slide 13. To better explain the period-over-period difference in our earnings per share figures, we have the EPS bridge we began showing you last year. As you can see, we normalized our 2012 diluted EPS from continuing operations for weather and a foundation contribution, as we have shown you consistently.

Next, we outlined the various financial drivers which get us to our 2013 year-end number, most of which I have already described in the revenues and expenses discussion. The 2013 GAAP diluted earnings per share is $2.06. We have added back the one-time debt tender impact of $0.14, which brings our adjusted earnings per share to $2.20.

Just as we adjusted the 2012 reported EPS of $2.11 to $1.99 to reflect weather impact, we felt that for a weather-normal reference, we should now show the 2013 weather impact on our EPS. The midpoint of our 2013 weather impact is approximately $0.05, which we described in both second and third quarters. This is the number we will use for inclusion on our long-term EPS guidance wedge, shown on Slide 21 in the appendix.

As I mentioned, the other components were discussed earlier. We will be happy to answer any questions or provide further clarifications if we need to during our question-and-answer session.

Slide 14 shows our O&M efficiency ratio. For the full year 2013, we achieved a 38.7% ratio, which is a considerable improvement from the 40.1% ratio we had for the full year 2012. As we shared with many of you at our Investor Day this past December 17, our goal is to achieve a 35% O&M efficiency ratio by 2018.

Let me just talk just a moment about the impact of these cost efficiencies. This is demonstrated in our Indiana rate case which we filed last month.

Our filing in Indiana by Indiana American Water reflected a $7 million reduction in O&M expenses from 2010 to 2015. If we had allowed those expenses in 2010 to rise just at inflation, it would have been a 23% increase in O&M, or $15.7 million rather than a $7 million reduction.

We are very proud of that. The team in Indiana has done a great job, as have the teams across our entire service area.

Now let's look at recent regulatory highlights. Slide 15 shows the expanded rate case template that we introduced last year, showing formal rate cases awaiting final order, as well as listing any step increases or [de sic] filings which impacted the quarter or are still pending. As you can see from the chart, we received resolutions in rate cases in Michigan, Kentucky, West Virginia, and Pennsylvania in 2013 for an annualized revenue increase of approximately $41.5 million.

Additionally, $7.5 million dollars in step increases from prior rate cases became effective in early 2013. Infrastructure charges awarded in 2013 and in January of 2014 totaled $49.2 million, and represent the ability to recover capital which we invest to improve both infrastructure and customer service. As of February 26, 2014, we are awaiting orders for the general rate cases in three states, infrastructure charges in three states, and a step increase in one state.

Last year we created a new slide, an updated version of which you can find in the appendix, Slide 22, entitled Regulated Utilities, Rate Base and Allowed Return on Equity. Many of you have requested this data showing each of our regulated states, authorized rate base, authorized ROE, authorized equity, and the effective date of the rate [case issued].

These are historic cases, and we advise you to review the footnotes for a fuller understanding of the particular case in question. While you can never project how any new case will be determined, we hope this will help you understand our current rate environment.

Finally, as part of our commitment to shareholder value, on December 13, 2013 we announced that our Board of Directors declared a quarterly cash dividend payment of $0.28 per common share, payable on March 3, 2014 to all shareholders of record as of February 3, 2014, which continues our commitment to an annual dividend payout goal of 50% to 60% of net income, while growing dividends at a rate commensurate with earnings per share growth.

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With that, I'll turn the call back over to Jeff.

Jeff Sterba *- American Water Works Company Inc - President & CEO*

Thank you much, Susan.

On Slide 17 you will recognize the growth triangle that we introduced at the Analyst Day event in December to give you a sense of the components of our growth and their approximate size. The triangle components, as we discussed then, will change over time, and what you see here is our projected 2014 earnings, that achieve our estimated guidance of $2.35 to $2.45 per share, excluding the impact of the Freedom Industries spill. The impact of that spill, as we talked about, is estimated to be about $0.02 per share through February 26 of this year.

This is probably a 7% to 10% growth rate from 2013 results. We also are reiterating our comfort level with the guided 7% to 10% long-term earnings per share growth rate. As we've done more detail in our planning and progressed it the way we have, we can see the pathway much more clearly about where we will be able to generate that kind of growth, provide better service to our customers at an average annual rate increase across all of our states of about or below 2% per year.

Slide 18 was also in the Analyst Day presentation and provides the identification of specific things that you can hold us accountable for achieving during the year and that we will report progress on. At this early date in the year, all things listed there are moving forward on schedule.

Last, for those of you who may not yet have talked with him, let me take the opportunity to introduce Durgesh Chopra who is now working with Ed in investor relations. Durgesh came put of our New Jersey rates group, and I know he will do a great job working with all of you over the next set of years.

With that, we would be happy to take any questions you may have.

QUESTION AND ANSWER

Operator

(Operator Instructions)

Shivangi Tipnis, Global Hunter Securities.

Shivangi Tipnis *- Global Hunter Securities - Analyst*

Thank you guys for taking my question. My first question is, there is nice growth for your industrial volumes in Q4 sequentially, as well year over year. What kind of drivers for the industrial volume growth [quarter] and do we expect to see the same positive growth, even in 2014?

Jeff Sterba *- American Water Works Company Inc - President & CEO*

I'm sorry. We're having real trouble hearing your question.

Shivangi Tipnis *- Global Hunter Securities - Analyst*

Okay, sorry. Are you able to hear me now?

Jeff Sterba *- American Water Works Company Inc - President & CEO*

Yes.

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Shivangi Tipnis - ***Global Hunter Securities - Analyst***

Okay. There is a nice growth in your industrial volumes in Q4 sequentially as well as year over year. What were the drivers for the volume growth industrials, and do we expect to see the trend ahead in 2014 as well?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

If I understand your question correctly, you said the quarter-over-quarter fourth quarter, the growth, what was driving the growth and do we expect to see that to continue, is that what you're asking?

Shivangi Tipnis - ***Global Hunter Securities - Analyst***

Yes. I'm talking about the industrial volume growth.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Yes. What happened with the industrial volume, I mentioned that the customer information system implementation, we held several of the more complex bills, and it impacted industrial and the public sales more than it did commercial and residential.

So what we do is, if you look at our 10-K, while we look at billed and unbilled revenue, on water volume we just report billed water volume. As we were holding bills, we had somewhat of a delay in terms of the amount of industrial volumes that we were able to bill.

That's where you might see a little bit of a disconnect. We do expect that to normalize through the year.

We have gone through those bills that are complex, ensured that the new system was generating accurate bills, and we've released the majority of those. Now, we had two waves of implementation.

The first wave was in May. Those bills, we've released those. We're on the normal billing cycle. Our second wave was on October 20 is when we implemented it. So after the first quarter, we should see more normalizations there.

Shivangi Tipnis - ***Global Hunter Securities - Analyst***

Okay, that sounds helpful. My second question is on the O&M side. You did a great job lowering it down from 40.1% to 38.7%, the expense ratio. So, the run rate of 35% is already -- which was expected on 2015, was already achieved.

Do we expect to see a gradual slowdown in the run rate going ahead, or if you look at the same run rate then I think we can expect you to achieve the 35% rate, even before 2018? Can you provide some color here?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Yes. The way I'd answer that is we have established a goal of 35% by 2018. We are not driven by that metric so much, as by doing the right thing in managing our cost structure.

That may enable us to get there earlier, but we certainly wouldn't forecast that at this stage. As you move up the tree, collecting fruit, it does become a little more challenged and difficult, but that's why our whole process is around continuous improvement and process excellence. And the reason why we're trying to engage as many of our folks as possible so that this becomes self-sustaining.

So, yes, I think we've had great progress. I think when I came here it was about almost 48%. So we've cut it actually by 10 percentage points, or over 20%, almost 25%.

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Going forward, we probably won't see it go down at nearly the rate that it has over the last five years, but we're still going to stay focused on it. Walter, you got anything you'd want to add?

Walter Lynch - ***American Water Works Company Inc - President of Regulated Operations***

We are addressing this as we know in multiple fronts, and Jeff you talked about Yellow Belt programs and the savings that are driving there, but we continue to look at our cost. The biggest cost we have are power, chemicals, fuel, and we continue to address those, along with labor costs. As you said, we're geared towards 2018 of 35%, and we are working right now to get there.

Shivangi Tipnis - ***Global Hunter Securities - Analyst***

Okay. So my next question would be, in case you get this 35% quite earlier to 2018, what would you say would be a sustainable ratio? You would definitely not keep looking at lowering the ratio in terms of costs. So what would be a ratio that makes you happy, and you would say, this is the ratio that I would like to maintain?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

One of the things that you get when you really go through all the data that we, from a management side look at, you see that there are differences by state. For example, California has a higher ratio just by operating in California because, well, it's an extended process to operate in California, and so every utility that operates there has higher ratios.

We happen to be very good in California and so we have a lower ratio than others, but it's higher than it is in many other states. So a lot of what is the right ratio will depend on where our growth occurs.

So if we see growth occurring in some states that have higher cost structures because of the way they operate or their regulatory approach, then we think about it in that way. We look at the 35% on the basis of where we expect to see growth, but also on the basis of our current business. I don't think you can say, here's the optimal percentage.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

But Shivangi, I think to your point, though, there is a point at which it's very difficult, because remember when we talk about cost efficiency, these are long-term efforts to take cost out of the business. These aren't quarter-to-quarter, year-to-year cuts.

As we look at more automation, more innovation, there are levels that you could sustain. But you're right, at some point you look and say, are we doing all we can do? Then there is usually a step change and something we can do in technology that maybe will help us further, but we don't know what that is right now.

Shivangi Tipnis - ***Global Hunter Securities - Analyst***

Okay. And maybe my last question, and then I will get back in line. So the estimated costs that you are expecting out of the Freedom chemical spill will be about $0.02 at this point in time.

I want to mention you have been doing a smooth execution, and it was really great. But then are there any headwinds that can still drive the costs ahead? And when we get a clear understanding that it's not just $0.02, and maybe a little more over $0.02?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Susan can maybe give you a little more detail about what's included in the $0.02 and the costs we have occurred so far. Going forward, it's really dependent on how the legal process goes, because that's really the thing that will continue for some period of time, and that's really hard to estimate.

We think a lot of the claims that have been made are easily dismissible. Other claims may have to go a little further before we can get free from them.

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But that's what's probably the biggest unknown, is how the legal process will go forward. For example, we recently filed on some of the claims to have them moved into federal court.

We won't know whether that's successful for a while because people may try to get them back into state court. Those kinds of things can help drive what those legal costs will be. So that's why there's uncertainty around that.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

But you are correct. This is a first-quarter event. And when we look at the charge for the credit that we mentioned earlier, when you look at the extra production costs, the labor, you look at O&M, you look at the cost of the tankers, bottled water, the legal expenses, the $0.02 that we reported reflect the expenses through February 26.

Going forward, as Jeff said, we see the predominance being mostly the legal. Now, because it's a first-quarter event, we will have more information at the first quarter earnings call where we should be able to be a little more specific.

Shivangi Tipnis - ***Global Hunter Securities - Analyst***

Okay. Thanks for the color, guys. I will get back in queue. Thank you.

Operator

Neil Mehta, Goldman Sachs.

Neil Mehta - ***Goldman Sachs - Analyst***

Good morning.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Good morning, Neil.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Good morning.

Neil Mehta - ***Goldman Sachs - Analyst***

Congratulations to your team on the response to the spill in West Virginia. I had a couple of easy questions here. So at the Analyst Day, you outlined several wastewater acquisition targets. Just wanted to get a status update in terms of how that process is faring.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Well, I think we're moving forward on a number of fronts in acquisitions in discussions and negotiations, which obviously we can't talk about who or where they are, both in the wastewater and water arenas. And as we get to a point of any of those being signed we will obviously let you know. That's probably about all I could say, Neil, at this stage.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

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Except for, as you know, we really benefit the following year from the acquisitions we made in the previous year. We mentioned in our acquisition increase revenue, a large part of that was from New York that we had the full year and not just eight months. So for 2014, we will be benefiting from acquisitions we made in 2013.

Neil Mehta - ***Goldman Sachs - Analyst***

All right, fair enough. As you think about your dividend, you've got a payout that's below your long-term target and you've got above average EPS growth. So can you talk through your dividend growth expectations as you look at 2014, but then also beyond that?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Yes. Neil, as we've talked about before, we have a series of criteria that have been what we've established as our dividend philosophy, which is the target of 50% to 60% payout ratio and have a growth rate in dividends that's more in line with our earnings growth rate. So we are slightly below the 50% to 60%.

So in one sense that gives us some flexibility, and we're still believe in the long-term growth rate of 7% to 10%. That's really the guidance that we have relative to dividends. Obviously we just sent out the last one.

The next one is, if you follow our track record, is typically the one where we have announced an increase. So we'll let you know what that will be when we announce it.

Neil Mehta - ***Goldman Sachs - Analyst***

Okay. In California, the Monterey Peninsula, you've got a couple of big projects out there. Could you give a status update on those?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Let me ask Walter to do that.

Walter Lynch - ***American Water Works Company Inc - President of Regulated Operations***

Okay. First on the dam. We are working through our timeline on the dam and we expect to have that torn down and the river rerouted sometime in 2015, according to our schedule. So that's progressing on time, and the team's done a great job out there.

Also on the Monterey Peninsula water supply project, we're working through the issues out there, and we're working cooperatively with municipalities and with the Commission. We're working with the Commission to look at the environmental impact report, which we expect now in the first quarter of 2015, and things are going according to plan.

Neil Mehta - ***Goldman Sachs - Analyst***

Terrific. Thank you very much.

Operator

Mike Gaugler, Brean Capital.

Mike Gaugler - ***Brean Capital, LLC - Analyst***

Good morning, everyone.

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Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Hello, Mike.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Good morning.

Mike Gaugler - ***Brean Capital, LLC - Analyst***

Congrats on the nice quarter.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Thank you.

Neil Mehta - ***Goldman Sachs - Analyst***

Jeff, you spoke about total contaminants. Those you test for, those EPA has under consideration, and some others. Given it wouldn't be cost effective to test for all contaminants as a Company, has AWK ever attempted or proposed to regulators to we expand testing beyond state/federal guidelines to encompass all contaminants in a region within a specific radius of a watershed? On the surface, it would seem possible by scanning MSDS sheets in a region, and my thought behind the question is, it would appear to be a win-win scenario -- greater public safety and also an additional avenue for CapEx investment.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Very good question, Mike. Let me raise a couple of points with you. There are, for example, on the Ohio River, there is, as a result of I think it was the Ashland spill back in the 1980s, there has been a network of testing, and some of it's automated, some of it's still not automated, but a network of testing over, I think it's over 200 miles of the Ohio River, where each of the entities plus some federal monitoring that's being done, is checking. But now, it is not checking all elements.

Part of the problem is that even if you have the sheets, what they put in these tanks changes. And so even once we can get to a point of having the required disclosures of what are in these tanks, then it's also a matter of keeping up with any changes that occur.

Today, take this tank in West Virginia. When I was meeting with the governor of West Virginia, and also with the former governor who's now the Senator, Manchin, one of the things that they said is, look, this tank, this is a material that was deemed non-hazardous. They don't even have to tell us what's in that tank.

So the first thing we've got to do is get more transparency, what the heck is in the tanks. Then it's a question of okay, how, for all of these other compounds can you develop, or can you develop, readily testing mechanisms, and you also have to establish a standard.

Take, for example, arsenic or mercury. We know those are contaminants, but they're naturally occurring. And so the regulations say, you can't have more than X in water.

It doesn't say zero, because frankly it's been naturally occurring for thousands of years, but they're concerned about it going above a certain level because there's been epidemiological study to determine what's the level at which it can create harm for people. The first thing you've got to do on these 86,000 toxic chemicals, and all the others, is figure out what the heck a standard is.

So I think there's quite a ways to go, Mike, before we even can think about testing because you don't have a standard, and you don't even know what all the compounds are. I agree with your point that there needs to be examination of what other kinds of testing can be done for broad-based contaminants that you know may be upstream, but it's a bit more complicated, just because we don't even have standards for most of these chemicals.

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Mike Gaugler - ***Brean Capital, LLC - Analyst***

Okay. That's all I had. I appreciate the clarity.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

You bet. Thanks, Mike. Thanks for the good question.

Operator

Andrew Weisel, Macquarie Capital.

Andrew Weisel - ***Macquarie Capital Securities - Analyst***

Hi, good morning. I'm filling in for Angie. The only question we have is wondering about the warranty business you have on water pipes, given the deep freeze this winter in so many of your states. Have you seen any increase in the activity in terms of people either requesting to add warranties and protection or in terms of actual claims filed?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

This is Susan, Andrew. When we talk about the warranties, we offer water, sewer, and in-home. We have seen an increase in the in-home, not so much on the water and sewer because they are buried deeper in the ground.

But the in-home is such a small part of our warranty business, it may be 6% of the homeowner services revenue. So really, yes we've seen an increase incident in-home, not necessarily the others. We have been able to manage through that.

And in terms of offering it again, we have a robust, disciplined process before we ever bring on a new contract. We have a system of contractors, we have a master contractor who coordinates that.

We go out to ensure before we institute a contract that there's not pre-existing conditions. We also look for any indications that there could be, if a week later there is a problem.

So yes, we saw an increase in incident in one small part of the business. We have been able to manage it, but we have a robust process to ensure that when we do take on new contracts, that they are actuarially sound.

Andrew Weisel - ***Macquarie Capital Securities - Analyst***

Great. Thank you very much. That's all we have.

Operator

Heike Doerr, Robert W. Baird.

Heike Doerr - ***Robert W. Baird & Company, Inc. - Analyst***

Thank you. Good morning. Congrats on a solid quarter.

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Jeff Sterba *- American Water Works Company Inc - President & CEO*

Thanks, Heike.

Heike Doerr *- Robert W. Baird & Company, Inc. - Analyst*

Wondering if we could talk about New Jersey, and if there is any update on pending CTA decision.

Jeff Sterba *- American Water Works Company Inc - President & CEO*

It is still in process. I think New Jersey has had a number of other things occurring that may have taken a little bit of a focus off this.

We do continue to expect that it will occur, that we'll get some clarification out of the commission. We don't have control of the timeline, and again at this stage, Heike, we don't have a good sense. I would hope that it will be in the next three months.

Heike Doerr *- Robert W. Baird & Company, Inc. - Analyst*

And assuming that we would get some kind of a favorable ruling that makes the way that the Commission treats this a little bit more fair, is that something that you would recognize in the next rate case cycle, or what would be the process once we have a decision?

Jeff Sterba *- American Water Works Company Inc - President & CEO*

It would be recognized in the next rate case cycle, absolutely.

Heike Doerr *- Robert W. Baird & Company, Inc. - Analyst*

Got it. Thanks for the clarity.

Operator

Jonathan Reeder, Wells Fargo.

Jonathan Reeder *- Wells Fargo Securities, LLC - Analyst*

Good morning. Susan, if I could, would you talk about some of those regulated O&M expenses, the drivers. It sounded like two of the increases, there was a lot of unsustainable components to it that we'll see probably drop off in 2014. But more importantly, the two accounts that dropped by a wider margin, the employee-related costs and the maintenance materials and supplies, how sustainable are those decreases going forward?

Susan Story *- American Water Works Company Inc - SVP & CFO*

First of all, on the increases, you're right. The two big increase areas were the billing and the uncollectibles, and the majority of that was due to the implementation of the new system, which as of 2013 we stabilized ERP.

We see 2014 as the year to stabilize even further CIS and EAM. Also the other increase, as you noted, dealt with temporary labor that we used, and leveraging efficiencies of ERP.

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In terms of the decreases, we continue to look at preventative maintenance. We continue, in terms of the implementation of automation, for example, across our system looking at the [sets, the smart ESS] technology, the communication protocol, of ensuring that we can commoditize the purchase of meters, we can tie it into reading pressure flows, et cetera. In terms of decreases, we're working on all of those.

Let me back up a little bit, though. Remember the goal, the chart we showed on Investor Day? It's to hold O&M as flat as we can, and in order to offset the increased depreciation and amortization, which was $26.2 million incrementally higher in 2013 than 2012, and because we are investing the capital significantly in 2014 will also increased, we're having to look at all of the O&M expenses. If I look at each category, there are certain things we can do in each category. But all of our employees and our teams have the goal of trying to keep O&M flat so that we can have experiences like I described at Indiana in their rate (inaudible) and we are (multiple speakers) --

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Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay, on the, sorry.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

-- Jonathan, the implementation of CIS, EAM, we have not seen the efficiencies yet from that because the implementation was in 2013. This year in 2014 we will be looking to leverage those systems the way we are looking to leverage ERP, and start seeing some of those over the next one, two, three, four, and five years. So we're just at the beginning of that process.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay. And so the overall goal is to just hold O&M flat, and grow the revenue side? And that's what's going to cause the decrease in the efficiency ratio?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Yes.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay. And then just a point of clarity. The 7% to 10% growth rate, is that now off of the $2.25 weather-adjusted 2013?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

No, the wedge starts at $1.99, and the wedge will start at $1.99 for the rest of this year also.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

And next year, and in 2016.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

(Laughter) Got you. Anticipating future questions, I like it. (Laughter). And then lastly, congrats on getting that military base contract. Do you know what the timing might be on the next determination from the military? Is there a few more decisions that we might see in 2014, or do you have any clarity there?

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Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Well, the last question really said it clearly. Do we have any clarity? The answer is no. We never really know when they're going to go forward.

We know what are typical schedules, and they seem to be moving forward on the more typical schedule now, and -- because we've said we have about six or so bids that are currently outstanding. We would hope to see one or two of those come out as decisions this year.

On Fort Hill, it's an eight-month transition, which is a pretty quick transition, and it has already started. So we'll start to see the revenues from that transaction this year. And we would hope to see a couple more decisions this year, but I can't tell you that we have intelligence that that's going to occur.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay, thanks. That's all I had.

Operator

Steven Fleischman, Wolfe Research.

Steven Fleishman - ***Wolfe Research - Analyst***

Great. Thank you. Hi, Jeff.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Hello, Steve.

Steven Fleishman - ***Wolfe Research - Analyst***

Just on the West Virginia, could you give us a sense of, do you expect to see additional costs throughout this year from that, or are you just not sure?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Well, Steve, I think as Susan said, the lion's share of our system-related costs are a first-quarter occurrence, and a lot of that I think has already been incurred in January and February in terms of chemicals, overtime, bottled water, tankers, all the things that go along with -- plus the revenue credits that we're providing customers. I think beyond that, beyond the first quarter, frankly, it'll largely be legal costs associated with working through the suits that have been filed that name us, working with our customers, because we're going to aggressively work to have them not just understand but get comfortable with the water.

One of the learnings out of this is, and it's different than a lot of other chemicals. In this instance, it isn't how much can someone drink without putting themselves at risk, it really is, can they smell it.

And so what we're finding is there is so much lower concentration that someone can smell, way below 200, 300 times below, what's been determined as the acceptable level by the CDC, and that's a different challenge. And that's both in people's homes as well as within our system.

We're continuing to do flushing, and yet, that costs because we're pushing treated water through systems. I would say the lion's share of the operating cost impacts, the one-time operating cost impacts, will really just be in the first quarter.

Steven Fleishman - ***Wolfe Research - Analyst***

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Okay. And just any bigger picture thought in terms of highlighting more the -- obviously, this is not directly related to something with a water system, but just, does this refocus on the story you've pushed about needing to replace and upgrade the system that we have overall?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

I think it absolutely does. One of the challenges that we had in West Virginia, Steve, when it occurred is, if you will remember, this was right after the Polar Vortex. So we'd had that enormously cold period, and then warmth. And when that happens, you get line breaks.

We had a lot of line breaks in our West Virginia system, which is an old system that is under a lot of duress because of the elevation changes within the system. And so what we find is that pipes in West Virginia, frankly, don't last as long as they do elsewhere because of the stress that is placed on them.

At the same time, our West Virginia customers have higher bills than most of our other systems because of density of population, which is very low, and the costs associated with operating such a complex system. That is probably the most -- well, it is -- the most complex system we have anywhere in our 30 states, regulated and unregulated.

So I think one of the things it does speak to is the costs that can be incurred with aged infrastructure. On the water plant side, our folks have done a great job operating that plant. We're going to continue to look at ways to help improve that plant.

One of the issues that has been raised is whether there should be a second intake off another water source. If we look about that across our systems, some 20%, 25% of our water treatment systems only have a single intake. That is something that has to be looked at in the context of what is the cost.

So I think what it does is this opens the door for good conversation with all of our regulators about the trade-off between cost and the greater levels of investment, how can we manage that so that we don't push rates up too high but we recognize that these systems are old? That is really separate from the issue of how do we protect against, hopefully not bad actors like I think we had in this situation, but potential contaminants dumped into a river or other water body.

Steven Fleishman - ***Wolfe Research - Analyst***

Great. Thank you very much.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Thank you, Steve.

Operator

There are no further questions. I would now like to hand back to the management team. Thank you.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Let me thank you all for joining us today, and we look forward to talking with you at our next quarterly call. We welcome Durgesh into these quarterly calls, and we look forward to talking to you all down the road. Bye-bye.

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American Water Works Co., Inc. (AWK)

Q3 2014 Earnings Call

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MANAGEMENT DISCUSSION SECTION

Operator: Good morning. And welcome to American Water's Third Quarter 2014 Earnings Conference Call. As a reminder, this call is being recorded and is also being webcast with accompanying slide presentation through the company's website, www.amwater.com.

Following the earnings conference call, an audio archive of the call will be available through November 14, 2014, by dialing 1-412-317-0088 for U.S. and international callers. The access code for replay is 10053559. The online archive of the webcast will be available through December 6, 2014, by accessing the Investor Relations page of the company's website located at www.amwater.com. After today's presentation, there will be an opportunity to ask questions. [Operator Instructions]

I would now like to introduce your host for today's call, Ed Vallejo, Vice President of Investor Relations. Mr. Vallejo, you may begin.

Edward D. Vallejo

Vice President-Investor Relations

Thank you and good morning, everyone. And thank you for joining us for today's call. As usual, we'll keep our call to about an hour. And at the end of our prepared remarks, we will have time for questions. But before we begin, I'd like to remind everyone that during the course of this conference call, both in our prepared remarks and in answers to your questions, we may make statements related to future performance.

Our statements represent our most reasonable estimates. However, since these statements deal with future events, they are subject to numerous risks, uncertainties and other factors that may cause the actual performance of American Water to be materially different from the performance indicated or implied by such statements. And such risk factors are set forth in the company's SEC filings. All statements in this call relating to earnings per share refer to diluted earnings per share.

And now, I'd like to turn the call over to American Water's President and CEO, Susan Story.

Susan N. Story

President and Chief Executive Officer

Thanks, Ed. Good morning to everyone and thanks for joining us on the call. I'm joined today by Linda Sullivan, our CFO, who will go over the third quarter results; and Walter Lynch, COO and President of Regulated Operations, who will discuss key matters in our Regulated Business.

I'm pleased to report that, through the hard work of our 6,600 employees at American Water, we delivered a quarter of solid performance, although most of our states experienced significantly cooler temperatures this summer. During this quarter, we achieved increases in revenues and earnings per share, made significant progress growing our Regulated and Market-Based Businesses, and we reached a settlement with our unions on national benefits after a four year impact, all while delivering water services to our customers safely and reliably.

In addition to the 2,200 customers in regulated acquisitions that we closed on this quarter, we had some exciting news on Tuesday. The residents of Haddonfield, New Jersey; Arnold, Missouri; and Russiaville, Indiana all voted to sell their community's water and wastewater systems to American Water.

We're honored that they put their votes of confidence in our company, to bring safe, clean, affordable and reliable services to them. And we look forward to welcoming our newest 19,000 customers in the near future following regulatory approval. These communities are adjacent to our current water and wastewater system. So we can bring economies of scale and existing resources to run these systems effectively and efficiently.

As you can see on slide five, our revenues increased nearly 3% for the quarter. Income from continuing operations rose 4.5% to $0.87 per diluted share, which is not adjusted for that weather impact of $0.04 to $0.06 per share. Walter will discuss the weather in more detail in just a few minutes.

Excluding the midpoint of this impact, the weather normalized income from continuing operations was an EPS of $0.92 for the third quarter. The increase in earnings per share is mainly due to the success of our Regulated Business and a pending rate authorizations and surcharges that support our rate-based growth through infrastructure investments.

We also continued strong cost management across our businesses. While we saw a slight decrease in cash flows from operations for the quarter, primarily due to the weather, of $0.04 to $0.06, we continue to improve our earned return on the equity. Our adjusted ROE for the last 12 months ended September 30, 2014, increased by 80 basis points to 8.85% compared with the same period last year.

Turning now to slide six. We continue to invest in the pumps, plants and pipes that deliver water and water services to our customers. This quarter, we invested $314 million in needed improvements. Year-to-date, we have made capital investments of over $700 million. And we expect to spend about $1 billion by year's end.

We completed four acquisitions this quarter adding 2,200 customers. Year-to-date, we've added about 3,700 customers on closed acquisitions. At this time, we have about 25,000 additional customers in pending acquisitions, which includes the 19,000 in Haddonfield, Arnold and Russiaville, which I've talked about earlier.

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We grew our Market-Based Business through the expansion of our homeowner services territory, as well as through our military group. This past week, we received notification from the Orlando Utilities Commission of its intent to award American Water Resources a home warranty protection agreement to market to its 260,000 customers, pending contract negotiations.

During the quarter, we also announced our second military award this year, Picatinny Arsenal in New Jersey. We now serve 11 military installations across the country. The Department Of Defense had not awarded any new contract the size we target since 2009 until the two this year. We won both of those through competitive bids. We are always honored to have the privilege to serve the men and women who protect our freedom and liberties every day.

During the quarter, we made progress on our ongoing goal to actively address regulatory lag and promote constructive regulatory frameworks. Notably, as Walter will discuss, the New Jersey Board of Public Utilities approved modifications to consolidated tax adjustment. And in California, a general rate case settlement was reached with the Office of Ratepayer Advocates and other interveners. We also filed for additional infrastructure investment revenues in Missouri and Tennessee which Linda will discuss further.

We recognized the important balance between making needed investments in our systems and helping our customers have affordable bills. To do that, we continue to improve our O&M efficiency ratio, which, adjusted for West Virginia and weather, improved 330 basis points from this 12-month ended period compared to last year.

We also reached an agreement on October 31 to sell Terratec Environmental Ltd., the Market-Based residuals management subsidiary of our Canadian residuals division. And we expect to close in the coming weeks. Our main driver for this portfolio optimization was to exit the Class B biosolids business and concentrate on Class A biosolids, which is a more specialized market and is more aligned with our Market-Based Business model.

Lastly, I'm pleased to report that American Water and the Utility Workers Union of America, representing the company's union, reached a settlement regarding our national benefits agreement. Walter will also provide more detail on that momentarily.

Moving to slide seven. In our ongoing commitment to our shareholders, American Water's board of directors on September, the 19, declared a quarterly cash dividend payment of $0.31 per share, payable on December 1, 2014, to all shareholders of record as of November, the 10. This continues our annual dividend payout target of 50% to 60% of net income, while growing dividends at a rate aligned with earnings per share growth.

Based on our performance this year, we are narrowing our earnings guidance for adjusted continuing operations for the year from $2.35 to $2.45 to a range of $2.38 to $2.44. This range is not adjusted for the $0.04 to $0.06 per share effective adverse weather. But it does exclude the impact of the Freedom Industries chemical spill in West Virginia.

We remain confident in our ability to deliver on our long-term EPS growth of 7% to 10% through execution of our investment and growth strategies, as well as continuing operational efficiency gains. Also, we plan on providing 2015 guidance on a conference call at 11 AM on Monday, December, the 15. So stay tuned for additional details and please mark your calendars.

Walter will now give an update on our Regulated Business.

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Walter J. Lynch

President & COO-Regulated Operations

Thanks, Susan, and good morning, everyone. Let's start with an update on the weather. This was a very cool and mild summer, as evidenced by the NOAA climate data on this slide. We've seen the same theme from electric and gas utilities throughout these regions during this third quarter earnings season.

In some of our service areas in Missouri, Illinois and Indiana, we experienced record cool temperatures. At the same time, we saw above normal precipitation levels in Indiana, Illinois and parts of Pennsylvania. This did impact demand and revenues. And we estimate the weather impact to be about $0.04 to $0.06 for the quarter. As always, we did take appropriate management actions to address this revenue shortfall associated with this unfavorable weather.

In contrast, California continues to experience a record drought and the hottest year on record. In response, California American Water has conducted extensive conservation outreach, mailings, bill messages, e-mail, social media campaigns and community events. We developed a special section of our website dedicated to keeping customers updated on this drought, its impacts and the resources we have available to help.

California American Water is calling for voluntary conservation from its customers in all districts, with the exception of one district, Larkfield district, which is in Sonoma County, which instituted mandatory conservation on October 23. State-wide water system delivery is down about 10% since the previous year. And in the third quarter, each California districts saw decreases in water use. Because of mechanisms in place, the company's revenues will not be impacted by declines in sales due to conservation efforts.

As Susan relayed earlier, in our California general rate case for rates effective 2015 through 2017, we and the Office of Ratepayer Advocates, along with others, filed a settlement. If approved, the settlement would provide $13.6 million in additional annualized revenues in 2015. And subsequent increase is presently estimated at $5 million for 2016 and $6.3 million for 2017.

We're awaiting a California PUC decision on this settlement in the general rate case at this time. Our California team also continues to make progress on the Monterey Peninsula Water Supply Project. The test well permit will be considered before a state agency next week. And construction work and drilling on the test well could begin this month.

And, finally, for California, our San Clemente Dam Removal Project is making great progress. Sediment has been relocated and a new path for the river has been cut. When the next rain occurs there, it will be the first time that water will actually flow through these new channels. This project is on time and on budget with substantial completion expected in late 2015 or early 2016.

Moving on to New Jersey on the regulatory front. As Susan said, the Board of Public Utilities approved changes to consolidated tax adjustments. The BPU is recognizing the more standard practice that other states have to encourage investment. These approved changes include limiting the look back to five years and additionally allocating 75% of the savings to the company and 25% to utilities' customers.

I also want to reiterate what Susan said about Tuesday's vote in Haddonfield, New Jersey. We're so pleased that the Haddonfield residents voted to sell their water and wastewater systems to New Jersey American Water. We'll now seek the approval by the Board of Public Utilities, which we expect to take place sometime in mid-2015.

Because, we already provide those services to surrounding communities, we're able to leverage existing resources to more efficiently and effectively operate these systems. Immediately after closing, we're going to begin to make the much-needed upgrades to the systems.

In fact, just to give you some transparency on it, in the first year after closing, we've committed to spending $6.5 million on several critical projects to significantly improve the wastewater system. An additional $9.5 million will be invested in the following four years to modernize these systems.

Haddonfield, along with Arnold, Missouri and Russiaville, Indiana, are great examples of the type of solutions that we can offer communities challenged by competing budget priorities and deteriorating water and wastewater systems. They're also great examples of our local business model. Our employees live and work in the communities and in these referendum efforts help to inform voters about the ways American Water can work with them to address their challenges.

In all three of these communities, local government leaders, along with our local employees, ensured that the citizens have the data they needed to make informed decisions on Election Day. That's what it means to be a local company and that's how we like to operate in the states where we're privileged to serve. We're committed to continuing the partnerships we developed with Haddonfield, Arnold and Russiaville. And I want to thank all of our employees who have volunteered to help in our growth efforts.

Additionally, last week, American Water and the Utility Workers Union of America, representing the company's unions, jointly announced the ratification of a settlement related to the complaint filed by the Utility Workers Union of America regarding our national benefits agreement. Part of this settlement included a new healthcare and benefits package for our workforce through 2018.

This benefits package remains competitive compared to other plans offered in the utility industry. We're pleased to reach a settlement that we believe is fair for both our employees and our customers. We look forward to working together with our unions in a collaborative way on issues such as safety, employee training and development and growth opportunities.

And, finally, I want to provide a brief update on the Freedom Industries chemical spill in West Virginia. From an operational perspective, we continue to monitor raw water for MCHM and PPH. And we're pleased to report that there were no traces of these substances in any samples taken.

We'll continue to do this monitoring until the Freedom Industries' site is certified as decontaminated by the West Virginia Department of Environmental Protection as this site right now is being completely torn down. We anticipate that this will occur in the next few months. Otherwise, we're back to business as usual in West Virginia.

Now, I'll turn the call over to Linda for a more detailed review of our financial performance.

Linda G. Sullivan

Senior Vice President and Chief Financial Officer

Thank you, Walter, and good morning, everyone. It is a pleasure to be here with you today to review our third quarter financial results in more detail.

Turning to slide 13, third quarter 2014 had solid financial results. Despite the cool summer temperatures, our revenue, operating income, operating margin and earnings improved over the third quarter of last year. In addition, we continued to make progress on improving operating efficiency.

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More specifically, for the quarter, we reported operating revenues of approximately $846 million, $24 million or about 3% higher than the third quarter of last year. Both periods were impacted by weather, which I will cover in more detail in a moment.

Operating income rose to $337 million or about $14 million higher than the same period last year, resulting in just over a 0.5% increase in operating income margin. Third quarter income from continuing operations was approximately $157 million or $0.87 per share. This compares to $150 million or $0.84 per share for the third quarter of 2013.

As Susan mentioned previously, we reached an agreement to sell Terratec Environmental Ltd., which was part of our Market-Based Business segment. As a result, both the loss on the sale and the operating results have been classified as discontinued operations. This resulted in a combined loss from discontinued operations of $0.02 per diluted share for the quarter and $0.03 per diluted share on a year-to-date basis. Although we reported a loss on the sale of this transaction, the transaction is structured to monetize about $4 million in tax benefits.

As mentioned earlier, both periods presented were impacted by weather. In the third quarter of 2014, weather impacted our results in the range of $0.04 to $0.06 per share. Last year, the weather impact was $0.02 to $0.04. Excluding the midpoint of these impacts, adjusted weather normalized earnings per share from continuing operations was $0.92, which is a $0.05 or approximate 6% increase compared to the weather normalized third quarter of last year.

We also paid a dividend of $0.31 per share during the quarter, which represents an approximate 11% increase over the $0.28 per share payment in the third quarter of 2013. We reported cash flow from operating activities of about $390 million for the quarter, relatively flat compared to the same period last year, despite the larger weather impact experienced this summer.

Now let's discuss the different components of our adjusted EPS growth from continuing operations on slide 14. On the left side of this page, our starting point is third quarter 2013 recorded earnings per share from continuing operations of $0.84. Last year was cooler and wetter than normal, so we have adjusted up for the midpoint of the weather impact or $0.03, which gets us to what we consider a weather normalized earnings starting point for the third quarter of 2013 of $0.87 per share.

And now, I will walk through each of the EPS drivers, which gets us to our third quarter 2014 adjusted weather normalized EPS of $0.92 per share from continuing operations. First, we had lower revenue in the third quarter of 2014 due to cooler weather in many of our states. This impact was in the range of $0.04 to $0.06 per share for the quarter and shown on the EPS bridge is the midpoint of that range or $0.05.

The next item shows the impact from both income and general taxes, which were higher by $0.03 per share over the same quarter last year due to two items: higher income tax true-ups of about $0.02 and higher property taxes of about $0.01, primarily from tax assessments in Pennsylvania and Kentucky.

Next, in the third quarter 2014, we reported higher consolidated depreciation and amortization expense of about $0.02, principally from growth associated with our capital investment programs, including our SAP project that was placed into service during 2013.

Next, EPS for our Market-Based Business was a $0.01 lower than the same quarter last year. However, there are two one-time items in the third quarter of 2013 that lowered the quarter-over-quarter comparison by $0.02 per share, including $0.01 from price redeterminations in the military services business and $0.01 from the release of contract reserves due to resolving uncertainties on certain O&M contacts.

Adjusting for these 2013 items, the Market-Based Business segment would have actually increased $0.01 per share on a quarter-over-quarter basis, driven by additional capital projects associated with our military contract and contract growth in homeowner services, mainly with our New York City contract, as well as expansion into other geographic areas.

In the next bar, the incremental revenue from regulated acquisitions increased a $0.01 per share, due mainly to our acquisition of Dale Services Corporation in Virginia in the fourth quarter of 2013. We also had a $0.05 increase from higher regulated revenue. This increase over the prior quarter was made up of three key items.

First, authorized rate increases for a number of our operating companies increased $0.08 per share. Second, increased surcharge and amortization of balancing account increased $0.01 per share. And, third, these increases were partially offset by decreased demand of about $0.04 per share as we continue to experience declining usage, primarily for our residential customers, in the 1% to 2% range.

Next, regulated O&M decreased $0.05 per share for the quarter compared to last year due to three main drivers. First, employee related costs, which were the single biggest contributor, decreased by $0.03 per share or 6.5% for the quarter, primarily from reduction in pension and postretirement benefit costs due to the change in the discount rate.

Second, operating supplies and services decreased $0.01 per share, primarily driven by lower contract services, as last year we had additional contractors assisting us with our SAP system stabilization and we experienced higher regulatory expenses. Lastly, production costs decreased $0.01 or 3.2%, primarily due to lower chemical cost in our Illinois subsidiary.

In the appendix of the slide deck, we have included our traditional revenue and expense bridge slides to provide more detail to the earnings variances I just discussed. I will not cover these in detail today as most items are a duplicate of what I discussed on the earnings bridge.

Also, I encourage you to read our 10-Q on file with the SEC for a more detailed analysis of both revenues and expenses. We'll be happy to answer any questions or provide further clarification, if needed, during our question-and-answer session.

On slide 15, we show our O&M efficiency ratio. We continued to see progress in this metric. For the 12 months ended September 30, 2014, we achieved a 36.8% ratio, which is a considerable improvement over the 40.1% ratio we had in the same period last year.

This ratio adjusts for weather and excludes the expenses related to the Freedom Industries chemical spill. As we have shared with many of you previously, our long-term stretch goal is to achieve a 35% O&M efficiency ratio by 2018. There is a full calculation of this ratio in the appendix section of the earnings call slide deck.

Now, let's look at recent regulatory highlights on slide 16, which shows formal rate cases awaiting final order, as well as step increases and infrastructure filings, which impacted the quarter or are still pending. But before I cover this slide in detail, I want to point out what is really key about this slide. And that is that you can see a shift in the way that we recover capital from formal rate cases to infrastructure surcharges.

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As you may remember, in past years, we would have eight, maybe 10 rate cases outstanding and few or no infrastructure filings. Now, we have eight surcharge filings approved this year. And, as you know, we recover our capital faster with these mechanisms, which improves our return on equity, provides more flexibility around the timing of formal rate cases, as well as providing better customer service and moderating bill impacts for our customers.

Back to the slide itself, in terms of pending rate cases, as of today, we are awaiting orders for general rate cases in two states, California and Indiana. In California, we now have a settlement with the Office of Ratepayer Advocate and other interveners, as Walter mentioned. Our Missouri and Tennessee subsidiaries filed for additional annualized revenues from infrastructure investment charges for a combined total of $11.1 million.

Shifting to rates that became effective in 2014, we had $2.4 million in step increases from prior rate cases in New York and California. A total of $25.6 million in additional annualized infrastructure investment charges have been awarded this year with the latest one being the July 1 approval of our annualized distribution system improvement charge of $7.4 million in New Jersey.

As I mentioned earlier, these infrastructure charges represent the ability to more timely recover capital, which we invest to improve both infrastructure and customer service. Additionally, we implemented new rates effective January 1 of this year in Pennsylvania and effective April 18 in Iowa for a combined annualized total of $29.8 million.

These are the highlights of these cases. And we advise you to review the footnotes for a fuller understanding of particular cases. And while we cannot predict the outcome of these cases, we hope that this will help you understand our current rate environment. And in the appendix, you will also find an updated version of our largest 10 states with our authorized rate base and allowed return on equity.

Lastly, as Susan mentioned, we are now narrowing our adjusted earnings per share guidance for continuing operations for the year to a range of $2.38 to $2.44 per diluted share, which is not adjusted for the adverse weather impact of approximately $0.04 to $0.06. This guidance does exclude the impact of the Freedom Industries chemical spill in West Virginia.

And, remember, that our year-end guidance is a range to account for a variety of factors during the year, with the largest being weather. Unless there are extreme weather impacts, this range should absorb those impacts. Our quarterly earnings are points, not ranges. So we like to disclose weather effects to give you more insight into our actual performance. Now, given that the guidance is not adjusted for weather, you should use the $0.87 reported in this quarter on your way to building our annual 2014 performance versus our $2.38 to $2.44 guidance range.

With that, I will turn it over to Susan.

Susan N. Story

President and Chief Executive Officer

Thanks, Linda. As we discussed last quarter, we will conclude each of our earnings call by highlighting initiatives or recent news than maybe outside of what we would typically cover in an earnings call. This quarter, we're going to highlight American Water's addition to the Dow Jones Utility Average.

We are very proud to be added to this index. The utility average is a 15 member index that represents the stock performance of large, well-known U.S. companies within the utility sector. During its 78-year existence, there

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have only been three major reorganizations of the index and only 40 companies have been part of that average since it was introduced in 1929.

Additionally, we're the only water utility to ever be part of the index. And, interestingly, we've been a member twice. When it was started in 1929, the original members of the Dow Jones Utilities Average included our predecessor company, American Water Works & Electric Company. In 1947, under the newly implemented Public Utility Holding Company Act, six holding companies, including our predecessor, were dissolved and removed from the Utility Average. Now, 67 years later, we're back. And, of course, we're better than ever.

Being included in the Utility Average is a tremendous honor for American Water in the entire water and wastewater industry for several reasons. First, having the index recognize the critical role the water industry plays in the utility space. And the economy is important. The legacy of our country's prosperity is rooted in infrastructure investments. And water and wastewater represent vital infrastructure necessary, not just for economic growth, but for quality of life.

Second, water is critically needed for electricity and energy production and for the growing of food. The EPA's November 2013 report on the importance of water to the U.S. economy notes that 94% of our economy is linked to this water, energy, food mix.

And, finally, being included in the Utility Average is a testament to our ability at American Water to deliver on our investment and operating strategies and provide dependable value to our customers and our shareholders. This achievement is a direct reflection of the dedication and expertise of our employees, who are committed to the customers and communities that we serve every single day.

In my six months as CEO, I've had the pleasure of visiting the majority of our work locations. And I've met with the incredible people of American Water, who every day delivers safe, affordable and reliable water services to our customers. These are the same people, who dedicated more than 4,700 charitable service hours to the communities that we serve, just during September, in our dedicated Month of Service. Our employees are very inspiring to me for these reasons and more. And I appreciate the privilege of being part of their team.

So now, we're happy to take any questions you might have.

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QUESTION AND ANSWER SECTION

Operator: We will now begin the question-and-answer session. [Operator Instructions] Our first question comes from Ryan Connors from Janney Montgomery Scott. Please go ahead.

Susan N. Story
President and Chief Executive Officer A

Hi, Ryan.

Ryan M. Connors
Janney Montgomery Scott LLC Q

Great. Thanks. Hello. How are you?

Susan N. Story
President and Chief Executive Officer A

Good.

Ryan M. Connors
Janney Montgomery Scott LLC Q

Great. So a couple questions. First off, I wanted to just talk about this New Jersey CTA issue a little bit and you gave a really nice discussion of it, Walter. But could you kind of talk to us a little more about the financial impact of that on the P&L and the timing of that in terms of how we quantify that and go about translating that into an actual earnings contribution?

Linda G. Sullivan
Senior Vice President and Chief Financial Officer A

Ryan, this is Linda. And this is a step in the right direction, we believe, for New Jersey. This decision will impact us when we file our next rate case in New Jersey. That is when it would become effective for us. And, as you know, we filed our last rate case in New Jersey in 2011. And that rate case was a black box settlement. So we cannot disclose the financial impact of this. But when we look at the timing of our rate case and the flexibility that we have in terms of timing around our infrastructure mechanisms in New Jersey, we take all of those things into consideration to help determine when we will file that next rate case and be able to implement this new change.

Ryan M. Connors
Janney Montgomery Scott LLC Q

Okay. But really no estimate or guidance on kind of the magnitude of the impact?

Linda G. Sullivan
Senior Vice President and Chief Financial Officer A

Because it was a black box settlement, last rate case, we really can't disclose that.

Ryan M. Connors
Janney Montgomery Scott LLC Q

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Got it. Okay. Fair enough. And then just the other question I had was just more kind of tactical, but – and I guess we'll get more detail on this on December 15, but just talking about the weather from a big picture perspective. So we had the cool temperatures in the Midwest, but, as you mentioned on the call, last year's third quarter was also negatively impacted by weather. So, as we look into 2015, is it safe to say we've got a very easy comparison, so to speak, as we sort of think about growth next year in demand?

Linda G. Sullivan
Senior Vice President and Chief Financial Officer A

So what we do from an earnings guidance perspective is we'll give you weather normalized earnings guidance for 2015, which, as we indicated earlier, will occur on December 15.

Ryan M. Connors
Janney Montgomery Scott LLC Q

Okay.

Susan N. Story
President and Chief Executive Officer A

Ryan, as Linda mentioned, just as the electrics do also, we put a range for guidance, because while we look at budgets and everything weather normalized, we understand that there are going to be variabilities. We disclosed at Investor Day last year – a set of those variabilities. And, for us, just like the electrics, the largest potential variable is weather. In a typical year, we account for some of that variability in our range, unless there is extreme weather. And, for example, back in 2012, the positive uplift was between $0.13 and $0.16 for American Water. That's a little beyond what you would have as normal variability. So when we look at weather, you don't want to start having a lot of guidance ranges that are weather affected and this type of thing. So we try to keep it as clean as we can.

Ryan M. Connors
Janney Montgomery Scott LLC Q

Okay. Great. And then one last one before I hop out, is just on your payout ratio. Can you talk to us about where you're running right now and how you feel about where you're at and whether you would up that payout ratio a bit going forward, depending on your equity capital needs and so forth? Thanks.

Linda G. Sullivan
Senior Vice President and Chief Financial Officer A

Our payout ratio is currently at 2.5% and the way that we look at – I'm sorry that's the – I'm sorry. Let me correct that. Our payout ratio is just over 50%. We have a target range for our payout ratio of 50% to 60%. And we plan to – our goal is to grow our dividend commensurate with our EPS growth.

Ryan M. Connors
Janney Montgomery Scott LLC Q

Okay. Great. Thank you.

Susan N. Story
President and Chief Executive Officer A

Thanks, Ryan.

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Operator: Our next question comes from Michael Gaugler from Brean Capital. Please go ahead.

Susan N. Story
President and Chief Executive Officer
A

Hi, Mike.

Michael E. Gaugler
Brean Capital LLC
Q

Good morning, everyone. I've actually got a follow-up on the CTA to Ryan's question. Just wondering given the changes and how you think holistically about where you're going to deploy future investment. Is that enough to put New Jersey at the top of your list?

Linda G. Sullivan
Senior Vice President and Chief Financial Officer
A

When we look at the prioritization of our capital, ROE is one of the key items that we look at in the prioritization of capital in addition to what are the needs for the investment in the states. And – so, that is a factor that we will look at, as we move forward and file a rate case in New Jersey. So, all of those factors come into play when we look at the capital prioritization. This is something that is moving in the right direction. So, although, externally we have seen lower ROEs being authorized in New Jersey, we see that this will offset those lower ROEs moving forward.

Walter J. Lynch
President & COO-Regulated Operations
A

And, Mike, this is Walter. Given the DISC program that was approved a few years ago, as you know, we've invested a lot more in New Jersey than we have in prior years. So it is one of our top states and we'll continue to do so, because of the DISC mechanism and the needed investment that we have to make in New Jersey.

Susan N. Story
President and Chief Executive Officer
A

And, Mike, as you know, and you've heard us say over and over, in our capital program, we will invest what we need in every state to meet our customer needs. We will make sure that our water is safe and clean and reliable. So you also know that that we do have some discretion. After we have committed those funds, we have discretion with other funds. And, as Linda and Walter both said, we look at a variety of factors, including ROE, and, as Walter said too, where you have mechanisms, you can get the return in a more productive and reduced regulatory lag. So, all of those factors come into play. So we look at our capital very carefully. We make sure that every single state has what they need to deliver services to customers than that which is discretionary. We look at these other factors.

Michael E. Gaugler
Brean Capital LLC
Q

All right. Then I have just one other question, probably for Walter, just kind of wondering how you're feeling about water supply in California. It seems like some of your peers are getting just a tad bit nervous looking out into 2015.

Walter J. Lynch
President & COO-Regulated Operations
A

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Well, right now, Michael, we're still okay with water supply. But, again, we've asked for voluntary conservation of all of our districts. We put mandatory conservation in, in one of the districts. We're obviously participating as a partner in the state to reduce water usage and we'll continue to monitor it.

Michael E. Gaugler
Brean Capital LLC
Q

Okay. That's all I had. Thank you.

Susan N. Story
President and Chief Executive Officer
A

Thanks, Mike.

Operator: [Operator Instructions] Our next question is from Richard Verdi from Ladenburg. Please go ahead.

Susan N. Story
President and Chief Executive Officer
A

Hi, Rich.

Rich A. Verdi
Ladenburg Thalmann & Co., Inc. (Broker)
Q

Hi. Good morning, everybody. Great quarter and thanks for taking my call. I just have one quick question which pertains to the efficiency ratio. At the Analyst Day last year, the company had highlighted the goal of achieving a 35% efficiency ratio by 2018. And, obviously, that's been the objective since it's shown on slide 15 today. Let's hypothetically fast forward to 2018 and say the target has been reached. Would a new target be set? And if so, what would it be? How long could it maybe take to achieve? And what would the driving force behind the reduction be? Because I would think there is probably going to be more room to go.

Linda G. Sullivan
Senior Vice President and Chief Financial Officer
A

So let me start with just an overview of the progress that we've made. So we've made significant progress on the metrics. And we continue to make progress. Yeah. As we move through times, the progress will tighten a little bit. As we work through and we file additional rate cases, our revenue will be trued-up as we return these savings that we have recognized back to our customers. And so the improvement will begin to tighten as we get closer to the 35% target for 2018.

And we will continue to look at are there other ways that we can continue to improve the metrics. Are there technologies that we can deploy or other operational efficiencies that we can drive in the business? Because, really, this is about how do we operate the business from an overall perspective. We know we have more infrastructure investment to make. And to continue to make that affordable for our customers, we need to make sure that we're managing every dollar on the operating efficiency side.

Rich A. Verdi
Ladenburg Thalmann & Co., Inc. (Broker)
Q

Okay. Great. I'm thinking. Is there any chance that smart metering could be used? Any chatter about potentially creating some sort of smart grid, like the electricity side did, for the water side?

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Susan N. Story
President and Chief Executive Officer
A

Rich, I'm so glad you asked that question. So the answer is yes. And I will tell you that, we actually have some information on our website. And we'll be happy to send it to you. We're actually pioneering a lot of work on the smart meter grid. We have our own R&D group. And we have an innovation development process. So what we're looking at on the smart grid, we're 85% AMR and AMI right now on the American Water system.

We also are doing a lot of research on water sensors near meters that can monitor flow and pressures. And we're working with an Israeli company to look at how to look at dynamic flow monitoring, so that we can reduce pressure at night at times of low demand, which will also reduce leaks. So, we're actually looking at the whole system from the customer meters to the pipes, smart sensors on the pipes looking at flows in valves and finding ways that we can do more predictability, more predicted maintenance that reduces costs, as well as provide more information to our customers.

The water industry, as you know, is behind the electricity industry on this, mainly because of costs. Water bills aren't as expensive as electricity. And you also have a very fragmented industry. So, you don't have a lot of entities like American Water, with the size, scope and scale to actually embark a partner on a lot of these research opportunities. We're very excited about it. And I would tell you that the efficiencies we're looking for going forward are much more heavily weighted, as you mentioned, to technology and automation and better ways to do the business.

……

Rich A. Verdi
Ladenburg Thalmann & Co., Inc. (Broker)
Q

That's super. Thank you, Susan, and great quarter all the way around. Thank you, again.

……

Susan N. Story
President and Chief Executive Officer
A

Thanks, Rich.

……

Operator: And the next question is from Jonathan Reeder at Wells Fargo. Please go ahead.

……

Susan N. Story
President and Chief Executive Officer
A

Hey, Jonathan.

……

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

Good morning, all. I hope everyone is well. Congrats on a big win last weekend, Susan.

……

Susan N. Story
President and Chief Executive Officer
A

Yeah. But in the SEC, it's one game at a time, Jonathan.

……

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

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So, it's a tough road ahead still. So, just have a couple questions here if you don't mind. The $0.03 discontinued loss on the sale of Terratec, how much of that was due to the sales price versus operations? Or perhaps maybe a better way of asking it, how much of the loss from Terratec operations was assumed in your previous guidance range?

Linda G. Sullivan
Senior Vice President and Chief Financial Officer
A

So there's a couple of questions there. Let me – for the second quarter, what we have included the loss on sale is $3.8 million and the remainder of that is associated with the loss from operations, both the second quarter as well as the year-to-date. Included in that loss is a book write-off of taxes of $1.5 million, which, as I mentioned earlier, we were able, through the structure of this transaction, to monetize about $4 million in tax benefits that we otherwise wouldn't be able to monetize. In terms of the guidance in going forward, in our earnings guidance for 2014, we had a very small loss included in our guidance for Terratec. So, it doesn't have a real material impact either this year or going forward.

Susan N. Story
President and Chief Executive Officer
A

When you look at AWE, Jonathan, it's about 10% of our revenues and even less of operating income. Terratec is even a really small part of AWE.

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

Okay. Okay. So I mean just the way to view it is, have we had normal weather, your revised range would have been, I guess, what, the $2.43 to $2.49?

Linda G. Sullivan
Senior Vice President and Chief Financial Officer
A

No. In our earnings guidance, for 2014, we had a very small loss from the operations of Terratec included in that guidance. We did not project the loss on the sale in that guidance. And so it really rounded out in the beginning of the year when we set forth our guidance.

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

Right, right. I'm just saying have you had normal weather in Q3, the revised guidance range, essentially we could just bump it up $0.05 if we wanted to compared to apples-to-apples to your original range?

Susan N. Story
President and Chief Executive Officer
A

No, Jonathan. Because, remember, we build in some variability to our range. So, we – and this is interesting. From weather normal, it's always an art, not a science, right? So, what happens is when we do our range, part of having a range for us is including some weather variability.

So – and we showed last year, at the Investor Day, that weather could be plus or minus $0.07. So, we build in variability to the weather. So the range that we're guiding to now is what we would have, again, non-weather normalized just assuming that you have some variability built in. And most companies do that.

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Jonathan G. Reeder
Wells Fargo Securities LLC
Q

Okay. I got you there. And then going back to New Jersey, could you remind us what the revenue increased cap is on their infrastructure mechanism? And I guess how much have you increased rates under that mechanism thus far?

Walter J. Lynch
President & COO-Regulated Operations
A

Yeah. The revenue cap is 7.5%. And we continue to invest within that cap. And we'll be able to do so. So -

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

How close are you to the 7.5% at this juncture?

Susan N. Story
President and Chief Executive Officer
A

We're making progress -

Walter J. Lynch
President & COO-Regulated Operations
A

We still have some room on that, Jonathan.

Susan N. Story
President and Chief Executive Officer
A

Making progress to the 7.5%.

Linda G. Sullivan
Senior Vice President and Chief Financial Officer
A

And, remember, Jonathan, we had two infrastructure increases this year, 10.1% in January and then the recent one of 7.4%.

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

Okay. And then, you've done a good job lately on the M&A front. Congrats on that. I know you gave us the customer count. Is there any way you can describe it in terms of either the purchase price or kind of the rate base that those deals represent?

Walter J. Lynch
President & COO-Regulated Operations
A

Yeah. And back – so the customers, as Susan said, and we talked about, we're going to be adding 19,000 customers. The rate base varies obviously and tied back to our acquisition price there, but anywhere from $20 million to $25 million per -

Susan N. Story
President and Chief Executive Officer
A

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And also to clarify, because some people report it differently. When we say 19,000 customers, that's actually customer connections.

Walter J. Lynch
President & COO-Regulated Operations
A

Right.

Susan N. Story
President and Chief Executive Officer
A

Those are meters, not the number of people. So – and also, interestingly, of those 19,000, 13,500 are wastewater, very consistent with our target of going after wastewater. In Arnold, Missouri, we already serve water to those residents.

Walter J. Lynch
President & COO-Regulated Operations
A

And back to Haddonfield, what I meant by that was $28 million was our purchase price for Haddonfield for those 9,000 customers, 4,500 water, 4,500 wastewater?

Susan N. Story
President and Chief Executive Officer
A

And remember, these were approved -

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

Could you – purchase price for the sale -

Susan N. Story
President and Chief Executive Officer
A

These were approved through the referendum, but we have not yet closed on those transactions.

Walter J. Lynch
President & COO-Regulated Operations
A

That's right. We've got to get Board of Public Utilities approval on that. And, again, as I said, that'll take about six months to eight months to typically – that's typical and we're looking at mid 2015 before we get that approval.

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

Right. Do you have the Arnold and Russiaville purchase price in here? Were those disclosed?

Susan N. Story
President and Chief Executive Officer
A

We don't but we can get – whatever is disclosed we will get to you.

Jonathan G. Reeder
Wells Fargo Securities LLC
Q

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Okay. And then last question and I'll hop off. Any idea when that government might act on another military privatization? I mean you've got the last two, including one recently. Do you expect more in the near future to be announced?

Susan N. Story A
President and Chief Executive Officer

Well, predicting the Department of Defense with the federal government is an art that we have not perfected yet. We do have outstanding RFPs that actually go back all the way to 2010. And understanding who is going to award win is something that we continually monitor. And it depends on the service and it depends on the base, quite honestly. A lot of times it depends on the situation they've got with infrastructure. We do have outstanding RFPs. We are hearing that the Air Force may also have addition wins that they bid out. So, again, it's hard to predict. But let me go back to something else.

There's three ways that we make money in military. Awarding new awards is something that because it's so difficult to predict that we work hard on the other two, which is our O&M contracts. But also, once we have a base, they engage us to look at what the infrastructure needs are on that base. And each year within their budget, we bring them potential projects and they choose from those projects, which also increases the amount of work we do on bases. So, we don't just wait for a big award and say great, it was success. For us, success are all three components.

Jonathan G. Reeder Q
Wells Fargo Securities LLC

Okay. Thanks. I appreciate the time this morning.

Susan N. Story A
President and Chief Executive Officer

Thanks, Jonathan.

Walter J. Lynch A
President & COO-Regulated Operations

And, Jonathan, one thing – one correction. On the [ph] desk (50:07) in New Jersey, the cap is 5% of revenues, not 7.5%. I want to correct that for the record here.

Jonathan G. Reeder Q
Wells Fargo Securities LLC

Okay. Thanks.

Operator: The next question is from Spencer Joyce of Hilliard Lyons. Please go ahead.

Susan N. Story A
President and Chief Executive Officer

Hi, Spencer.

Spencer E. Joyce Q
J.J.B. Hilliard, W.L. Lyons LLC

Hey. Good morning, folks. Thanks for taking my call. Just wanted to touch very briefly on the ballot initiatives that were approved. I think from my standpoint, it was very positive to see a New Jersey, Missouri and Indiana, kind of, across the footprint approvals there. And my question is did you all go three for three on these initiatives or were there a handful that maybe weren't approved?

Walter J. Lynch
President & COO-Regulated Operations
A

No. I'd like to – we're batting 1.000, three for three. Really I think the recipe for success here was to make sure that our employees and the community leaders were hand-in-hand talking about the value that American Water can provide to the communities. That's really what, I think, was driver of success on all three of these.

Susan N. Story
President and Chief Executive Officer
A

And, Spencer, what was even more exciting, we didn't just win the ballot initiatives. We were two to one or greater on all of them. In favor of.

Spencer E. Joyce
J.J.B. Hilliard, W.L. Lyons LLC
Q

Okay.

Susan N. Story
President and Chief Executive Officer
A

And that's what we were very proud of.

Spencer E. Joyce
J.J.B. Hilliard, W.L. Lyons LLC
Q

Yeah. And I thought you all may have insinuated this a little bit, but these weren't areas where perhaps the American Water brand was already somewhat of a household name. Is that correct?

Walter J. Lynch
President & COO-Regulated Operations
A

Well, I'll tell you in Haddonfield, New Jersey, we surround the system. So we have a big presence in this area. So the brand is out there. And that's right. And also, in Arnold, we bought the wastewater system, but we have the water customers. So our brand has been out there. And I think that's helped us.

Spencer E. Joyce
J.J.B. Hilliard, W.L. Lyons LLC
Q

Okay.

Walter J. Lynch
President & COO-Regulated Operations
A

But the key to this has been our passionate employees, going door-to-door and talking about, again, the value that American Water can bring to the communities.

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Spencer E. Joyce
J.J.B. Hilliard, W.L. Lyons LLC

Q

Okay. Great. Thanks. That's all I had. Nice quarter.

Susan N. Story
President and Chief Executive Officer

A

Thanks, Spencer.

Operator: And our next question comes from Shivangi Tipnis from Guggenheim (sic) [Global Hunter Securities] (52:18). Please go ahead.

Shivangi D. Tipnis
Global Hunter Securities LLC

Q

Hi, guys. Thank you for taking my questions. I'm a little under the weather, I hope I'm audible enough on the call. I just wanted to ask you about your CapEx for Q4. Your earlier guidance in Q2 said it was about $1.1 billion. And year-to-date, it's about $700 million. And you expect it to be now $1 billion for the full year. So I was wondering if the Q3 CapEx was less than what you earlier anticipated or are you expecting a little lower CapEx, about $100 million lower, in Q4?

Linda G. Sullivan
Senior Vice President and Chief Financial Officer

A

Yeah. This is Linda. Let me answer that. The CapEx for the third quarter was what we expected. That was related to the regulated investments. What we are seeing this year is lower than planned investment on the acquisition side. And so that has enabled us to deploy more capital in certain areas on the regulated side. And that's really a timing issue associated when we deploy the capital. So, yes, we're still on plan for $1 billion. And, as a result of the timing issues associated with the acquisition, we have been able to deploy more capital on the regulated side.

Susan N. Story
President and Chief Executive Officer

A

And that's why, Shivangi, we started looking at a five-year capital plan. Prior to 2014, we reported capital year-to-year. We know that by separately disclosing last year's strategic and regulated acquisition capital apart from regulated investment capital that there would be some years that because of delays in being able to close on a deal, for example, if you have to have a referendum, et cetera. So what we saw is, just as Linda said, that you're going to have some timing issues. So that's why we disclosed now our five-year capital plans.

Shivangi D. Tipnis
Global Hunter Securities LLC

Q

Okay. Sounds good.

Walter J. Lynch
President & COO-Regulated Operations

A

And – I'm sorry.

Shivangi D. Tipnis
Global Hunter Securities LLC

Q

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Go ahead.

Walter J. Lynch
President & COO-Regulated Operations

A

No, no. Go ahead. After you're concluded.

Shivangi D. Tipnis
Global Hunter Securities LLC

Q

Okay. My next question is actually on the gallon usage on your slide 23 based on the customer class. The weather impacts are primarily related, I guess, to your residential usage of water, especially on the outdoor activities. However, your commercial and public gallon usage appears to have declined about 4% and 3%. How do you understand these declines and can you just provide some color on that?

Susan N. Story
President and Chief Executive Officer

A

Absolutely. There's actually quite a bit of noise that's included in these numbers, because we implemented our customer information system last year in two ways. And so the third quarter of 2013 includes a time period in the first wave of the implementation to where we were looking at our bills in more detail to make sure that they were appropriate before we sent them out. And so, in the industrial class mainly, we have lower billed water sales volume, because we were holding those bills. And so, there is some timing issues there as well. If we were to kind of normalize that, we would expect our industrial usage to be more in line with what we have seen historically.

Walter J. Lynch
President & COO-Regulated Operations

A

Yeah. And one more point on the Arnold acquisition. The total purchase price is $13 million and that's got to be trued-up as we work through the approval process. We're buying the collection system, not the treatment plant. And that's why it's a little bit on the low end as far as total purchase price for that number of customers. I'd just wanted to provide that clarification to everyone.

Operator: This concludes our question-and-answer session. I would like to turn the conference back over to Susan Story for any closing remarks.

Susan N. Story
President and Chief Executive Officer

Thank you so much. I appreciate all of you on the call. I know that we typically are at the tail end of a very long quarterly earnings call season and that you all are very tired. And we appreciate the time and effort. I just want to close with just a couple of sentences.

And I just had to tell you. Walter mentioned it and so did Linda. We had a really good financial quarter. We are poised for long-term growth and a healthy company. And it's because of the employees we've got. I cannot tell you enough going around looking at the expertise, but, as Walter said, the passion that our employees have for our customers and for growth and finding ways not just to grow the numbers for financials, but to bring new customers in on our system, so that they can enjoy the benefits that our current customers do.

So it's a great time to be in the water business. We look forward to a great year. And we hope that everything goes well for you all. And if Jonathan Reeder is still on the call, I just want to tell you War Eagle. See you all next quarter.

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Operator: The conference has now concluded. Thank you for attending today's presentation. You may now disconnect.

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AMERICAN WATER WORKS, #26294-14
AMERICAN WATER WORKS ANALYST DAY
December 17, 2013, 12:30 PM ET
Chairperson: Jeffry Sterba (Mgmt.)

(Video Presentation)

Jeffry Sterba: Well, good afternoon. You know, it's always a little weird when you watch yourself on TV; do I really look that bad? But I want to welcome you this afternoon. I think if you look outside, this is kind of proof positive of something we've told you many times before – we don't control the weather. But I understand; it's not too bad, although the subway seems to be having problems.

I'm sure a number of you all saw a little announcement that we put out last week that, as of May, I'll be retiring and will be succeeded by Susan Story, who I know most of you have had the opportunity to meet. This is something I've tried before, and I didn't succeed last time retiring so I'm going to try it again, and when you do this, what you hope is that your personal plans and aspirations jive effectively with where the company is that you're going to be departing. And I got to tell you that what I think you will see over these next intervening months is going to be an exceptionally smooth transition, so it'll give me a chance to go back and fulfill some commitments that I made the last time I tried this, but the Company has come so far and accomplished so much but yet has got such great opportunities ahead of it, and to have Susan Story to lead the team and take it through that next step is just going to be wonderful because everything that we've really accomplished is because of the team of people that we have. And so I—let me just take a quick moment, if you haven't met them all, to introduce them to you so you understand and know some—a few of these folks who will be joining me in the presentation, but that you will understand why we've been so successful.

Let me start with Walter Lynch, who is the President of our Regulated Operations and has done a tremendous job in driving our cost efficiencies, as he'll talk about later; Sharon Cameron who has run our market-based business and, in fact, was one of the initiators of the Homeowner Services business a number of years ago, and you have—we'll talk about the great results that we've had in our market-based business; Kellye Walker, who is our General Counsel and Chief Administrative Officer; go back to the back, John Bigelow, John runs our Business Services and so is—has been the prime driver for our development of a culture of continuous improvement and the push on our Six Sigma and the like; Mark Strauss, who runs our Strategy and Business Development, and if you want to hear some great stories, Mark is a great storyteller. And then also with us today are two people that many of you know, Mark Chesla, our Controller, and Bill Rogers, our Treasurer.

And so this is the team I've had the pleasure of working with. Now I'm a little biased, but I also tend to think that we've got one of the best IR teams in the utility space, led by Ed Vallejo as Vice President of IR, so Ed, you get to stand up. And yes, I still don't understand why he doesn't pronounce his name the right way, Vallejo, but you know, he gave up trying to do that a long time ago, but he is ably joined by Muriel Lange in the back; and where's Cathy? I think she's up front, Cathy DeMots.

So one of the things that you learn with an IR team is it's best that they remain calm, so to help ensure that, let me refer you to the cautionary statement concerning forward-looking statements. You have it in front of you and it's now on the screen, so I have done my duty, Mr. Vallejo.

Let me just briefly run through what we're going to talk about today and who's going to do what. I'm going to spend a little bit of time on our strategy and looking, both how we got where we are and what we're doing to continue to advance the Company, and then Walter is going to get up and talk about our foundation. This is what we rely on as our core business. It has been and always will be our core, and it has come a tremendous distance in a fairly short period of time in terms of improvement. And then we'll take a short break, and Sharon will bring us back to talk about how we take our core business and build adjacencies, where we create some market exposure and a higher growth opportunity but do so in a regulated-like risk parameter set. And then Susan will come up and translate all of that as to how it fits within our financials, and then we'll come forward and do some Q&As with whatever questions you all may have as a result of that and see if the snow has stopped by then.

If you think about what we have done with American Water, I think, hopefully at the end of this session, there'll be six key takeaways that you can take with you about our investment and why we think it's so—such a solid investment. Building a culture of continuous improvement is foundational. You know, a lot of times in these presentations, we get focused on numbers, which are important, but numbers are the result, not the start, and this culture of continuous improvement is foundational for us, why? Well, think about it. It's what makes the success that we've had replicable. How many times have we seen companies that have done a great job in cost management, only to see it creep back into their business two or three years later?

The way in which you combat that is to ensure that you truly build a culture of continuous improvement, not just on the cost management side but also on your business extension—business line extension side, so the ability to look at adjacencies and for our people to always be looking at how can we take what we do best and extend it into another market or add another product or create additional value for customers through something else is core to what we've been able to accomplish. It is the primary driver of us being able to control our costs and minimize consumer price increases. Remember, one of the things that we've talked about a lot is a small equation of a dollar of operating cost has the same impact in customer rates as $6 of investment, but that $6 of investment creates greater service, better service for the customer and generates $0.30 per year of earnings. So the better we can control our cost side, our operating cost side, not by slashing and burning but actually through continuous improvement, reducing those costs, the greater headroom we create to invest capital to better serve customers and provide earnings for our owners. Let's put some numbers to that. The plan that we are—we have implemented as of now will save over $900 million of operating cost from 2012 through 2018. That's $900 million that creates headroom, which we can then use to put more investment into our systems, and as Walter will talk about, that's something that water and wastewater systems across our country desperately need.

We care greatly about the rate impact that will occur to customers, and as we've talked about before, a number of us on the electric side saw what happens when you just kind of say, utilities said, "well, we're rate-regulated; we'll get these costs recovered," and regulators found ways to say no and, at the end of the day, caused over $40 billion of shareholders equity to be written off over about a seven-year period in the late '80s, early '90s. That is not going to happen to us. Why? This plan that we're implementing will allow us to have bills for our customers go up, on average, over the next five years across all of the states we serve by 2% per year. Now, that doesn't mean every year in every state, 2%. No, it varies from 0.5% to 5% across the state for that five-year period. So some years it may be higher, and then it's 0 the next year, but those are averages and that is including every state that we have. So when you think about a value equation of 2% rate increase, 900 million O&M cost reduction, growth in the 7 to 10% range, we think we start to have something that really hums. It is a lot of that cost control that helps ensure that the regulated and regulated-like cash flows are the main driver of our earnings per share growth.

Now, one of the things that's really important is within that 2% rate cap or rate structure, on average, what does that mean we can do on the investment side? So over the last five years, American Water has invested $4.4 billion, almost all of which was into the regulated end of the business, so 4.4 billion over the last five years. Over the next five—and that's through to '13, 2013. Over the next five years, we will invest $5.8 billion, 300 million of which we have set aside as strategic investment. This can be used for things like concessions or in the shale arena or other things that we'll talk about, biogas, use of water waste to develop biogas and then to sell that biogas, so there are a number of things it can be used for. The lion's share of that $5.8 billion, as Walter will go through in more detail, is committed to our regulated business, and that 2% average rate increase across all of our states over the five years includes that level of investment, which is, as you can see, a sizable increase from what we've done in the past five years. And even with that, investing that level of capital, under normal conditions, normal operating conditions, we see no reason to issue any additional equity for the foreseeable future.

So now you take those components of 2% average bill increases, $900 million O&M reductions, $5.8 billion of capital, 300 million of which is set aside for strategic capital, all helping fuel and which we're going to talk in more detail about, the 7 to 10% growth, and it provides the great opportunity for strong dividend growth. And you couple that with a fairly transparent policy which says we will pay out 50 to 60% of earnings in dividends, today, we're just under 50% payout ratio if we look at the midpoint of our 2013 earnings, and that we will have dividend growth at a rate similar to what our growth rate in earnings is.

Now, just like the culture of continuous improvement is core, so is having the customer at the center of what we do. And, you know, a lot of companies say that; the question is, what do they really do? Well, some of you have heard us use the formula, if you will, B greater than P greater than C. The value of the products and services we provide our customers has got to be greater than the price that they pay, and the price that they pay has got to be greater than the costs that we incur. Half of that, the front half of that, is a customer equation. The back half of that is an owner equation. We have to make sure that those things stay in balance. So when we put value and creating superior value for our customers, how does that translate? Well, certainly, continued capital investment to help make sure that we've updated the infrastructure as necessary, and we've just talked about investing $5.5 billion into our regulated business, and we have to have affordable prices. Well, it won't be 2% every year for every customer, but average over five years across our 16 states, 2% rate increases.

Reliability matters, but reliability is not just when I turn the faucet on, is there water? Or, maybe more importantly sometimes, when I flush the toilet, does it go down? But it's also the health and efficacy side, so does the water have an odor? Does it smell? How does it taste? Because remember, this is the one utility that people ingest, so to help make sure that, that water is clean, safe and usable. Now, when we think about things, as we've talked before, Hurricane Sandy, it still is amazing to me we only lost 2,000 customers through all of the implications of super storm Sandy, and when we went through the droughts in the Midwest in 2012, we didn't—there was no instance where we didn't have water to supply customers.

So we've done things to harden our system, to build security and safety within our system so we have redundancy and that we can do things that help provide greater value to customers. You saw in the screen, on the—in the video, Mark LeChevallier talking about what we've done – and that was only one example of many – on the energy water frontier to help—using technology to reduce energy use and reduce our carbon footprint. We also use that technology, as he mentioned, in areas like reducing leaks or better leak detection so we can catch small leaks before they become main breaks. But our future of putting the customer in the middle is to help also extend that technology so it's more customer facing so that in the future, we can call a customer and say, "Based on what we see happening in your meter today, or yesterday, we think you've got a leak on your side," because today, they have no idea, and if you can stop a leak, particularly then through our Homeowner Services side, you can stop a leak, take care of it before it becomes a full rupture, that's value added to the customer.

Walter's going to spend some time talking about regulation and the way we approach building constructive relationships, and he's going to give a number of examples about the things that we do to help enable that. I want to use—I want to give another side of that though. A lot of times, it's easy to say, "Well, the regulators didn't treat us well," and, you know, I probably even said that at one point or another and one particular commission that comes to mind. But a lot of times, the first thing you got to do is look at yourself and say, “What did we do to contribute to that?” Let me just give you one example. If we take the State of Tennessee, when I came to the Company, we had just finished two rate cases, you know, over the three years prior to that. Each of those rate cases took over 20 months, were fully litigated and had bad outcomes. And we looked at that situation by—under Walter's leadership and said, "You know, in this one, we need to look at ourselves. We're the problem." So we changed up management, we changed out the approach, we brought in people that had a different ethic and a different approach to the political and regulatory process but also in running a business. What was the result? The next rate case we filed, from the day we filed it to the time rates went into effect was five months. That's also a state where we just closed an acquisition yesterday to add another 2,800 customers to our Tennessee system. So a lot of times, we'd look inside and say, "Are we doing the right stuff?"

Our theory goes another step and it's that notion that results are, in fact, that. They are results. They're not the things that we engineer. They're the sum of the things that we do to help serve customers, to do effective cost management, to innovate and bring technology to bear, the kind of constructive relationships we build with our regulators on our regulated business, and are we really part of the community that we serve. Let me give you an example of that. One of our communities in Illinois has the opportunity under an 80-year-old agreement to buy the system every five years. They—all they have to do is say, "We're going to buy it. We want it." They just went through that and the outcome was they said, "No, we're not buying it." Why? "Because you all provide great service and we think the rates are fair." Now, that's in an arena where too all frequently you hear about people saying, "Oh, we need to take our water systems back." But Peoria said, "No, we like the service we're getting, we like the prices that we're getting, you provide great service," and they passed. These are the things that will lead us to the kind of financial prospects, financial growth and financial results that I think you've seen from us and that we'll talk about.

So speaking of that, if you are a shareholder today, we hope that you've been happy with the 139% total shareholder return that we've provided to you since the IPO, and that we hope after our discussion today, you'll come to the conclusion that maybe it's worth putting a little more money into. Or if you're not a shareholder today, it's not too late, because I can tell you, the things that I was excited about when I came to the Company three and a half years ago are even more so, in my eyes, about what Susan and this Company is going to be able to do going forward.

So let's talk about earnings and earnings growth. You know, you all have seen us go through some different kinds of presentations trying to communicate what is growth going to mean for us, and we started with this which we euphemistically called the sandbox. And in this sandbox, what we are trying to demonstrate is that what drives our growth is going to change over time because, frankly, we had a lot of ROE catch-up to do. We also knew that we could drive costs out of this business that were going to add value. You all as analysts kept looking at that, saying, "Okay, but where on that line are we?" Well, we're not on one point; we're at different points on different lines. And we went through that for a while and we said, "This isn't working." Now, you can blame me for the sandbox. This was my creation.

So our next incarnation was, when you think about it, we really have core growth, we have our core operations and there are different components that grow within that, and we have enhanced growth, and marvel of marvels, the idea of putting it into a water pitcher came out. Now, this one you can blame on Ed. This is Ed's creation. We went along with it because he'd given me such grief about my creation. So I decided I'd be polite. I would—we would do this. So these are the two things we've used to communicate growth and you know, quite frankly, they didn't work all that well. Wait for it. So we decided, let's try something different, because what our hope is and what I think you will see us doing today is providing a great deal of added clarity and specificity to our projections and our business directives and what really makes up that growth. So – ought to be a drum roll – let's introduce you to the triangle.

We're using a triangle to kind of give a sense of size but also components, and this will change from year to year. So, for example, this is looking at our growth between 2010 and 2012. We are on a weather-adjusted basis, we earned a 17% CAGR on EPS growth, and what were the components of that? Well, the biggest was our regulated investment, the making of the investments we made in our 16 regulated states, that generated 8 percentage points of that 17% growth over that period from '10 to '12, 2010 to 2012. The improvement in our ROE, and really, this is comprised of two things, regulatory lag but also portfolio optimization, so the exiting of certain states where we just felt it was not a good place for us to put our capital; that generated 6 percentage points of the growth during that window. Market-based business generated 2 percentage points, and keep in mind, the market-based business only accounted for about 4% of our net income and about 9% of our revenues at that point in time, but it added 2% of our—2 percentage points to our growth and acquisitions that we made added a little less than 1%. So that's 2010 to '12.

Now let's go to '13, and in '13, going again from a weather-adjusted 2012 result, which Sharon—Susan will go through in more detail, to let's call it the midpoint of the landing zone or that range of high and low, it—we have a range of what the impacts are. So regulated investment is still the most important, it's our core, and it's generating 6 to 7 basis points of the growth we'll experience this year. We have continued to make improvements in our regulatory lag and the full implementation of transactions that occurred in 2012, and that's another 2 to 3%. Our market-based business has continued to grow 1 to 2%—adding 1 to 2% growth – it’s growing obviously much more rapidly than that – but it's adding to the Company bottom line 1 to 2% of growth. Corporate expense reductions, which Susan will go through, because you'll see this also recurring in '14, Susan will go through it in detail, but that's adding 1 to 2%, and then acquisitions, frankly, less than 1%.

Let's go to '14. So in '14, we've told you in the announcement that we made this morning that we've established a new range, and that range is 2.35 to 2.45 per diluted share. And if you look at that range, that's roughly 7 to 10% growth, again from the 2013, and what are the components? They've shifted a little bit in composition but, again, regulated investment; that's going to be 4 to 5 percentage points of the growth. Corporate expense reductions, which Susan will go through in more details, 1 to 2 percentage points; acquisitions, 1 to 2 percentage points, and this is not so much acquisitions that were going to make; it's frankly internalizing the ones we've already made because of the acquisitions that we made in 2013, most of them are closing toward the end of the year. So they really didn't affect '13 that much; they will affect '14, and Walter will spend some more time regarding our acquisition strategy. Market-based business is going to go about 1% in shale. Let me just spend a brief minute on shale.

If you look at Butler County, and I don't know how many of you know Pennsylvania that well, but Butler County is out in the western part, a little south, but it's in the western part of Pennsylvania and it's in what's called the liquids-rich fairway of the Marcellus. It's really kind of in the heart of that liquids-rich fairway. In 2013, we will supply water to 70% of all wells drilled in Butler County. If we look at the entire state, we're supplying water to 8% of any fracked well that's been drilled in 2013. Now, this is largely—it's all been done on a regulated basis. We have 34 points of interconnection with 18 different companies. We are, today, working with about 11 companies on another 14 points of interconnection with mainline extensions to serve them in 2014. In fact, we'll probably build as much pipe to serve the shale industry in 2014 as we did in 2012 and '13 combined.

As we work with these entities – and these are more and more the—what I'll call the majors and the mids – as we've worked with them, we are finding that there are other ways in which they need assistance, and some—and in many instances, we're now talking with them about doing something, not on the regulated side but on the market-based side. But for us to do it, it has to be done in a way that takes—makes the risk look regulated-like, so we are not going to build pipe and have them come. We will build pipe when there's the committed demand for that pipe, for that water. So we're not—it's not going to be a speculative play, but the—and it's now moving, it's not just Marcellus, it's Utica. And so as we look across that range, you're starting to see patterns develop where we can see and are working with drillers as to how we can meet those needs by building some trunk lines from which they can take spurs. So that's 2014, 2.35 to 2.45 per diluted share.

Now, let's go to the long term, which is looking '15 through '18, and so this—these ranges are a little wider because, frankly, they're going to vary year to year, and so we're now talking about a three-year period instead of just one year over another year, but they're made up pretty much the same – regulated investment capex is 3 to 5%; market-based businesses will add another 2 to 3 percentage points of growth; acquisitions will be 1 to 2%, and that's because, as Walter will talk about, what we have seen on the acquisitions front this year is probably more the norm as we go forward, not so much on the waterside but on the wastewater side. Shale, broader—a range between 0 and 2% because if some projects go, they can move the needle fairly substantively, and then the other, what's the other? Well remember, I talked about setting aside $300 million for strategic—you did that very well. You—no one saw it; it was very graceful, and I'm not going to walk over there. So the—remember, we talked about the $300 million that we set aside. This is what can fuel the other. What would it be? Well as I said, it could be concessions. It could also be in the shale frontier or in the biogas world as we move more into wastewater side. So that gives you a sense of the 2015 through 2018 side.

So when you take all that and you translate it, what are we saying? Well, 7 to 10% long-term growth, we're reiterating that, frankly, our level of comfort with that has gone up. As we've done more detail in our planning and we've progressed the way that we have, we can see our pathway where we will be able to generate that kind of growth, provide better service to our customers and not dramatically cause unacceptable rate increases. And again, I'll remind, the 2% is over time and across all states, it can vary fairly significantly from 0.5% over 5% a year, depending on the state. The 7 to 10% EPS growth, we will be free cash flow positive by the end of this period, which when you think about the amount, we're investing 3 times our depreciation, that's pretty significant.

We're increasing our capex to 5.8 billion from 4.4 billion over the last five years. We have no plan, no need for equity offerings to create dilution under normal operating circumstances. It means we could, if we saw a tremendous opportunity, it creates value, but we don't have to, to finance our baseline investments to provide safety and security of supply for our customers. And the average customer bill, about 2%. Now, that 2% on the bill includes the impact of declining usage, which we continue to forecast will occur with our residential customers.

Now let me close with this pictorial. Ed put together a group of utilities that are reasonably similarly sized; some are a little smaller, some are a little bigger, but generally within our universe, and then included three water companies – ourselves, WTR and CWT in that group. And what we did is we took the consensus estimates for long-term growth and what their P/E ratios are, and you can see that the consensus for us is 7% growth and our P/E has moved up. We've closed a lot of the gap, but not by any means all of it, that has existed between ourselves and other water companies, but in reality, if we then not only look at that growth, but if you took a look at the midpoint of our range of growth of 7 to 10%, what does that imply relative to our P/E? I mean, when I came to this Company and I realized that we traded at a discount, you know, all the obvious things, why? And you come up with all these reasons, well, we don't have a track record; we've only been back in the market for a very short period of time; well, you know, your return on equity is low; well, you don't have—you know, you really are still so institutionally held you don't have the stickiness of retail buyers. Well now you look at what we've accomplished.

We're pretty happy with the track record that we have established. We've shown year-over-year growth frequently in excess of expectations. We've changed the internal part of the Company to make sure that that kind of growth is—continues to be replicable. We've taken our retail shareholders – this is really one of Ed's great successes – from about 12, 13% at the time of the IPO to now about 32%, and he keeps creating phantom new retail holders to increase—I'm just kidding. But we did, we did. We went out to St. Louis and found out we had another four million retail customers we didn't know were retail customers. But—so that stability and that people buying into this notion of dividend and dividend growth and the prospects for the Company takes hold. We still trade at a discount.

Now, some of us feel so good about this business and the way—and where we've come that maybe we think we should trade at a premium. But I'll just take elimination of the discount because we still are trading at about a 1.5 to 2 turn discount, which we hope to see vaporize over time as people become even more comfortable with us. So you all have to decide where you think that growth will be, obviously, and you'll have to decide whether or not what we're doing is replicable and whether or not this provides the kind of insight to give you a better comfort level about where that growth will come from.

Speaker: (Inaudible) I understand the P&L is still very low (inaudible).

Jeffry Sterba: Yes, it has, you know, not as good as we did a long time ago but very well, and I was chair through 2012, so I was still involved with them, but they've done very well. And I think—here's a—this is a—New Mexico changed its regulatory environment by law, and that had to happen, so they made changes to the statutes associated with regulation in that state and that helped stabilize it did a bit.

So with that, I'm going to turn it over to Walter to talk about our fundamental Reg Ops.

Walter Lynch: Thanks, Jeff. Okay, so our success is built on Regulated Operations. I want to start with a quick overview in our industry, and there's an urgent need to invest in our water and wastewater infrastructure in the United States. We have approximately one million pipes in the United States and every two minutes, there's a major main break, and I'm sure many of you have seen the main breaks in your communities where you live and where you work. They're very disruptive to people's lives on a daily basis. We lose two trillion gallons of untreated water, two trillion gallons a year of untreated water at a cost of $2.6 billion. That's about 15 to 20% of the treated water in the United States, and just to put it in perspective, two trillion gallons is about the annual household usage of 22 million homes.

On the wastewater side, we have approximately 800,000 miles of collection pipes. Many of those pipes and the infrastructure was put in years ago and they are in dire need of repair, and they're also posing a risk to the groundwater. Nine hundred billion gallons of untreated sewage is discharged every year. Now, think about Hurricane Sandy that came through here not long ago. Eleven billion gallons of untreated sewage was discharged in those affected states, so 11 billion gallons; to put that in perspective, that's the area of Central Park 50 feet high. That's a lot of untreated sewage. And in Long Island, two billion gallons were discharged into the streets, and there's still a lot of ongoing work to clean that up.

By 2020, 44% of our pipes are going to be classified as either poor, very poor or life elapsed. That's up from 10% in 1980 and it's pretty indicative of the lack of investment in our infrastructure. So we're going from 10% in 1980 to 44% in 2020, over 40 years, and that's why the American Society of Civil Engineers gave the water and wastewater infrastructure a D rating, and that was the lowest of any infrastructure rating they gave. And there's been many surveys, but they range anywhere from $650 billion to $1 trillion as far as the amount of investment that's going to be needed over the next 20 years to improve our water and wastewater systems.

So let me give you a quick overview on American Water's Regulated Operations. We serve 11.7 million people in 1,500 communities in 16 states. We own 80 water treatment plants in various sizes, anywhere from a couple of million gallons a day up to 150 million gallons a day. We own 100 wastewater facilities. We have 87 dams, and I'm going to talk about—and Rob MacLean talked about a dam. We did have 90; we decommissioned three in the last year. And we have more than 46,000 miles of mains and collection pipes in American Water. The Regulated business provides about 90% of the revenues and we operate from coast to coast. We operate from New York to California. That really—that geographic diversity helps us in a number of ways but primarily from the weather, so it could be raining and wet in the Northeast, which has happened many times, and particularly this year, and that would be offset by some dry conditions either in the Midwest or the West, like happened in California this year. And also, because we operate in 16 states, we're able to mitigate regulatory risk, and that's unlike many other utilities, operating in 16 states. As you can see here, our top two states, New Jersey and Pennsylvania, account for about 40% of our population served, and our top seven states account for about 87% of the revenues on a last 12-month basis, ending September 30th of this year.

We're very proud, as Jeff said, of our performance in American Water, and I want to give you an overview of some the key performance indicators, our targets that we've set in accordance with those and the actuals in 2013. So on a customer satisfaction perspective, this is vitally important to American Water for the long-term success. We survey our customers on a routine basis and ask them how satisfied are you, overall, with the service of American Water? And they're giving five answers; so we have extremely satisfied, very satisfied, somewhat satisfied, somewhat dissatisfied, and then dissatisfied. This measure is based on our customers answering in the top three categories, extremely, very and somewhat satisfied. We set a goal of 90% or greater, and we're at 90.5%, so we're very satisfied but we want to continue to drive that number up.

On the second measure, customer service quality, those are the customers that call our customer service centers and ask us to provide a service for them. We then send a service order out to the field, the field service rep goes to their home and conducts some service. So within seven days of completing that service, we poll our customers and asked them, how satisfied were you with the outcome of your contact? This measure, 85%, is the top two category, so the guy's got to answer, extremely satisfied or very satisfied, and so that's a pretty aggressive goal of 85%. Happy to say that we're over 87%, and this is through three quarters, September 30th of this year. Now, this is all in light of – and I'm going to talk about in a second – SAP implementation that we've been undergoing for the last four to five years. We've gone live with a number of different platform systems and this really shows the dedication of our employees in providing the greatest customer satisfaction for our customers.

Environmental compliance, this is another area we take great pride in. We establish a more challenging goal every year. So we have this year a goal of not to exceed 15 notices of violation, and you can see where we are at five. But to put this in perspective, American Water serves about 5% of the US population. Last year and on average in prior years, there were about 11,000 notices of violation. So if we were like the industry on that percentage, we would have roughly 550 notice of violations, and we have five, and our aspirational goal is to get it down to zero. And this is, again, the dedication of our customer—or our employees in making sure that what we're doing is in the best interest of our customers. On an efficiency ratio, this is a measure of how efficiently we run the business. We established this goal three years ago to get below 40% by 2015, and you can see, we're performing against that. We're at 40.3% in the last 12 months ending September 30th, so we're almost there more than two years early, and I'm going to talk more about that in a minute.

And lastly, SAP implementation. We've been at this for four to five years, and this has been a key project of mine, Jeff's and the entire ELT. We spend a lot of time on this engaging with the business. We've implemented SAP platform systems, we've implemented new financial systems, new asset management systems, new customer information systems, new HR systems and new supply chain systems, and I've got to say, we are very pleased with the outcome of our implementations, not to say we don't have problems; we do have some problems and we're working through them on a really consistent basis and a professional basis to make sure we're addressing the issues of our customers in real time. But overall, I couldn't be more pleased with the progress here, and I know Jeff has said this on many occasions, and this really touched every one of our employees and customers. And so our employees were up for the challenge and weathered through a lot of challenges along the way, but you can see the results from our customer surveys. It's right on track of where we want to be.

So constructive regulatory policies. We work very cooperatively with the commissions in each of the states where we operate to reduce regulatory lag, and we do that by looking at infrastructure surcharge tools and forward—future test years. You can see the red line that indicates 60%—2014, 60% out of our invested capital is going to be added to rate base in the year it's invested, and that's up dramatically from 30%, so we've doubled that in the last three years. Tremendous progress. We're going to continue to work with the commissions to enhance these mechanisms, but right now, we have this mechanism in five—our five largest states, including New Jersey, and I think that's a very successful program, and we have future test years in eight of our states. So tremendous progress over the last few years, making sure that we're reducing regulatory lag.

So this shows the long-term view of our capital program. This is the first time we've done this, so you can see out to 2018, and as Jeff said, we've increased our investment in our infrastructure dramatically. The last five years, we invested overall $4.4 billion. The next five years, we're going to be investing $5.8 billion. That's a $1.4 billion increase. On the Regulated side, the last four years, we were up 4.4 billion, obviously the vast, vast majority of the capital invested was in the Regulated side. And this year, including growth—or this five-year plan, including the regulated acquisition, is going to be at 5.5 billion. The other 300 million is what Jeff talked about as far as providing capital for the market-based businesses to grow.

So included in this is the biggest component of this, obviously, is regulated—the Regulated business. In this, we have pipe replacement that I've talked about, upgrading water and wastewater facilities in our two large California projects. In the video, Rob MacLean talked about them, the San Clemente Dam and the Monterey Peninsula Water Supply Project. They're all in this number. Also, in the red, is our regulated acquisitions. I'm going to talk a little bit more about that in the future, but those are utility acquisitions, not concessions or anything else, utility acquisitions that are in our plan.

So you can look at the regulated capital by purpose; the biggest component is asset renewal, and again, that's back to pipe replacement. As I said before, we have 46,000 miles of collection pipes and mains. On an annual basis, we're going to be replacing about 300 to 350 miles of pipe. We also are upgrading water and wastewater treatment plants. To give you an example of some of the work that we do on a routine basis in American Water, we're upgrading—we're doing basin work at our (inaudible) plant in Chattanooga, Tennessee; we're doing electrical work at our central plant in St. Louis, Missouri; and we're doing general rehab work at our (inaudible) Millstone plant not far from here in New Jersey. Those are the things that we typically do in our business and we do them on a routine basis.

Next category, regulatory compliance. There's a lot of things in there but the biggest component—the two biggest components. One is length of service meter change-outs. We're required by the commissions to change our meters every so often, anywhere from 10 to 20 years, and so we do that across American Water and we change out anywhere from 250,000 to 300,000 meters every year. That's the biggest component, and we do that in a way that we're implementing new technology. So all of those meters are automatic meter readers, and I'll get to that in a second.

The other component, if you talk—we talked about the two major California projects, they're in regulatory compliance as well, San Clemente Dam and the Monterey Peninsula Water Supply Project. And lastly, capacity expansion. That's where we expand our services within our existing franchise areas, and that includes additional mains and valves and hydrants, those kind of things, and meters to expand within our existing service territories.

As Jeff said, we strive to build a culture of continuous improvement in American Water, and part of that continuous improvement is operating as efficiently as we can, and I think this tells a really compelling story. If you look back to 2010, our O&M efficiency ratio was 44.2%. We have been able to drive that down, and we're projecting in the landing zone this year of 39.5. Remember what I talked about before in our targets; we established a long-term target of less than 40% by 2015. Based on our landing zone for 2013, we're going to be below that target, and that requires dedication and commitment that we have from our employees in American Water. We've also established a long-term goal in 2018 to get down to 35% or lower.

When we first established aspirational goals back in—three years ago when Jeff first joined, we established, okay, we're going to have an aspirational goal of 35%, and there were a lot of people were going, "Where are you guys thinking? That's way too low." And now that we've worked for it and we're below 40% at the end of this year, that looks so doable and we've built that into our plan. So the 35% is a commitment that we're making to get down by 2018.

If you look at the pipe replacement, a lot of our investment obviously is in pipe, and what we've been able to do is drive down the replacement life from 250 years, if you look to 2010, down to our projected in 2014 of 150 years. Our goal is to get down to 100 years but we've got to balance that with the impact on customers, and as Jeff said, the average annual increase for our customers on their bills is about 2%. We can get down there sooner but it's going to have an impact on the customers and what they're going to be paying on their bills.

I want to re-emphasize one of the things Jeff said. Our employees understand the why. That's very important. Why do we need to drive cost out? When I first joined the Regulated Business back in 2005, there was a lot of questions around, well why do we need to do that? We can just pass those costs through; and that's not the formula for success in this business. We want to continue to invest so we need to be able to take cost out of the business, operate efficiently so that what we're doing is asking for a recovery on our capital, not pass-throughs. So all of our employees understand the $1 of cost equates to $6 in capital. That's very important so they understand that. So we're providing better service with that capital investment, and then from a shareholder perspective, we're able to earn $0.30 on that investment.

And if you look back to 2009 and 2010, our rate filings, our revenue requirement of rate filings had 58% of our revenue requirement asking for a recovery of operating expenses. In the rate filings that we have right now, that's down to 6%, so we went from 58% to 6% in a short period of time, in three years. The vast majority of our revenue requirement in our filings is due to recovery of capital, 94%. That's something we're very proud of at American Water.

So we look to growth. This tells another compelling story. 2010, '11 and '12, we averaged about 5,000 customers a year and adding to our customer base through acquisitions. You can see in 2013, we're going to be about 30,000 customers. Just to put it in perspective, those 30,000 customers, that's more than the five prior years combined. A big part of that 30,000 is a 20,000 customer acquisition that we did in Dale Services in Virginia, and it was a private wastewater company that we just closed on last month. That's an excellent fit for us, and let me explain why.

We own the water system in the area, so essentially, we're providing service now on the wastewater side for the customers that we have on the water side. Well, what does that do for us? Well, we're able to operate more efficiently, provide better service. We're using the same trucks and employees who provide the wastewater service as we do the water service. That's part of our long-term growth strategy.

If you look at the targets in 2014, we've listed a number of targets here. These are targets that we expect to close in 2014. If you add up the numbers there, it's well in excess of what we closed in 2013. Many of these are on the wastewater side; and another great thing too is that this culture of growing our business and the need to grow our business is really prevalent across the entire system, 16 states on a regulated basis where we're operating. So everyone's out looking, and so it doesn't require—for us to hit our target for this year, it doesn't require us to close one big deal or two big deals. There's a multitude of deals that we're going to be closing across the business. This is a great story. Stepped up in 2013, a lot of this was due to the work that we did in the prior years in establishing where we want to grow, putting the right team in place and then effectively executing on it.

So you're asking yourself, why is your pipeline more robust? What's different now? We looked at this in two different ways, from an external perspective and an internal perspective. On the external factors, continuing aging of the infrastructure that I talked about. Every year, it gets worse. Every year, we're not investing in our pipes on the water and wastewater side, upgrading our water and wastewater treatment plants, so there's a need, so less attachment to wastewater than there is water. We continue to focus on the wastewater, and when we're talking to municipalities, they're much more willing to talk to us about wastewater acquisitions than they are the water. Not to say we haven't done water and continue to do water, but they're much more willing to talk about acquiring their wastewater system. And EPA regulation's increasing, so it's posing a challenge for many in the industry because it's going to require significant capital upgrades. There's also an increased effort on part of the EPA and on the regulatory bodies in enforcing existing regulations, and there's a number of additional consent orders out there that are posing problems from a capital investment perspective for many of the municipalities. So those are the external factors driving our growth.

From an internal perspective, we have a new focus on wastewater, as I've said. We've got tremendous expertise internally and experience internally to drive this side of the business. We have a strong presence in communities. Part of the American Water model is that we just don't have 50 people in business development; we've got 7,000 employees in business development, and this is getting better every year. Our employees are engaging in their communities, they're talking to people and they're uncovering opportunities, and we're seeing those opportunities come to fruition, and more cost-effective service when we have both customers. Dale Services is perfect example. We have others. When we're providing service with the same employees, the same trucks, the same back office, it's much more cost effective and efficient and better service to our customers, and we're going to continue to go down that road.

So one of the things we're doing, we looked at the external factors and what can we leverage internally to drive higher acquisitions in our Company? So don't take from this that the dam of opportunities is going to break. It's not. We get asked that all the time. With all the problems out there, why aren't you acquiring more systems? We took a very focused approach. We looked at the external factors. We leveraged our internal capabilities to address those, and that's what you're seeing in 2013 and will see in '14 and beyond.

And this is my last slide. I'm going to spend a little bit of time on this. You can see here the key strategic objectives, really centered on investing in our infrastructure, growing our business and mitigating regulatory lag. Those are the three things that are contributing to the 7 to 10% EPS growth. So what we do on a broader scale, we look at what key strategic objectives do we want to accomplish over the long term, and we say, as Jeff said, what enablers are we going to put in place to allow us and enable us to achieve those objectives? And it's not just filing in a rate case. That's too late at that point. You've got to do a lot of work leading up, having a constant discussion and interaction with the commission and municipal leaders, and then we set key strategic—or key actions by people who have accountability of delivering these, and that's what, on the right, the enablers, that's what's meant to show there.

This is a result of our efforts of the last couple of years, and I want to take you through some of these. The single tariff for water and wastewater. This is as a result of Act 11 in Pennsylvania, which allows us to combine the wastewater rates into the water rates. Let me give you an example. If we made an acquisition, which we have many times in Pennsylvania on the wastewater side, typically as I've talked about, they require significant capital upgrades. When we do that, the increase in rates on those wastewater customers, so we've had to go in and ask for 100, 150% increases. We know that's not sustainable, so we work with the commission, we work with the legislature, say we want to be able to do more wastewater acquisitions, so let's come up with a mechanism where we actually work those into the water rates. So now if we do the same acquisition and we have those capital upgrades, those costs are going to be shared across our entire customer base, including water, to mitigate the impact of those increases. That's enabling many more wastewater acquisitions in Pennsylvania, and we actually completed one and integrated into the rate case that Pennsylvania has, right now, they're going to be addressing later in the week.

Enabler two, facilitating acquisitions of smaller or troubled systems. We've been pretty successful in two states, among others, but these two I want to spotlight. In Missouri, House Bill 142. That requires the commission to combine any acquisition of 8,000 customers or less into an existing system in Missouri. That's to mitigate the rate increase. We've worked very diligently with the commission to see the benefits of this, and I think we're going to be seeing the benefits of this in the future. Missouri doesn't have single tariff pricing so what we're able to do is combine that with an existing system that's closest to that. In Illinois, the Water Systems Viability Act. In Illinois, prior to this act coming about, the only thing we could pay was cost less depreciation, and so some of these systems had very small valuations that didn't represent the fair value so we couldn't really go in effectively and acquire systems without paying a huge premium; and so what this allows us to do is go in and get an appraisal and tie the acquisition to that appraisal instead of the cost less depreciation, again another enabler for acquisitions in Illinois.

We've got some other things and innovative mechanisms for capital recovery. Again, as part of Act 11, we now have a DSIC mechanism on the wastewater side like we have on the water side. And also, as Jeff mentioned in Tennessee, there was legislation passed that allows the commission to consider innovative regulatory mechanisms, and so in our filing that we just filed, we requested four innovative regulatory mechanisms, one of which is DSIC, and the commission will be looking at those as we work through the rate case process. And then applications of future test years. As I said before, we have now eight states within the American Water system where we have future test years. Indiana and Pennsylvania were recently enabled by a legislation that passed Act 11 in Pennsylvania and other legislation in Indiana to provide for future test years.

So these are things that we've done. We're going to continue. We've got a number on our plate right now we're working in the states where we operate, and we're going to continue to do this for the long term in American Water. It's the way we really deliver value for our customers and our shareholders.

So with that, I believe that we're going to be taking a break, 15 minutes. So quarter to, if you come back at quarter to, and I'll be around if you have any questions, all right? So thank you.

Sharon Cameron: If I could get everybody's attention, if you could take your seats now, we're going to try to get started.

Hi. My name is Sharon Cameron. Good afternoon. It's exciting to be in New York City around the holidays, with the snow coming down, so it's a great welcome for us coming over from South Jersey. I am very excited to be here today. It's really been personally rewarding and exciting to work with the colleagues that I have in American Water, and I think because we have an incredible track record and we've had some great success. What I want to share with you today is the performance we've had over the past few years, give you a little more insight into the market-based segment and then, hopefully, exhibit to you that—the same sort of strategies that got us to where we are today. We have a lot of momentum and I think they're going to take us to great results in the future.

So quickly, let me just give you a quick overview of the Market-Based segment because some of you may not be familiar with what our current portfolio is today. But the Market-Based segment really is a portfolio of businesses that capitalize on the core competencies and strengths of the Regulated Business, and furthermore, they benefit from the very strong brand reputation of American Water, as well as over 125 years of customer trust. And what our focus is, is we develop and we want to build profitable businesses that provide a customer solution and that also are aligned with what I will say are our regulated-like business characteristics or traits that you see here, because we know that's what our shareholders expect of American Water.

We have four businesses today. We have our Homeowner Services business, and that really came out of a customer need. We heard from our customer service reps and field service reps about 12 years ago that when a customer had a waterline leak and we went out to tell them and said, "Mrs. Jones, you have a leak and it's on your property and you're responsible," that about 90% of those homeowners were not aware of their service line ownership and their responsibility. And so we decided we needed to educate them about that, and we also developed a warranty program that was optional to provide them with peace of mind, and it's been a very successful program, which we'll talk a little bit more about.

Our second line of business is the Military Services Group. In 1999, Congress passed legislation that required that every military base evaluate privatizing their utilities, including water, wastewater, electricity and gas, and American Water saw that as a great opportunity. It was a way to do what we do today, provide water and wastewater service, to a long-term 50-year regulated-like contract. In 2003, we won our first military award, Fort Leavenworth, and today, we have nine military installations; eight of those are Army and one of those is Air Force.

Our next line of business is the Contract Services Group, which we call CSG, and they provide water and wastewater operations and maintenance to about 40 municipal customers, about a dozen industrial customers and eight commercial projects as well. And finally, we have Terratec. Terratec is the largest biosolids company in Canada. We acquired Terratec back in 2001. We provide turnkey residual operations for municipalities and for industrial clients, but Terratec also is very highly regarded for their beneficial reuse of biosolids, and that is done through land applications on farmland across Ontario, as well as through Class A technology in a pelletizer that we do with the City of Windsor.

Let me talk to you briefly about the performance of this segment over the past few years. If you look to the right, our operating income you'll notice has doubled since 2010, and that has been with a focus on cost reduction, portfolio optimization and targeted growth, and next year, we're projecting our profits to come in at just around $51 million. However, if you look at the revenue chart on the left, you'll see a little bit different story. You'll notice that our revenues were flat for the past three years, but that really varies considerably by line of business. So if you look at the chart on the left, the dark blue bars in the middle represent our Military Services business. The Military Services business has doubled their revenue since 2010, and they're projected to grow an additional 33% next year. The lighter blue bars underneath Military is our Homeowner Services business. Homeowner Services has had a top line CAGR of about 14% over the past three years, and Homeowners is projected to grow another 15% next year.

Conversely, however, if you look at the orange bars at the top representing the Contract Services portfolio, we have been highly focused on eliminating and shedding low margin, poor-performing contracts. The result? Our revenues have declined $44 million but we have a much more stable and a much more profitable business of Contract Services. And you'll see Terratec, indicated by the yellow, has remained relatively flat. Next year, for the segment, we're estimating that our top line growth will grow about $48 million, and what's significant about that is that represents a third of American Water's total revenue growth that's estimated for 2014. So we've got a big growth challenge ahead of us, but as I hope you'll see through the end of this presentation, we have a great track record and a lot of strategies in place to deliver on that.

So let's take a closer look at Homeowner Services. I came to American Water about 11 years ago to work on this business, and my background is not utility. I come out of Cambell's Soup and Comcast and a lot of other different types of companies, and I've had a lot of really exciting, I'll call, opportunities in my career. This has been the most fun and the most exciting, growing this business, because it really takes a true customer need and we were really able to grow this through the footprint of American Water through the brand and the trust that the customers have in each of the states.

This business has grown really two ways. We've grown by expanding our geography. So we started with waterline protection, in blue, and we originally went to the American Water footprint, and then, over time, we took it further to partnerships with municipalities and also, we do a lot of dedicated targeted marketing across the country now. In addition to increasing the geography, once we gain that household with waterline protection, we then upsell them with other adjacent complementary products. Once you've identified or sold a warranty-minded risk-averse customer, you're then really able to bundle services and get more wallet share or more revenue from that household. And so, over the past few years, we've introduced sewer line protection, in-home plumbing protection, and if you see that little green piece on the top of this year, we are currently in a pilot test for an electric and gas line warranty protection program.

So what are we going to do going forward? That chart prior showed you how we got to where we are today. We're just going to build on that same track record. We're going to continue to expand geographically through targeted marketing initiatives and through partnerships, and we're going to continue to develop and launch adjacent and complementary products and services to our captive footprint of warranty-minded customers. In 2014, Homeowner Services, as I mentioned before, is projected to grow about 15% in revenue, and that will bring this business to just under $100 million in revenue.

So why do we feel confident about this growth? This is a map of the top 100 cities in the United States today, and the purple dots represent cities today that currently do not have a service line partnership. It's about 85% of the top 100 cities. Our cities where we've partnered are designated in red and our competitors are in green. We have seen a tremendous amount of momentum just in the past year. We've seen more RFPs for this type of service offering in this year than we have in the past three years combined. We've recently expanded our business development team, and we also have met with at least 12 of the cities that you see here on the map so we think there's a tremendous opportunity. Of course, on the heels of our launch to New York City, which is not even a year old, we launched last January, we already have one in seven New York City homeowners who have enrolled in our programs, with 98% of them taking both water line and sewer line protection. In fact, I met John when we got here today, and he said, "American Water, I love you guys. I just signed up for your service line protection program," so we might bring him in to do a testimonial a little later today. He's showing it to all of his neighbors.

But on the heels of New York, we have such a great story now to go and promote across the country, and we won national right after—pretty much soon after the launch of New York, so we are very excited and hopeful that we can grow and expand geographically through these partnerships. But as I mentioned earlier, the other path to growth is through introducing adjacent products, and there's a lot of opportunity. The homeowner warranty and maintenance market is about $15 billion and it's growing. We feel that American Water is really well positioned to capitalize on this opportunity. As I mentioned, we already have the customers. We have close to 700,000 customers and 1.25 million contracts, so we have an audience that we know is responsive to these types of programs and offerings. I think you'll be hearing a lot about a lot of new products over the coming years. We have a lot of work. Many of these are in different stages of product development, and as I mentioned, we do have some that are in pilot test today.

Okay, let's talk about our next, I will say, very successful business, our Military Services business. It's interesting to me, but when you look at the business, it's really grown the same way that Homeowner Services has grown. It has grown from a focus on expanding its customer base, or in this case, military bases specifically, and then, once we win that award, focusing on getting more revenue – if you want to call it more wallet share – from each of those bases that we serve. Today, we have eight army bases and one air force base, and the way that we have an opportunity to get more revenue, once we have the award, is through the items you see on the left side. The first is called price redetermination. After we win an award—two years after we win an award, we have the opportunity to go back and say that economic changes and fluctuations have occurred in the market, and we can also go back and say, now that we've been on base for two years, we've identified a lot of assets that we were not aware of during the original due diligence period, and we have the opportunity to work with the DoD and reset our service fee. Additionally, we get the opportunity to do that every three years throughout the 50-year contract. So again, this is really very reg-like in a sense in that we get to recoup—recapture costs as they change in the marketplace.

And the second way that we get to add revenue on an ongoing business is through infrastructure projects on the bases. Let me show you a similar chart, and I'll talk to you about that a little bit. This is the history—this is revenue for Military Services group. The blue bars represent the service fee contracts, the operations and maintenance contracts for each of the bases. I think what you're going to see is that, all of a sudden, these yellow bars start showing up in about 2010 to a pretty significant level, and you can see coming into 2014, it's almost half of our total revenue. What we realized, after we got onto the bases, is that similar to what Walter talked about, the assets have been completely neglected on base.

You know, garrison commanders are really no different than mayors. They have a certain amount of dollars that they're able to spend each year, and they have a lot of priorities, just as city mayors do. Your water assets and your wastewater assets, they're underground, they're out of mind, people aren't thinking about spending money on them, but as I will share with you shortly – I can do it right now – we have a very effective mechanism that we have been focused on for the past few years to be able to get funding to do needed infrastructure projects on bases, and this is a cycle that we now follow and we are very focused on and we do it every year. We start in October, right after the awards are made in September, which is the fiscal year, for the government, and we start working with our customers to identify what are the most needed infrastructure challenges on the bases; we work together, we do pricing and then in September, we are awarded contract modifications. What makes this very unique and very successful is that there is a dedicated funding mechanism through utility privatization that provides for this funding each year. We do get delays very often because the processes can be very slow.

If you remember, earlier I talked to you about the price redetermination process; for example, that process often gets delays. But one thing good about the government is everything is retroactive back to the effective date, so for example, this year, we were awarded $4.4 million in retroactive price redetermination. That obviously had a great impact on our profits this year. But again, a lot of these processes, you might hear often in our earnings calls that things are slow and they slow down a bit, but we do always get the payout in the long term.

Let me just also say that, currently, we have $200 million of backlog in infrastructure projects that are already awarded, and that backlog will be executed in our plans over the next three years and that $200 million does not include the infrastructure projects we will be awarded in September of '14 and going forward.

So there have not been a lot of recent awards that we've told you about on our earnings calls in the past few years but we think we're at a point where that's going to change. Right now, there are 15 RFPs that are pending for water and wastewater across Army and Air Force installations. Now, we don't bid on all of those because they're not in our target, they don't match our business model. We're interested in those installations that have significant utility assets and that have 50-year revenues between 250 million and $0.5 billion, so we're actually bidding on probably less than half of those pending awards that are out in the market today.

The procurement cycle, shouldn't surprise you, is about four years long. Things move very slowly, but they do move. We are pleased to say that a few of the pending RFPs we're working on are nearing the end of the procurement cycle, and so we're hopeful that that, along with, hopefully the sequestration that's been lessened, things are moving, there is momentum and we will be able to announce new awards in the near future. So what does that mean? Our portfolio in MSG today is worth about $2 billion. The RFPs that we currently have in the markets that are pending would double our size, and then we see another 9 billion in Army and Air Force opportunities that are in, what I'll call our sweet spot, in that 250 to $0.5 billion range with significant assets. So again, we see strong momentum in the Military Services arena as well for continued performance for this line of business.

I just want to talk to you for a moment – and this is my last slide – about how beyond Homeowner Services and Military Services, we're thinking about growth for the Market-Based business. Jeff started off talking about us having a customer-centric focus. As somebody who runs competitive businesses, we have to be customer-centric. We can only be successful if we identify true customer need and then work to think about how we capitalize on that and leverage our American Water strengths, our core competencies, our brand, our customer trust, and that's where the opportunities really become exciting. So we're making an investment this year in business creation.

We're looking at all four of these quadrants, and we have market landscape assessments that we are actively analyzing and executing on. We are looking at the entire water and wastewater cycle, maybe not where we've traditionally looked but really pulling back and looking across the entire cycle to see, again, what can we leverage from our competencies, from our customer footprint, from the strength we have as a company, from our brand, what are the customer needs in the marketplace, what are the growing categories of opportunity, and where can we profitably scale businesses that are aligned with those regulated-like business traits that I mentioned at the beginning of the slide. And that is really how we're going forward and thinking about growth for the Market-Based business at American Water.

So again, I thank you. I'm very excited about the future. I'm very excited about the colleagues that I have the opportunity to work with. I'm going to miss Jeff terribly – I can say that personally – but I can also say, in the short time that I have known Susan Story, I am thrilled to be working with her, and I know that we're going to deliver on great growth in the future.

So with that, I'll turn it over to you, Susan.

Susan Story: Thanks, Sharon. So you've heard a lot today. You've heard about—Jeff talk about our strategic kind of direction in the future, and you looked at the triangles we looked at, so where have we been, where do we look at 2013 landing, what does '14 look like and what about long term? Then you heard Walter come up and talk about, here's how we're going to achieve the regulated capex and the regulated acquisitions, and then Sharon came up, and I think this may be the most, in this group at least, that we've ever had this type of discussion in depth, about the Market-Based business, the bigger components that you're very familiar with on Homeowner Services and Military Services Group, what goes into them, but more importantly, what are we doing looking forward? It's not just what's happened in the past, but for what we can learn going forward.

So what I want to do, kind of closing up the formal part of our presentation, first of all, talk to you again about the 2013 landing zone; then I'm going to go back and summarize for '14 the components of growth, summarize; and then I'm going to going to lower detail about the corporate expense management piece that Jeff alluded to. Then we will come back to the guidance again for 2014, and then we'll go to Q&A.

So let's talk about the 2013 landing zone. We've shown you before how we got to the 1.99, which is the base from which we started our growth. You will also see for 2013 landing zone, the reaffirmation today, or the affirmation today of the 2.17 to 2.22, with the landing zone, the GAAP, 2.03 to 2.08 for continuing operations, which I guess makes it still non-GAAP, but—and then the—we have it—for the year '12, last year, we had the sales that we had at operations, so some of that will show up from the year-to-year comparison; and then the tender, the premium and fees. Now, just in 2012, the way that we built back in and basically said the favorable weather should be taken out, where we land in 2013, for all the projections you saw us make on the triangles, we will add back in $0.03 because we had unfavorable weather, mid-range of the unfavorable weather was 3, so where we end the year, we will add $0.03, and that's what we've done when we've projected growth, just to let you know, so that this is a weather-normal basis.

So let's talk about 2014 again. This is the same slide you've seen. Walter came up and talked to you about regulated capex. He mentioned three key things. One is the—really, how it is recognized, acknowledged that we have an aging infrastructure and that we can only go so long in this country without replacing the pipes, the valves, things we need to deliver clean, safe, reliable water, so we know that that's out there. He talked about the continued investment into capital expenditures to replace that and that 66% of 2014 reg capex was going into asset renewal. He also mentioned how a growing percentage, what we estimate to be 60% next year, will be through mechanisms that do not require us to have a rate case to get recovery from customers, so 60% through mechanisms like the distribution system infrastructure charge, as well as the future test years.

He talked about regulated acquisitions. We talked about the growth of this. A few key points here. Walter mentioned 30,000 new connections that we will close on in 2013, and Jeff and Walter both mentioned, and this isn't—you know, we say we were going to focus on wastewater. Well, this year, of the 30,000, 8,000 are water customers and 22,000 are wastewater customers, as Jeff said. So as we go forward, you can see, and as Walter talked about, the—what we get when we are able to combine water and wastewater, and the internal efforts that we are doing to ensure that we can provide the most efficient services by having dual customers.

He also talked about the fact that we have these enablers, and this is really important. We've talked about 2013 was a good year in acquisitions, more connections than we've had in the previous five years combined. He showed you targets – that was not an exhaustive list – that 2014 we fully expect and hope that it will be better than 2013, but he also showed you only enablers page; this is going forward. It's one thing to sit back and say, “We think we can do this and we've got these one or two ways that we're going to reach this goal," but what Walter said, we're stepping back, going, "so how do you deal with the real issues that would prevent us from expanding into wastewater and water?" And those are regulations or laws or things that prevent us from being the competitive choice and for being what's best for customers.

And that's the core thing that I hope you've heard everyone talk about today, which is, when we do this, it's not just what's best for American Water's shareholders; it's what's best for our customers, because we really believe, as Jeff said, if we take care of our customers, the financials will follow, and that's part of the regulated acquisition. When people come in – I know a West Virginia acquisition we did this year – they were so excited about getting American Water, water because it was clean and it was—they could depend on it. So we take very seriously the fact that we're there to make sure, what do the customers need, what will make them happy and let's work through the regulations, or the laws that prevent us from doing that.

We talked a little bit more about the five-year capex, and as Walter mentioned, we've not, before, actually shown the rolling five-year capex plan. We wanted to show you this because we've added the pies (ph) in. This is not our plan but we want to show this for contrast, and you heard both Walter and Jeff talk about the fact that, from 2009 to 2013, our capex budget was about 4.4 billion, and you see the breakdown between regulated services and service company, most of that's IT, business transformation, it's recovered basically through the subsidiaries. And then you see Market-Based, as Sharon said, very asset-light, very capex light, and then regulated acquisitions, for the past five years, have only been about $100 million, including this year.

Our plan, that you've heard about, is the middle, 5.8 billion. You see that 5.1 billion of that is regulated capex, not acquisitions – we've broken that out here – regulated capex and services. Then you see the Market-Based regulated acquisitions, over this five-year period, we are estimating 400 million and strategic, 300 million. Now, the strategic is, for 2014, we have 100 million of strategic investment. We have not put into our financial plans a return on that, to be very conservative. So that is, if an opportunity comes up, as Jeff and Walter discussed on unregulated shale, if an opportunity comes up on a major concession, we're just looking at a way to identify some strategic capital.

But what we wanted to show you—and as Jeff and Walter both said, the average impact on the bill is 2%. Now, if you look at the last chart, here's what we did. We said, "Okay, so let's look at how much capital we could spend without stretching our credit metrics or putting our credit ratings in jeopardy and without having to issue new equity. Could we spend more money than the five-year plan we have?" And the answer is, yes. In fact, we could spend $600 million more, not all in one year, we could spend $600 million more, and if we assume that all 600 million goes into the regulated side of the business, the difference, because we've already taken into effect the declining usage, rather than a 2% average – and as Jeff said, that's less than 0.5% up to 5%, depending on the state – that increase to our customers goes up to 4%, and that was not acceptable to us. This is a real-world illustration of how, when we do capital budgeting, we are clearly looking at what impact will this have on our customers and affordability and regulatory relationships, although, just from a strictly financial standpoint, we could do this.

Now, one thing I just want to mention to you too, and we're in a very good position, the EPA has what they call an affordability index for water. The Department of Labor, the latest statistics that we can get from EPA and DoL, 2011, they said the median income was $40,000 and the EPA estimates that families spend about 10% of their median income on all utilities; that's electric, it's telecommunications, it's gas and it's water. Water is about 10% of the 10%, or 1%. They have an affordability index, the EPA, that says 2.5% of median income is affordability for water, which is about $84 a month. Our bills in American Water range from about $33 a month to a high of $74. So comparing that to the EPA Affordability Index, we're still well within the range, but just to let you know, as Walter mentioned to you all the customer satisfaction numbers, we're always looking at this and this is critically important that we compare this anytime we're doing any of our budgeting.

You heard Sharon talk about the Market-Based business, you heard her talk about Homeowner Services, you heard her talk about partnerships and geographic expansions, and products and services expansions. We are very careful when we go out; in market testing, we do significant risk analysis. You also heard her talk about the Military Services Group, which really plays to our strength, being national. The larger bases are the ones that we're interested in. We have built a history of performance with the Department of Defense, and that has a value. So all of those things come into play when other opportunities come up, both the Army, the Air Force and, as Sharon mentioned, for a period of time, there was—there seemed to be very little movement but we've seen a new interest in terms of even new RFPs, especially from the Air Force. She also mentioned that we're towards the end of a four-year cycle for a lot of RFPs that have been pending, some of which go back to 2009.

And then shale, and Leslie asked me a question at the break. You know, Jeff talked about the shale and the regulated side of the business. We have a tremendous amount of experience, in Pennsylvania especially, with providing water for drillers and ensuring the quality of the water because that's the source of water we use to serve our customers. The unregulated piece is—and as Jeff said, we are not going to do anything speculatively. It will have to something to, like the rest of our market base, mimic the regulated side of the business, but we're building a lot of relationships and a reputation and an image for being a great partner in terms of ensuring that we care for the water and we provide a great service at a great cost.

The bogey is, of course, trucking water in. We're working with a lot of the major players to say, what if it's not in our service area, what would the opportunities be? But you'll also notice on the triangle, shale always has a zero to, zero to one, zero to two in the outer years, and that's because we are not basing our future financial plan on shale and what happens.

Corporate expense reductions, let me spend a little bit of time going through this, and this is significant for us this year, for reasons that I know that most of you are already very familiar with. You've heard it from the electrics and it has to do with interest savings, as well as pension savings, along with other post-employee benefits. I want to talk about cost control. You know, when we talk about corporate expense management, we also want to talk about cost controls because the ability to hold our costs down helps mitigate any of the O&M increases. You heard Walter talk about the fact – and this is critically important – when we go in for increases for our customers, when 94% can be based on capital investment that makes their systems more reliable, improves customer service, then it gets a lot better treatment than the perception, perhaps, that you could have as a company that you're not maintaining control over your O&M cost. So it's a lot better to go in for the capital, and as Walter said, we've gone from 58% in 2010 recovery for O&M to 6% for the rate cases this year.

And Jeff mentioned a little bit about this; the green line, starting in 2011, the business plan was 3% growth in O&M a year, and that sounds not that much, right, 3% a year. So our previous plan, we came in and said, "No, we think we can do better than this," and we put some controls in. This year, in developing the 2014 to 2018 plan, you see where we've come. Jeff mentioned that from the green line to the blue line, that you're talking about, over the five years, $920 million, but the difference in the red line and the blue line, just last year's plan to this year's plan, is about $240 million difference. How are we going to do this?

Now, I don't want to repeat everything that Jeff and Walter said, but the SAP efficiencies are a big part of this. There's very specific projects I'm not going to go into, but I will just remind you of one thing. The SAP system has allowed us to have a tremendous amount of information. We have resources dedicated to the manual generation of data. With SAP, we don't need resources dedicated to the manual generation of data; it is value-added analytics. We are looking at our enterprise asset management system, work (ph) management being automated. The efficiencies from SAP, we believe, are going to be significant. We have different areas of our Company who are doing a tremendous amount of work, not just saying, "well, what report can I quit doing?" but stepping back, looking at their entire businesses, saying, “based on the system, if I started today, what is the most cost effective and efficient way to do this process.” And then we're coming together across organizational lines, making sure that we're fully leveraging those efficiencies, and because we're completing conversion now, the fourth quarter of this year, next year is a big year for us to step back and after we've gotten the system fully stable, everybody's comfortable, we go, so what's next? What's next?

Plant automation, you know, the idea of a virtual water treatment plant. You heard—on the video, you heard Walter talk about a lot of the things we're doing to implement technology into our Company and how technology can help us be much more efficient; and like Jeff said again also, it's not about quick cuts for one year that make your earnings for a quarter or a year. That—we're not—that's not what we're about. What we're about is changing how we do our business fundamentally. Jeff, what he brought in three and a half years ago, the value is greater than the price, which is greater than the cost, and how do we do that were effectively?

AMR/AMI. You know, in the water industry, contrasted to some of us who have a background in electric, the meters are required, as Walter said, to be changed out every 10 to 20 years. So you have an opportunity where you're going to be implementing and deploying new meters anyway, so we have a chance to move that technology there. And I believe now, we're what, 80%, Walter? Eighty, 85% with AMR, and when it's cost-effective, AMI. And Process Excellence Projects, a group John Bigelow heads up which consults throughout our Company with how can we do our business better?

Now, some of the big things – and Bill Rogers is here and you all know him – the Treasury group has had a really tremendous year this year. They've done an outstanding job of looking at our liability management and our debt management. One of the things, I know you're already familiar with, the 226 million tender offer – that was how much we were able to get in; we basically went out and said we wanted to tender up to 300 million – the purpose of this was to reduce capital markets volatility in 2017 and 2018. We have what we refer to as parent company debt of 750 million maturing in 2017 and the other 450 million maturing in 2018, so we went out with a tender. The results of the tender? We took an extinguishment charge; however, we also expect, over the life, to save $18 million. That wasn't the purpose, but because we've not only reduced the market risk – and you've seen the chart at how much—how spiky it got in 2017 – but we're also going to have significant interest savings.

The plan is to finance the commercial paper through mid-2016. Of course, we're always looking at the market to determine the optimum time to do that, and in 2014, we project the interest savings from the tender will be $7.5 million. If you combine that with some of the redemptions, the refinancings we did on redemptions as well as maturities, we had $150 million worth of redemptions at 10% coupon and 8.25% coupon. Now these were ones that we were happy to refinance, and we were able to refinance at 3.5% coupon. And also some of the activities that our Treasury group had this year, increasing the size of our revolver from a billion to 1.25 billion and taking out maturity for 1.18 billion of that, an extra year, as well as on the commercial paper program, we went and expanded from 700 million to $1 billion. So when you look at the interest savings to net income, you look at the impact of the tender, the redemptions, the retirement refinancings, it's about 7% EPS diluted impact.

We talk about pension a little bit. I know several of you have written up about pension. So when we look at our pension cost, we work with Towers Watson, as most utilities do. We went in with them and we looked at our assumptions; now let me talk about that first. Discount rate, we're showing you what was used for 2013, what's being used for subsequent years, with the latest Towers Watson study that we just received about a month or so ago. Our expected return on assets is actually decreasing in our model, and here's why. At one point, we were close to 70% equities. We want to de-risk our pension investment, so what we will—our target through the end of 2014 is to be about 52% equities, 8% real estate and about 40% long-term fixed income. The impact of the new numbers for the pension, for 2014 – and this is incremental to the previous plan – so these savings compared to the plan that we earlier had, $7.5 million on pension, post-retirement benefits 2.7 for a 10.2 million net income impact or $0.06. So that is where you see the corporate expense reductions.

Now, I want to go back and just be clear. The O&M controls that we're doing are helping keep us flat. As you know, because of the increased capex expenditures, we are seeing an increase in depreciation and amortization, so we're having to make sure the cost controls help us offset that, as well as some purchased water increases that we're seeing.

Now, so what's kind of—some of you have seen a chart similar to this before; we've had various names for this chart. So where are really kind of the variabilities for 2014 in terms of our guidance? Well, in terms of a set (ph) the weather, of course, is the biggest. We did not show a weather impact as big as we saw in 2012, that we just believe was extraordinary year, extraordinarily hot and dry over a big part of the country, which is why we had a 13 to 16% range then, so this is what we're showing as kind of a plus and minus. Market-Based businesses – and Sharon talked about this – on the downside, the timing of the military awarding new contracts, the RFPs, price determinations, where—and then also on price redeterminations where we could actually get it, but it might be delayed in terms of when we would actually see it realized. And on the upside, we could have more partnerships, we could see more of the Military Services Group, the price redeterminations, or RFPs, come into play that we have in our plan.

Corporate expense reductions, this is predominantly—the plus or minus would be in terms of pension, could be better or a little less than what we thought, insurances and interest. And then regulated acquisitions, a little bit tighter around that based on '14. We have, as Walter said, a pretty well-defined pipeline for that. So these are kind of the variances we see that could impact the 2014 guidance.

So moving from the guidance to some financial metrics, free cash flow. Let me first of all note, if you look at the bottom, our—we used a very conservative calculation, which is net income plus depreciation minus capital expenditures. Also note, regulated acquisition capital expenditures are not included in this. Regulated capex and strategic capex—and strategic capex does not include a return, but this does not include regulated acquisitions, of course, or dividends, pretty standard. But you look and see, as Jeff said, we start showing a positive free cash flow in 2017. Also, you'll see that we continue to strengthen our balance sheet. When you start looking at our equity, a slow growth, and also, one of the things – and Bill Rogers takes the full credit for this – we've typically had very, very little variable debt, and so we're basically setting an amount of variable debt that we want to ensure the floating debt that we keep through the years, and we're doing that through the debt management program. We will do most of that, by the way, if not all of it, Bill, I believe at the parent company, typically not at the subsidiary, which is fixed. And again, this was a good year for us in terms of our credit ratings were both raised by S&P and Moody's, and as we've said over and over and over, no planned equity offering under the normal course of business.

Now, we're very proud of this slide. This is a terrific slide. When you look at 2011, we've got our net ROE that was earned by the regulated subsidiaries, you've got ROE impact of parent company debt, or parent company debt drag, as we refer to it, and you've got the regulatory lag. That's either not being able to earn authorized or having a lag between when we can realize the investment that we make. 2014 plan, we go from 7.2 to 9.1, the parent company lag goes from 100 basis points to 50 and the regulatory lag, from 100 basis points to 40 basis points, and we're very proud of this. Of course, the parent company debt drag goes down because—not just the tender, which was 2.26 out of 1.2, but the fact, of course, that as we've refinanced, interest has gone down and shareholder equity as we've grown the business has gone up.

And our dividend history. As you all are very familiar with and on December the 13th, last week, our Board declared a quarterly cash dividend of $0.28, and you see the dates there.

So on EPS, we come back to our 2013. We are affirming 2.17 to 2.22 for 2013, and we're putting the 2014 initial guidance at 2.35 to 2.45. Jeff?

Jeffry Sterba: Thanks very much, Susan. I hope that we've provided you with some good information about our business. In this presentation, we have tried to give a greater level of transparency and insight and detail about our business, our prospects, where the growth comes from, and I know most of you, or at least a number of you well enough to know, we probably aren't meeting all of your wants. I'm not sure that that's possible to satiate, but at least, I think—I'll hope that you'll agree that we are providing a lot more so you can get—decide about your level of comfort as we see the growth and prospects for the future.

The other thing that I hope that you take away from this is the level of comfort that I and our Board have in the hands that we're leaving this Company. From Walter, Sharon and Susan, you heard people that understand this business, have a laser-like focus on what we're trying to accomplish and a drive and a commitment to the culture that we've started, which will sustain the results. That's exceptionally important. And if the other three senior execs that had been able to come up and talk, you would have heard the exact same thing from them. So the level of confidence that we have in the ability of this Company to actually accomplish the things that we've talked about is quite high, so that gives me a lot of comfort that this will remain my core retirement investment.

One of the things that we started three years ago was—at the beginning of every year when we gave guidance, was to provide to you a list of those things that you can hold us accountable for during the year, so that as we go through the year, you can either check off or decide, 'well, I don't know if they're doing this or they are doing this,' and we will also report on this every quarter. So let me just go through them very quickly.

Optimize capital spend. We're focused on this capital investment side, not only in how much we spend but the efficiency with which we spend it. It's what we spend and how much do we accomplish, and so we have instituted within our Company a series – and we've got more to go – of measurements that are all around the effectiveness of our capital spend. So a lot of this involves our supply chain initiatives, but it also involves our workforce initiatives to help ensure that the productivity on both our capital and our human capital side continue to increase.

The constructive regulatory frameworks, we will resolve three rate proceedings during the course of the year. We're looking at filing up to five rate cases this next year. We won't tell you which states, because the first conversation—that conversation's had with those states first, but we're looking at filing up to five rate cases. And you will see us continue to pursue these kinds of initiatives and opportunities to expedite the return of capital through mechanisms other than a rate case because, quite frankly, they've been—this benefits customers, it benefits, certainly, the flow of capital into those states that enable it and it helps manage the risks that are associated with things that either have volatility or the investment of the capital.

Our O&M efficiency. Walter said it but I got to reinforce it. When we established the 40% target and then an aspirational 35%, I mean they really thought that we needed to go see a certain kind of doctor, because it was just something very different than they are used to. But to now see our employees absolutely believing they can achieve 35% and not at any risk to reducing the quality, safety or reliability of our service, this is being done by technology, innovation and efficiency, not by slash and burn. So the fact that our folks feel good about saying, "Yes, we beat the 40% two years early. We can do 35." And frankly, also remember that the 35's going to be done in a period where rates are going to be going up at a slower rate of increase than they have over the last five years.

So it really takes a level of discipline and trade-offs, and it all starts with us—these three questions that we've talked about before, that we engrain in our heads and our folks' heads, A, is what we're doing adding value, and by value, I mean at the end of the day, is it better providing service to customers? If it isn't providing value, why are we doing it? And it's amazing how many things you all and we end up doing because we've done it, not because it makes sense to do it in the future but it's the way we've always done it. And then once we say, "Okay, it adds value," is it being done through an efficient process? And there's so many different ways to think about efficiency of process but that drives bureaucracy, and so whether it's de-bureaucratizing our policies and procedures, whether it's changing the process by which we get work orders into the hands of the people in the field, whether it's the process by which we're able to produce our financials in six days – and Mark made five and a half by the way this—last month – versus 12 days, which was the rate before, that's a process improvement.

But then even when we've got an efficient process, our big focus and the enormous strain on business is associated with errors and rework. And there are—there's case after case where our folks are now—they didn't even think about counting errors. We didn't know what error rates were. Now, our folks do, and so we start—once you start identifying errors, now you figure out how do you start to reduce those errors? How do you take them to zero? So this O&M efficiency side is one that it's not just about reducing our cost; it's about the mentality of our employees, how they think about the business, how they make incremental continuous improvement.

Our regulated acquisition strategy, Walter and Susan both talked about that. This is not—as Walter said, we're not turning around now and saying, "Oh the dam's going to break; look at all of these acquisitions." It's absolutely not. We don't believe that's going to be the case, particularly in the water space. What we are saying is we serve 3.2 million customers water every day, great water. Only 100,000 of those do we provide wastewater services to. Our big wastewater businesses are on our Market-Based business, so only 100,000 of those do we provide wastewater service to. That means, even where we already have a footprint, there's 3.1 million customers that we can talk with those communities about, "You know, we can use the same trucks. We can use the same supply chain. We can use many of the same tools to provide wastewater services to your community, in addition to water." And again, it's not necessarily about laying people off, at all; it's about using capital investment more efficiently.

And then the continued growth in our Market-Based business. One of the things that's really important to us is that, while our Market-Based business is growing more rapidly, we are absolutely focused on having that occur in a way that does not change our risk profile. So while it becomes a bigger share, it is—the lion's share of it is reg-like. It's military service contracts, 50 years, and we re-price every three years. It's Homeowner Services, where we have 85% renewal rates, and it's incremental to what we're doing and it's tied to our overall customer satisfaction. So—and if it's—if we move into the market-based shale side, it'll be not on the com (ph); it will be fixed revenue sort of streams associated with it. So that is what you can hold us accountable for through the course of the year.

At this time, we'd like to open up the floor for any questions that you have. You want to get the chairs? While they're—we're grabbing chairs, because I want everybody up here – because I just get to direct the questions; they have to answer them – I do want to make note of something that goes along with the cases. You noticed at your table these cases which—I'm sorry, we don't have any for BlackBerrys. I'm still trying to figure out who still has a BlackBerry. I see Steve does, yes, and you call—you thought the utility industry was hard to change. They don't break, I agree with that. The one disappointment is we wanted to put Ed Vallejo's mug on the back of that, but we're just not going to do that. But we also have made an app that you can pick up for either your Apple or your Android that has our investor water—investor relations app in it, and you can go to AWK IR on any of the app stores—on the app stores, iTunes or whatever, and you can download it, and in fact, the presentation that we've done is on it. And I'm sorry, that's the wrong price. I think we're up about, I don't know, $0.70? A percent and half or so today alone. So please feel free to use that, and I must say that there was some foment around the naming of the app; AWK IR just fit, I guess.

So with that, we'd like to open up the floor to any questions that you may have. Yes, sir? Mr. Chin. And we've got a microphone, so—because we're still on our webcast.

Brian Chin: Great, thanks, Jeff. Brian Chin with Bank of America Merrill Lynch. On slide 43, the cost controls with the current plan, just wanted to make clear that that current plan is now embedded in your '14 guidance and going forward. Is that correct?

Susan Story: Yes.

Brian Chin: The reason why I ask is because, when we look at that current plan on—I'm sorry, it was—I guess in my book, it said slide 43; I think in the slide deck (inaudible) slide 45.

Susan Story:	It's the pie chart, the pie—the three pie charts. That one, okay.
Jeffry Sterba:	(Cross talking). It's—what…
Speaker:	That one.
Speaker:	(Inaudible).
Speaker:	Forty-five.
Brian Chin:	Yes, the only reason why I ask is because when we look at the magnitude of the difference between the previous plan and the current plan, it looks like there's a fair amount of savings there, and then when we look at the EPS trajectory, your long-term compound annual growth rate, which I believe hasn't changed from your prior disclosures, your new guidance for '14 doesn't seem to account for the difference between these two O&M plans here versus how much higher your '14 guidance is above the long-term trajectory. So is there, like, an offset that we need to think about?
Jeffry Sterba:	No, the thing—the red bar was really the five-year plan that was developed in late '10, 2010. We've done—redone annual plans, so a lot of—some of the change for '14 was baked into the plans that we did in '12 and '13 and '14. So this is just looking at two five-year plans, one that was really done in 2010, and then the one that was done in 2013, so it's not a year-to-year change.
Brian Chin:	Gotcha.
Jeffry Sterba:	Okay? So if you look at our O&M for 2013, it's going to be right about where that blue mark is.
Brian Chin:	Okay, great. And then I've got one more follow-up and then I'll jump off. In general, for the shale commentary, you had said there's going to be no speculative building of infrastructure that's being contemplated by the Company. Who are your competitors out there that are looking at shale? Because to the extent that they start grabbing market share or opportunities, I got to imagine you're going to have to balance, well, how much of that risk do you want to take on versus potentially giving up the share. Can you walk through what are some of the competing interests you might think about as you sort of face that decision on a going-forward basis? Thank you.
Jeffry Sterba:	Well, the—I'll start and others will add. The primary competitor is trucking. So if you look—I think I mentioned that 8%, we basically serve—provided water for 8% of all wells in Pennsylvania, 70% of the ones in Butler County. All the other water that was provided in Butler County was self-supplied from drillers. They may have put in a small pipe on their own for—with a river permit, or they're using a trucker that has an

outtake permit for raw river water and they're trucking it. We don't see a lot of competition on the actual building of pipe. There are a few that—of the companies that have tried to do a little bit on their own to bring water, but not in a significant way. If you look at—I mean, Aqua built one pipe that's up in an area that's dry gas, predominantly dry gas, but not down in what we call the wet gas region.

So we're very—our primary approach is we're looking at what is it going to cost to truck, so what's—because that sets a ceiling; are we going to be able to deliver for less than that? And what's the right sizing of that pipe? So we will take some risk, sure. You always—I mean, but how much—but placing capital at risk versus placing a little bit of return at risk are two different things. So we're not—we're focused on not placing capital at risk. The—any of you got anything to add or, Mark, is there something you would add?

Mark Chesla: The only...

Jeffry Sterba: Hello, Mark, grab the—use the mic. No, right behind you.

Mark Chesla: Brian, your question. What we've seen, and you know—and I'm not claiming that we have encyclopedic knowledge about the whole industry, but from what we've seen, some of the companies or the midstreams do try to self-perform, but there's no other major company that's out there trying to do it on an aggregated basis, so trucking is the best reference pricing and then some of the drillers or the midstreams have tried, in limited circumstances, to do their own piping.

Jeffry Sterba: Yes, sir?

Adriano Almeida: In the very beginning...

Jeffry Sterba: If you—just for the people, if you could give your name and where you're (cross talking).

Adriano Almeida: Yes, I'm Adriano Almeida with Cramer Rosenthal. In the very beginning of the presentation, I think you highlighted some—that you have had some challenges with the SAP implementation. Can you kind of elaborate on what exactly those challenges are? And also kind of quantify, because I know there have been some cost pressures related to installing this, so to the extent that it's going to go online and everything is going to start running smoother, there's going to be some cost savings associated with that event.

Jeffry Sterba: Let me give a bit of an overview. I'm going to ask Walter to give some details on, you know, areas that we continue to work with; they're not major, but we continue to work with them. One of the things about this SAP implementation, which frankly, is very surprising – I mean, very pleasing but surprising – this may be the first, or one of the only few utility implementations of SAP that is on budget and on schedule, and this is a budget and schedule established about five years ago. So we've basically been able to keep this thing at the budget that was originally set and on the schedule. The kinds of challenges with this—with as much as we did is typically—you'll find a company that they'll put in the ERM system or the CIS, but not all of it. We put in everything, from the CIS and EIM system to the ERP, our reporting and financial system, so it's been a big chunk to take on.

You want to talk about the...

Walter Lynch: Yes, sure. I mean, two areas that I'd like to spotlight, one of them is on our dispatching function. We deployed some software that we programmed with certain priorities and how to effectively dispatch our field service reps, and it's not working exactly the way we want it to so what we're doing is taking a look it. We've put a team of experts internally looking at what's the best way to modify that to be able to increase our productivity in the field, and that's an ongoing effort. We were expecting in the next couple of months we'll have that solved, but in the interim, we've done some things to really alleviate some of the issues there and giving the latitude down to the field service rep and their supervisors to determine what makes most sense.

What we're doing is traveling a little bit longer distances than we wanted, and we're just putting some common sense back into it, where the field service reps can say, "Okay, instead of going there, I'm going to modify my schedule some way." That's been an issue that's been out in the field and we really discovered that after having gone to the field, spending a lot of time in the field and asking our employees, where do you guys have issues? What's not working as well as what you expected? And that was a common theme that we heard and that we've acted upon, because it's one thing to go out in here; the next is you've got to act upon it and do it in a way that displays common sense and business judgment, and that's what we've done.

Jeffry Sterba: And I think this speaks to the culture of our workforce. When—we've had our implementation reviewed by an independent third party and they basically are calling it a textbook implementation, but one of the things—we agreed on—(inaudible) how many pages of metrics?

Walter Lynch: Four pages.

Jeffry Sterba: We have a very specific set of metrics that we were going to measure ourselves by and they helped us develop it. One of the things that they kept telling us is, "Look, you're going to see a 10%, or 10 percentage point erosion in your customer satisfaction." Utilities have put in place SAP; it happens because you don't—or you're not able to respond, they're on the phone longer, the service doesn't get dispatched. You have to shake through this and you see, typically, a 20 to 40% productivity loss as you put in place a system. Well, based on the customer statistics that Walter walked through, we're not seeing that, and I really think, even though we have had some bumps with the implementation system, it's not perfect, our folks work through that. They're not letting it get in the way of serving—providing that service to our customers. That's pretty special.

Adriano Almeida: How about the cost? (Inaudible).

Jeffry Sterba: We incurred some higher operating costs when we implemented ERP last year, and Susan, you may want to mention that.

Susan Story: Right. So when we did ERP, which was the first phase in 2012, in the implementation all at once, there were what we call workarounds, and so it took a little more time to get the system stabilized. Mark Chesla's here and he heads the groups that are doing this. So what you saw in the first quarter of this year was we had a few million of O&M expense. We expensed it—we basically had some expenses, and then we have gradually, if you look in the first quarter disclosure, second quarter and third quarter, that number has gone steadily down as we have basically stabilized the system.

Jeffry Sterba: And on the capital cost of the project, it's on budget and it looks like it will be completed roughly on a budget set five years ago.

Walter Lynch: So one of the great things about our culture too is we never have to worry about our employees telling us what's on their minds. So as we go out to the field and ask, "What's not going, in the way we—the ideal way?" they share with us because they've got a tremendous passion for customer service, and anything that gets in the way of that, they're communicating with us. We take that and learn from it.

Susan Story: And also, by the way, the people who go out in the field aren't just Walter and Jeff. Every member of the executive leadership team, we have in our goals, it's called casual conversations. We go out and we go to where the service technicians are, we go to call centers. We have our executive team meetings all over the country, where we have employees and we have breakfast with them, lunch with them. I mean, the whole point is to not have things filtered from all parts of our Company to the executive leadership team, and it's really remarkable to see how open all the employees are.

Jeffry Sterba: And it's not even just the—limited to ELT. For example, every officer of our Company is required to do – and it varies based on what their role is – anywhere between four and 12 safety walks. What that means is you're out in the field, with a crew on site, and you're not there to critique their safety but you're there to talk to them about safety, to get it front of mind, but the other part of it is, is it opens a door to a lot of other conversations, and so it keeps us very much in tune with what's going on. It helps us pick up, for example, when we've got messages that aren't getting cascaded down through the Company, they're not hearing about something that's really important for the future of the business, or—so we find bottlenecks and we're then able to address those bottlenecks such that our folks stay engage because that's critical.

Yes, sir?

Ryan Connors: This—well—no, well. I’m sorry, this is Ryan Connors with Janney Montgomery. And by the way, let me just—I wanted to say, Jeff, I actually like the sandbox and the pictures, so I was sad to see it go down the toilet like that. That was pretty (inaudible).

Speaker: (Inaudible).

Jeffry Sterba: Did you want say anything about the picture?

Ryan Connors: But two prominent industry topics that I didn't hear you mention in your prepared remarks were decoupling and repair tax accounting treatment. So just, respectively, on decoupling, I mean there's lot of talk about that spreading beyond its kind of home base in California to become a broader phenomenon and just wanted to get your perspective on whether you see that occurring. And if so, that's something the Company would be—view as a positive or want to encourage or just your view there? And then on repair tax, recognizing that's a pretty complex topic, just give us your update on how you're viewing that, how you're treating that and whether that's something you might utilize more heavily going forward.

Jeffry Sterba: Okay, on your first one regarding decoupling, look, we are, as an industry and as a company, dealing with this issue of declining residential use, and it has to be dealt with or those states that don't appropriately deal with it, quite frankly, you can't afford to invest that capital because you're investing—you're—where 80% of our costs are fixed but on average, only about 25% of our revenues are coming in off fixed charges. So—but our approach is that's the problem. How do we address it? And there are multiple ways to address it. Decoupling is one, and we have decoupling mechanisms in California and a variant of that in New York. It doesn't have to be done through decoupling, but we are very open to talking about it and pursuing that mechanism in other states.

There are other ways though. For example, the more you move to future test years and you reach forward two years on what you're building determinants will be, so that by the—when the rates are going into effect, they're actually being collected on what that level of usage will be or what that—at that time, so you get them synced up, if you will. That's one way that some of our states have chosen to go. Some states, they don't want to reach out that far, to which our response is, "Folks, tell us another way." So, for example, in Kentucky, the entire rate increase that we've—the commission has yet to—well no, they have not formally acted. All of that rate increase was put into the fixed charge side, so it's reducing the amount of revenues that we're collecting on the volumetric charge. So our approach is to say, "Look, there are a couple of different ways we can look at this. It doesn't have to be decoupling or nothing." But every one of our states has got to address it.

Ryan Connors: Absolutely.

Jeffry Sterba: Do you want to add anything to that?

Speaker: No, it's really around the declining usage. As Jeff said, in looking at what's the right way to address it in each of the states, and we work very cooperatively with the staff and commissions to say, "Okay, this is the issue and this is how we see the best way to address it," and they're not all the same but they're tailored approach to meet the needs of the commission and the staff.

Jeffry Sterba: And on the tax issue, Susan, you want to take that?

Susan Story: Sure. We actually do—we have implemented repairs tax accounting. We were one of the first companies to adopt it in 2009. The difference is coming in that there's two ways that you can implement it. You can implement it through the way we did, which is called normalization, where we basically take the benefit, the tax benefit, and we apply it over the life of the asset and it basically goes into the deferred income taxes. So customers benefit because, of course, you get the reduction of the rate base through deferred income taxes, but it's over the life of the asset so it's not as drastic.

The other method that we do—we have not chosen to utilize, and at first, we couldn't. When we first adopted this, the IRS said, you have to use the normalization method; however, they changed that before some other companies adopted it, but we wouldn't change. I mean, given the choice, we have—we're not interested in going back because, for us, it aligns the benefits over the life of the asset for the customers who are enjoying that asset over its life, but those are actually acceptable. The flow-through and normalization method are both acceptable. We're just very conservative and we've chosen to do it on a normalized method. But we are employing the tax repairs accounting and it is a major contributor to our deferred income tax balances.

Jeffry Sterba: Let me add just two quick thoughts, and you know, look, we focus on running our business. We—other people will make different choices in how they run their business. For us, we're in this business for the long term and so a long-term approach that recognizes the value of this benefits the Company through receiving the cash benefit and normalizes that for customers over a longer term, keeps it smooth, so you don't end up with saw tooth, because if you flow through and you file a rate case, it's all going to go through in that one year. So it's—whether it's philosophy or not, we're very comfortable with what we've done.

The second thing is, rules have not been issued for the water industry. What we're waiting for is to see the rules that will be issued for the gas industry, which are expected, Mark, this next year, maybe?

Mark Chesla: That's best guess.

Jeffry Sterba: Best guess, 2014, sometime, because gas and water have a lot of similarities in terms of the types of equipment, compressors, pipes, all that stuff. We have, fairly conservatively, held—or what we've put on our books, and so a lot of what, even under our methodology, would be taking it into account, we've reserved for. So once we get through the gas rules being issued, you know, then we'll be able to see where we are. I don't think we've ever said what percentage we've been reserving, but I—it's significant.

Susan Story: FIN 48, right?

Jeffry Sterba: Yes, under FIN 48. Okay, right there.

Speaker: I have three probably somewhat unrelated questions. One is, on the deferred taxes, the—when you went through your free cash flow calculation, did you include the benefit from these deferred taxes?

Susan Story: Yes.

Speaker: Okay. And then one of the costs that you mentioned continues to increase, besides kind of D&A going up from additional investment, is the purchase order expense. Could you just talk a little more about that and sort of how big that component is and where that comes from?

Susan Story: Yes.

Speaker: And then, after that separately...

Walter Lynch: Yes, I mean in various states, New Jersey and California and others, we purchase water from different purveyors. Typically, we have a pass-through mechanism. I know in New Jersey, we have purchase water adjustment clause, where we'll file for that and get recovery in that in a short amount of time. There's a percent—it's relatively small, what we do. It's larger in California but smaller throughout the rest of our system.

Jeffry Sterba: So give a sense, in California, roughly what percent is purchased water? Twenty five?

Walter Lynch: I would say 20, 20%; 20, 25%

Susan Story:	And over the five-year period, the purchased water is, like, 36 million total over the five years, so it's not anything close to the increase in depreciation and amortization.
Speaker:	And you said that mostly has pass-through mechanisms?
Jeffry Sterba:	In most states.
Walter Lynch:	Yes.
Speaker:	Okay. And then finally, you had talked about a few legislative initiatives being enablers for kind of some of the growth that you're planning for. Can you talk about sort of legislation that we should expect or perhaps that we should be looking at in any of the states that might become kind of the future enablers for continued growth?
Walter Lynch:	We'd prefer not to do that.
Jeffry Sterba:	We like to talk to the legislators first.
Walter Lynch:	Yes, we like to work it through first.
Jeffry Sterba:	But mention the approach that we use with the initiatives for every state, et cetera.
Walter Lynch:	Yes, we have goals, and as I said, we look to the long term, what key strategic objectives we want to accomplish, and we have goals in each of our states. We had a goal in 11 of our states to level the playing field between municipal systems and ours and also be able to accelerate acquisitions. So each one of those states have goals or multiple goals in how we're going to drive that, and every month, we look at that and then report out against it. And the great thing too in American Water, we have so many states that we're able to learn from one another, so if something is going down a path in one of the states and they learn from it and they were able to get something through the legislature, we take that learning and apply it to another state, if it makes sense. That's what we do on a routine basis. So each one of our states have these goals and we routinely review them, learn from them and then execute on them.
Jeffry Sterba:	Well—and we create very specific metrics that are built into people's performance plans. So I'll just give you—I'll tell you one of Walter's. Of those 11, he had to get five done. He's gotten six and probably will have seven, so...
Walter Lynch:	Yes, thanks. But as we say, we don't have to bat a thousand; we're batting about 450, in baseball terms.
Jeffry Sterba:	Yes, Neil, and then in the back, and then here in the seat (ph).

Neil Mehta: Thanks. Neil Mehta at Goldman Sachs. On the dividend philosophy, you stepped up your dividend by 12% this year, so that's in excess of the 7 to 10% range, and you're on the low end still of the 50 to 60% payout guidance. Could you see yourself on the top end or even above that 7 to 10% as you look forward, and how do you think about where you want to be within that 50 to 60% payout?

Jeffry Sterba: Well, you know, there's always that trade-off between returning funds to shareholders through dividends and reinvesting. We're in a position where I think we can use good judgment about what that right mix is because we've got headroom, both from a cash side but also from that 50 to 60%. I don't think—we don't think about it as there's a magic percentage. We are on the low end. We would rather have a sustained growth than a big spike, so we'd rather see a more sustained growth that's at or above what we have as earnings levels than do it all in one year or something like that. So I don't think you will see us do a big jump at one point in time. But 12%, well, you know, if you looked at what we showed, we were—we have grown in the—at 17% normalized and then in excess of 10 the last year, so it was appropriate.

Neil Mehta: And then on the military side, it sounds like you're making some progress with some of these RFPs. How do you think about the timing for when some decisions can materialize?

Sharon Cameron: Well as I said earlier, a few that we have RFPs on are nearing the end of that four-year procurement cycle, and with, you know, the recent budget settlements last week at least, which is lessening, hopefully, sequestration, and also through the conversations that we've had, we basically feel pretty good that we'll—hopefully, some of these will be awarded. We hope to be a recipient of those awards, which—of course, these are competitive bids, but we are hoping that, you know, from a timing perspective, a few of those that are pending will come to fruition in 2014.

Jeffry Sterba: Sharon, mention the—our understanding about the additional resources.

Sharon Cameron: Yes, we were also recently told that the Department of Defense, I guess the actual—I'm trying to think which arm that actually does the...

Jeffry Sterba: The contracting office.

Sharon Cameron: Yes, be the contract office. They have actually added staff, which, I guess, for today in Washington, is pretty unique. I think they really see the value of utility privatization program, and again, because it is a mandate, they do want to see the program go forward. So again, that's another positive indicator that we see.

Angie Storozynski: Thank you. Angie Storozynski, Macquarie. So first, about your ongoing operations, you mentioned that you're going to file five more rate cases next year. I thought the…

Jeffry Sterba: Ought to (ph).

Angie Storozynski: The strategy was to say out of rate cases now that the gap between allowed and realized ROE is getting close. And secondly, with the M&A playing a bigger role in your earnings trajectory, your earnings growth trajectory, how should we think about your ability to, first of all, you know, have the 60% of ongoing capex being derived from riders (ph)? I mean, are we—are you planning to acquire assets only in the states where you have this superior treatment of capex? And also, secondly, I mean, we all remember how some of the M&A strategies worked out in the past, and so how can we make sure that we're not going to have any years where acquisitions are actually serving as an earnings drag?

Jeffry Sterba: I'm going to have Walter and Susan take your second set of questions. I'll take the first one relative to rate cases. What I said was up to five, and now think about it. We serve in 16 states. Even if you move to a three-year rate cycle, that's five a year. So the fact is, we were filing in the nine-plus every year, and what we're doing—what we're able to do because of the cost control work that's been done is create potentially a little greater time. So an 18-month cycle slips and moves to two years or maybe two and a half years, so we'll still be in the rate case business. This is—there's no way around it, but the frequency and the magnitude of those rate cases is what I think you will see change.

Susan Story: M&A you want to...

Walter Lynch: Yes, the acquisitions that we have in our plan are in the states where we currently operate. Obviously, we want to expand in those states, and the consideration of recovery on capital is one of the things that we look at, so it does play into the objectives of where we're going to close deals.

Susan Story: And in terms of the amount of capital, if you look – and there's about 118 million in capital that we're looking at for regulated acquisitions for 2014; it goes down significantly for '15 and then there's a hold in place (ph) – you will notice that relative to the size of the total capital spend, that's still not that great when you look at the reg capex, as well as strategic capital. So it is a significant part of growth, but when you look at the outlay, and that is base (ph) '14—as Walter said, we have a pretty good line of sight on '14, pretty good line of sight on '15, you know, out there, we are looking at—as Walter said, things were starting to look at now. You know, when you look at these acquisitions – and, you're right, people say, "Well, there's going to be a floodgate," and I think Jeff was very clear and Walter – we're not expecting these big concession things and all the municipalities are going to decide that they want to privatize their systems. We don't believe that.

What we believe is, is one by one, looking at our service area where we already have regulated operations, where we're known, looking at systems, specifically, wastewater is a special focus, not that we're not looking at water, but wastewater and the benefits we get from wastewater combined with where we already have water customers or contiguous systems. So going back, if you just look at the relative size of what we're putting in for M&A, it's smaller than what we're doing for the rest of the capex.

Angie Storozynski: And one follow-up. So what type of volume erosion are you assuming in your projections, especially vis-à-vis those M&A transactions, because your gaining customers this way doesn't make any—is there any dent in the detriment to your volumes from the M&A?

Susan Story: In terms of customers?

Angie Storozynski: Like, volumes served basically, because—should we still assume a 1% degradation on annual volumes served, or is the M&A somehow offsetting that detriment?

Susan Story: Offsetting number of customers I think you're talking about.

Jeffry Sterba: Yes, no. It's—yes, there's declining usage. This, as—we're adding customers and that customer set brings usage, and so, you know, in terms of total volumes sold, it's going to offset the decline, but it doesn't offset the decline in the same territories. So we will still—the declining usage is per customer, so we will still have declining usage and so the issue of needing to pick up change rate structures, get more on the fixed side, et cetera, is still a pressing issue. Particularly remember that a lot of these additions, we think, will come on the wastewater side and so declining use in our drinking water is like, really, a given for, well, all of our territories.

Walter Lynch: And Jeff, one more point on the rate cases. If you look at the number of rate cases, less than five is a heck of a lot less than what we'd experienced over many years. If you go back four and five years, we were in the double digits of rate cases filed, so less than five is significantly less.

Jeffry Sterba: Right here, and then Steve and then right here.

Speaker: (Inaudible), Franklin Templeton. In the places where you're developing water infrastructure for the shale drillers, for the next two years and for the top 15 customers, potential customers that you are looking at, what is the difference in cost in terms of cents per gallon between what you can provide and what their cost is, alternative transportation cost is, and is it—can you provide it at 80%, can you provide it at 20% of their cost? That's one thing. And secondly, is the hurdle more on the contractual side, where—I mean, are you looking for two-year contracts to meet your return calculations? Are you looking for three years? Are you looking for more than five years of contracts for those customers, and from a perspective of where the hurdle really lies?

Jeffry Sterba: Okay. Relative to the first question—well, let me take them in reverse order. On the second question in terms of what's really the hurdle for us to build feeder systems for the wells, the issue—the real issue is their—how—we trade off between how much demand or how much will they commit to and the life that they'll commit to. Typically, you know, these guys don't like to make commitments more than tomorrow, so when you make it three years or five years, you're really stretching them. But we think that's viable, we think that's possible and we believe that, at least the ones that we're taking a hard look at, we can get adequate recovery of the capital within a timeframe that they're willing to make a commitment; but the challenge is each of these drillers has their own driller plan, and so how do you get the plans to come together at a point where you can get enough drillers to subscribe to a pipeline in the same window of time? That's probably the biggest challenge, because they each—you know, they have different leasehold interests and locations and then, in that, they will develop their own wellhead plan and you got to get them to mesh. So more than the issue of how much of a commitment will they make, getting coherent timing is probably the bigger issue.

And then in terms—I’m sorry, remind me of the first question.

Speaker: The cost.

Speaker: Cost.

Susan Story: (Inaudible).

Jeffry Sterba: It's all over the map. There is no formula of we'll provided it to you at 80% of avoided cost because it really depends on how big is the trunk versus how big is the feeder side. So one of the things though you got to keep in mind, the drillers are increasingly under real pressure around road traffic, safety of the public, as well as pollution and road damage. Now, they bond for the road damage, if you will, but in a lot of these communities, the notion of 1,000 trucks a day or 500 trucks a day going through an area is really concerning. So—in fact, of the—of what we did in 2013, that took about 60,000 truck hauls off the roads of Pennsylvania. That's becoming more of an issue, so we may be able to price up pretty close—reasonably close to their avoided cost but they have the benefit of no truck hauls. The trade-off for them is they can call a truck tomorrow, right? They make a commitment to take water out of a pipe, it's going to be a longer period of time. So those are really the variables that we have to work on.

Steve: Yes, thanks. Two questions. First, just on the 7 to 10% growth rate, can you just—just want to make sure I clarify, is that off the 2012 adjusted base of $1.99 through to 2018? Is that kind of what you're committing to?

Susan Story: Actually, when you look at the triangle to the triangle, it is the growth we're expecting year-to-year, so the long-term EPS is the 7 to 10%. The triangle to triangle is the year-over-year.

Steve: Okay. And then secondly, on the Homeowner Services and Military...

Susan Story: And by the way, they approximate each other, if you add up the numbers.

Steve: Close. Just want to make sure. But on the Military Services and the Homeowner Services, you did a great job laying out the current revenue growth outlook. Could you maybe just elaborate a little more on margins and the—and if you can't do it on margins, just the risks of the business, i.e…?

Sharon Cameron: Risks (ph) are different, yes. I mean, as a competitive business, we're pretty cautious (cross talking) our margin…

Steve: Right, but it’s becoming a more important part of the story, right, so we need to know, from an investment standpoint, what the risks of the business are and the costs. So maybe, for example in the military, you know, when you have these two or three-year re-openers, do they always go up, or could they go down? Or, for example, in the Homeowner Services business, like what—how are you pricing the product and what are the—could we have a whole bunch of, you know, people come in and say, "Hey, my stuff broke and you have fix to it?" Could you just give us a sense better of how—what is the risk profile of these businesses?

Sharon Cameron: Yes, absolutely. I'll take Homeowners first and I'll go backwards. We do a tremendous amount of work to mitigate risk for Homeowner Services, everything from the way the terms and conditions are written, which really limit our exposure to the cap we put on the claims, to the geographic expansion that we're doing now, similar to the Regulated Business, to really mitigate, you know, if there was a unique geographic impact to the business, to a tremendous amount of analytics for pricing variables, again, to meet what the severity and frequency might be in certain markets versus other markets. We've gotten pretty sophisticated over the years as we've grown in being able to really manage that, I'd say, very—with a very focus—and we also—because of all of the reporting and analytics we have in place, we would have very early warnings about things as well. We track things, you know, on a very micro basis.

For Military Services, the price redeterminations, again, are based on two things. They're based on economic fluctuations and, as long as I’ve been living, I haven't seen that go the other way, so it's really based on the cost, right, the cost of what it costs to run the business. And then secondly, it's also based on assets, and if anything, those assets just increase. They really—they don't go the other way because we're actively on base rehabilitating and upgrading the assets on base. So I have a pretty high confidence that the price redetermination would be in our favor, and in those negotiations, we have always—we've really gained the trust. We really—you know, our Military Services Group just does an amazing job servicing the customer. You know, they built that trust and they've built a really great model of how to work with the customer in ensuring that that process works smoothly.

Jeffry Sterba: Let me add two thoughts, Steve, on the risk issue on the military side. The biggest risk is that, when you initiate a new contract, that you underpriced it because when you do that, if you underprice your bid, in order to win the bid for example, you're not going to make that up because they're not going to allow you to change your cost because you estimated wrong. They're going to allow you to change your cost because you put more capital into the facilities so there's new facilities or general increase in wages and those kinds of things, you know, materials, et cetera. So once you're in, if you came in at a good point, you're going to stay at a good point. I think that's the primary point.

Sharon Cameron: That's right, yes.

Jeffry Sterba: And, you know, there has been some examples where players have had to work for quite a long time to get out from under—having underbid. We—I think we've shown a track record. We don't underbid. If we don't win something, we don't win something, but we're not going to make it up on volume. On Homeowner Services, what—one of the things that our folks do very, very well is in our contractor management, because if you think about it, what are the real risks? Well, one risk is that your claims rate goes up, and so how we—the way in which they verify claims so that it's not someone signed up and the next day, they're saying, "Oh, by the way, I got a leak today," and then also on the claims—on the management with the contractors so that we've got full control of what the costs are when a repair has to be made. Those are the two big risks that you have in that business.

No, no. Yes?

Speaker: Along those same lines, Sharon, you mentioned $200 million of backlog, and I wasn't clear exactly what that referred to. Are those projects that have already been approved and you're just waiting for them to be implemented, or those are...

Sharon Cameron: Yes.

Speaker: RFPs (inaudible) awarded? What is that 200 million?

Sharon Cameron: So if you remember that process cycle that I showed you, each year, our military team works with the folks on each base to identify and prioritize what are the greatest infrastructure projects and needs, and they submit those, and then in September each year, projects are awarded. That backlog of already-awarded projects is approximately 200—a little over

$200 million. That also includes, I would call it, the initial capital upgrades from the initial awards. When we first win an award, there's also an amount of capital work that needs to be done that is aligned with that project, so that total backlog today is 200 million. Just because of timing, of permits, of managing, you know, the contractors through the process, we will execute that work over a period of two years, and then each year, we hope to be awarded new contract dollars. Part of that is we're going to be doing an entire water treatment plant in Fort Polk. That's about $80 million and that will take several years to fully execute and build that plant.

Speaker: Okay, and then also on municipal industrial contracts, you talked about how you were shedding the less profitable contracts. You know, sort of what is your outlook for that business going forward?

Sharon Cameron: Yes, we've done our shedding. We're done shedding.

Speaker: Are they growing there, or is it going to stay a stagnant part of the bar chart? What happens?

Sharon Cameron: So what we're do—so we—what we have now is we have a stable portfolio of about, as I said, 40 municipal and about a dozen industrial and some commercial projects as well. These are typically three to five-year contracts. We certainly want to maintain and continue to get renewals for projects that have strong margins, but we're not going to be investing a lot of pursuit dollars to continue going after this category if it's not something that the customer wants to—a lot of customers are not interested in up and, you know, out-servicing O&M right now. Where we think there's an opportunity is in up-selling our existing contracts, so we're working very closely with our existing customers in those contracts and thinking about additional ways we can help service and provide extended service options to those customers, so gain a little more wallet share from our existing customers.

What I talked about at the end is we really need to take a hard look at the municipal segment and the industrial segment. There is a tremendous amount of opportunity in those segments but we want to really be focused on, again, what are the products and services that the customer really wants from American Water, where they want us to provide service and where we can build a business that capitalizes again on, I'd say, our core competencies and strengths but that also has those regulated-like business traits. The—call it the vanilla O&M business that we were in for many, many years is a very challenging business. It was not a growing category. The margins were low and we took all the risk. We don't want to do that going forward, and we feel that there's many other business opportunities in both of those sectors. You know, we're intrigued by waste energy. We're intrigued by back office for municipalities. If you look at what Walter talked about and what we've been able to achieve in our call centers, the efficiencies we've been able to drive, we have a lot of expertise that we think we can potentially, you know, offer to municipalities. Again, these are just ideas and that's why this year, we are investing in what I'll say is business creation, to think about all these things, to identify where we think there are really profitable and scalable growth opportunities for the future.

Kevin Cole: Hi, Kevin Cole, Credit Suisse. First, congratulations, Jeff and Susan, on the promotions for both of you (inaudible). And I guess first question is, I guess, piggybacking on the last two questions, is that could you talk a little bit about the cost to acquire for the customers for the Homeowner Services, and then what the average renewal rate is and just kind of how to think about the overall earnings gearing as you ramp this up?

Jeffry Sterba: The average approval rate of what? I'm sorry, I didn’t (inaudible).

Kevin Cole: I’m sorry, the average renewal rate.

Jeffry Sterba: Oh, renewal. (Cross talking) cost to acquire…

Sharon Cameron: Okay.

Jeffry Sterba: And average renewal rates.

Sharon Cameron: Okay. The cost to acquire really varies considerably by which initiative we're executing upon. You know, when we launch, for example, with our New York City, we're not going to see the profitability of that probably in year one because we spent a major amount in marketing in that initial year, but we see a profitability by year two. Our renewal rates are extremely high, where we can offer the product on bill and we do that in the American Water footprint, probably to about 70% of the market, and in New York City, we're offering it on bill. So not only is the take rate extremely high in New York where, again, we've penetrated one out of seven homeowners have already taken the product in less than a year. We expect renewal rates in New York City to be around 92%.

Now, where we don't sell the product on bill, we do have lower renewal rates because we have to go out and resell that customer each year, and we have a lot of strategies, as you can imagine, in play to try to extend that contract life with those customers as well, but that's also a higher cost to renew customers where we don't have a bill mechanism.

Kevin Cole: Okay, and I guess changing subjects a little bit, so I guess I'm hearing that you're playing more of an active role in New Jersey with the CTA conversation, and so I guess, what are you expecting for the path and timing for resolution, and how much of your rate base is at risk?

Jeffry Sterba: Well, CTA, consolidated tax, is an issue in about four of our states, and New Jersey has started a docket to investigate and is going through that process. You know, I hope that we will hear an outcome in the not-too-distant future. It is a significant one for us because New Jersey is—frankly, the whole notion of consolidated tax is odd, because it basically means someone's getting a benefit for something they never paid for, that someone else paid for, but the—New Jersey's, the way it was created actually can never go away. In fact, it increases. So it's a somewhat just concerning mechanism. In total, the consolidated tax issue for us in New Jersey – I think we've disclosed this – is about 200 million of rate base because it's done on the rate base side. Now, we have settled cases and so, within a black box, it's hard to piece part it out, but it's about a $200 million rate base element at issue for us in New Jersey, and as I said, I really commend the commission for starting the process to look at this as to whether or not it's appropriate, and I hope for a quick resolution to it.

Kevin Cole: And by 'quick resolution', do you mean—like, is it a 2014 resolution?

Jeffry Sterba: I look forward to a quick resolution to it. Kevin, that's all about all I can say. You know, it's not—there isn't a time clock on it, and our hope is that it can get handled because, frankly, until it gets resolved, how you file rate cases and all those kinds of things are kind of messy. So it would be good for it to get addressed one way or t'other and, you know, our personal view is it doesn't make sense to have. It should be eliminated because it effectively is giving someone a benefit for something they never paid for.

Kevin Cole: Okay, great. And just one last question, just from a high level. So on slide 21, you show how you reduced the average age of a pipe from—by 100 years in the last three years, and so you're 50—I think you're currently now 50 years above your target. Now since you've stepped up your 2014 to 2018 spending, how long will it take you to hit your target age of 100 years? And then once you hit that point, I guess, where will your organic regulated growth be coming from?

Walter Lynch: Okay, well, yes, we're at 150 years through '14, so the remaining four years, we're going to be working down towards that 100-year mark, but there's a significant amount of capital. As I said, we have 46,000 miles of mains and collection pipes. We're going to be getting down towards it, the 100 years, but—and approaching it, and we're going to continue and invest in our systems. We still have a lot of water and wastewater plants we need to upgrade. That's a tremendous focus. And as I talked about, the two big projects in California are going to take an awful lot of capital. But on the pipe issue, we are approaching the 1%, or the 100-year replacement rate.

Jeffry Sterba: And it's not just putting more capital at it. This is where this effectiveness of our capital spend really becomes important. So little things like having all of our states go by a standard on pipe, as opposed to states doing different things because that's the way they've always done them, that's saving us, John, $7 million?

John Bigelow: (Inaudible) 10 million.

Jeffry Sterba: Over $7 million in pipe acquisition costs a year?

Speaker: Yes, and it's in excess of that.

Jeffry Sterba: And then we start moving to, okay, how is that pipe laid? What's the most effective process used across our states and let's get that deployed across all of our properties, so we get more value for that same amount of spend. But even once we get down to 100 years, we're still investing multiples, 2 to 3 times our rate of depreciation, so that rate base growth will continue. One of the things you might have noticed is that when you look at the triangles over time, the amount—the magnitude of growth that comes from rate base investment has declined. It was 8%; it's down to about 5%. Well, that's because while we're increasing our capex spend, our denominator has obviously—continues to increase and so you get that divisor impact. There's also some issue—some impacts associated with what we talked about before, on the repairs maintenance accounting, and then, frankly, the other parts of our business are growing a little more rapidly than that is, so that's why those changes are occurring. But it's still—for as long as we can see, it will be the primary fundamental driver—foundational driver of our growth.

Walter Lynch: And just to put it in perspective as well, our capital programs are bottoms-up driven, so the states submit to capital programs to Susan and myself. We take a look at them; they're well in excess of what we plan to spend over the next five years. (Cross talking).

Jeffry Sterba: (Cross talking). Who's next? We got Heike. Heike.

Heike Doerr: Hi. Two unrelated questions for Walter. First, as we look about—as we look at the 35% efficiency ratio goal, how are you going to be able to do that while maintaining the corporate culture without, you know, hurting employee morale? And second, I believe you call them enablers; we refer to them as enhanced regulatory mechanisms. Is there something we should be paying attention to? Is there some type of legislation in 2014 that could meaningfully impact you in one of your operating states?

Walter Lynch: Okay. The second one first. There's nothing out there that's going to—that's on the horizon that's going to meaningfully, I think, impact one state. We're working on, as I said before, across a number of states. Enablers are going to enable growth, infrastructure investment, reducing regulatory lag, so—and those, as Jeff said, are built into the performance metrics of each one of our states and our state leadership teams. That's great.

On the next—on the first question, we're very cognizant of running our business for the long term. We're not going to do anything that impacts the long-term sustainability of our business. Our goal to get down to 35%, we believe, is doable through a number of areas. We're looking at technology, which Jeff and Susan both mentioned; skater (ph) systems, where we can more remotely operate facilities, the water and wastewater plants; automatic meter reading, so we can more efficiently read meters. Those are key things.

I'll tell you, one example that we did about a year and a half ago is—and one of things I mentioned before is that we can learn from each other. So we looked at the different ways that our states were operating and said, “Okay, if you look at the layers in the organization,” we had, from Jeff down to the front line employee, 11 layers in one state and we had eight in another, and we looked at this and said, “Okay, we have a couple of different operating models. Let's put this down so the states understand what the opportunities are to reduce their layers and let them make their decisions on what's the best way to run the company.” Through that effort—it was a couple of month exercise. Through that effort, we were able to eliminate 135 management positions in the business, and I can tell you after that, running the business right now, we're more efficient and effective than we were before. That's another thing that we're looking at ways to learn internally, not just from the external marketplace but internally in our business.

Susan Story: And Heike, also, you know, bringing workforce planning with this, which is utilities have been saying for a long time, in the next five to 10 years, we may be looking at 60% of our employees who are eligible to retire; to be able to be more efficient to use technology and automation, to not have to fill those jobs one-on-one is a good thing. So we're actually integrating this study into our workforce planning processes and looking at where we have more risk for people to lead and where we have skills. And another thing is that, as we transform, we also create jobs that are more fun jobs in some cases; you know, you're doing, for example, from manual data generation to value-added analytics, for example. So part of it is an opportunity for us to address another issue, that not just us but the entire utility industry is facing, which is the workforce planning and the aging workforce.

Jeffry Sterba: A good example of that is SCADA. SCADA is system control and data acquisition, and you know, quite frankly, a lot of water plants are fairly labor-intensive but the technology is there where they don't need to be, but what the—the labor you do need is a much higher level of capacity. It's people who are instrumentation experts that know how to deploy and utilize SCADA systems. So you may have fewer of them but they're going to be much more valuable kinds of position.

Walter Lynch: And one other thing too is that—I always mention this, but our supply chain has done a tremendous job in leveraging our buying power, in fuel, in power, in chemicals, and John and I spent a lot of time—we partner in ways that we can drive the cost structure down and by, as Jeff said, looking at pipe, let's buy all the same pipe, let's reduce the number chemicals that we have in our business so we can get better purchasing on those. It's a whole host of things that we've been working on that we're continuing to drive value.

Roger Lidell: How should we think about—Roger Lidell, Clear Harbor Asset Management. How should we think about newly recognized contaminants on the wastewater side, Western Pennsylvania bromine concentrations that are clearly traceable to drilling; triclosan now getting attention; pharmacologically active concentrations coming out of wastewater treatment plants? So I'm not sure how to think about that, whether this is a significant opportunity with upgrading removal capacity in treatment plants, either wastewater or on the potable side. And would this be an O&M issue, or could there be capex-es? What's the magnitude of the opportunity, if there is one there?

Jeffry Sterba: You know, honestly, that plays to our strength. We're the only water utility in the United States that has its—not only its own laboratory, but it's own research function, and in fact, half of all of our cost of our research function are paid for by grants given by other organizations to us to do research. So if you look on the drinking water side, there are 102 emerging contaminants. There's a whole set, obviously, also on the wastewater side. This is where a lot of our leading research is done, is what's going to be the best way to handle this, and in fact, in many instances, we're providing baseline data to the regulators, particularly the EPA, for what's the magnitude of this issue, because we're the only one that spans as many states, from Hawaii to New York.

So I'll give you one example, chrome 6, Chromium 6, which has the—Tech California has now implemented a standard for Chromium 6. This will increase cost, both on the capital and the O&M side because we will have to put in place new treatment regimens which will take additional capital, but then it'll also increase operating costs, just not as much, but there will be capital that will need to be invested on chrome 6. So it really varies. I think the advantage we have is—there's not one of those that we're not looking at and figuring out, well if and when a regulation comes and what's going to be the best way for us to meet it. We also—you know, it'll vary by state. So even within California, probably, I don't know, 30% of our supply is going to have a chrome 6 solution. The balance doesn't need it because it's way under. So you really have to go contaminant by contaminant. I think entities that are on more on the leading edge and have the capacity to both design and test have an advantage. Those that are going to have to always have that provided by someone else, they may not even be able to do the adequate testing, are going to have to buy that from somebody.

Roger Lidell: And final question, is there any movement to remove or reverse the exclusion of the oil and gas industry from Safe Drinking Water Act and Clean Water Act?

Jeffry Sterba: You know, that's for a group of people with a different pay grade than us. I'm not going to say if it's—which way it goes, but that's really not ours to judge. We're—we will—our role is to take whatever the rules and regs are and make sure that we not only meet them, but in many instances, help shape them and help beat them. So, you know, the whole oil and gas question and whether or not—what's done at the state level versus what's done at the federal level, we may have personal views but those are, frankly, not—we're not going to have a major impact on that issue.

I think you have one and this will be the last question.

Speaker: All right, hopefully, kind of easier ones, but does the 2 to 3% growth in the Market-Based businesses through '18 assume that you win some of the outstanding RFPs for new bases, or does it just factor in the price redeterminations and infrastructure projects?

Sharon Cameron: Are you speaking to 2014 or future?

Jeffry Sterba: 2015 period.

Speaker: Fifteen and beyond, the 2 to 3%.

Sharon Cameron: Two to 3. Yes, it is—our growth is based on both winning new awards and continuing to see those contract infrastructure projects awarded.

Speaker: All right, so you're embedding some of the 7 or less RFPs being won?

Sharon Cameron: Yes.

Speaker: Okay. And then, Susan, maybe...

Jeffry Sterba: It's not 100%, John (ph).

Sharon Cameron: No, (inaudible).

Speaker: Right. Susan, probably for you, the NOL balance, what's it going to look like at the end of '18, or how much are you expecting to realize on an annual basis, and when do you think those will be fully utilized?

Susan Story: We do not believe that we will pay cash taxes until about 2021.

Jeffry Sterba: Okay. Well, I want to thank you all for the time that you spent with us today. I think we got the snow stopped, so that's a good thing. You know, I just would reinforce that, as we've gone through this planning process, the level of comfort that we have with what we presented to you today, I'm sure it's probably also raised some questions that you'll think about and feel free to get hold of Ed or…

END

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AWK - Q3 2013 American Water Works Company, Inc. Earnings Conference Call

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NOVEMBER 07, 2013 / 02:00PM GMT, AWK - Q3 2013 American Water Works Company, Inc. Earnings Conference Call

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PRESENTATION

Operator

Good morning, and welcome to American Water's third-quarter 2013 earnings conference call. As a reminder, this call is being recorded and is being webcast with the Company slide presentation through the Company's website, www.amwater.com. Following this earnings call, an audio archive of the call will be available through November 14, 2013 by dialing 303-590-3030 for US and international callers. The access code is 4643778. The online archive of the webcast will be available through December 6 by accessing the investor relations page of the Company's website located at www.amwater.com.

At this time, all participants have been placed in a listen-only mode. Following the management's prepared remarks, we will then open the call for questions.

I would like to introduce your host for today's call, Mr. Ed Vallejo, Vice President of Investor Relations. Mr. Vallejo you may begin.

Edward Vallejo ***- American Water Works Company Inc - VP of IR***

Thank you. Good morning, everyone. Welcome to American Water's third quarter 2013 conference call. As usual, we'll keep our call to about an hour. At the end of our prepared remarks, we will have time for questions.

Before we begin, I would like to remind everyone that, during the course of this conference call, both in our prepared remarks and in answers to your questions, we may make statements related to future performance. Our statements represent our most reasonable estimates, however, since these statements deal with future events, they are subject to numerous risks, uncertainties, and other factors that may cause the actual performance of American Water to be materially different from the performance indicated or implied by such statements. Such risk factors are set forth in the Company's SEC filing.

And now I would like to turn the call over to American Water's President and CEO, Jeff Sterba.

Jeffry Sterba ***- American Water Works Company Inc - President & CEO***

Thanks, Ed. Good morning to you all and I appreciate you joining us on this call. Susan Story, our Senior VP and Chief Financial Officer will join me in the brief presentation and then we, along with Walter Lynch, who, as you know, heads our Regulated Operations and Mark Chesla our Controller will respond to questions that you may have.

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As have seen from the 10-Q in the press release, that we filed last night, while mild weather impacted the quarter, I am pleased to say that we have a solid performance to date with strong cost control, good growth in market-based operations, and good acquisition success. So based on that, we are now narrowing the earnings guidance from the year from $2.15 to $2.25 per share on a diluted basis to a range of $2.17 to $2.22 per share. For the quarter, we recorded decreases in income from continuing operations and earnings per share as compared to the same quarter in 2012. This was mainly due to decreased regulated business revenues due to lower customer usage related to weather, in addition to the ongoing usage decline that we see on the residential front, as well as higher depreciation expenses due to additional utility plant and service. That includes our business transformation SAP conversion project.

In addition, as we mentioned last quarter, as you look on slide 5, it appears in that slide that our 2013 year-to-date cash flow from operations is lower, but this is due to on how our bank overdraft is being treated, as a reduction to operating cash flow as opposed to a financing activity. And this is the result of the decision we made last year to internally manage our cash activities. Year to date this changing cash flow classification amounts to about $35 million.

Going to slide 6, let me take a minute to discuss the weather's impact on our business. The same type of weather that impacted our second quarter continued to pressure third-quarter regulated revenues. As you can see by the cooling degree days chart from NOAA, which, as most of you cover the energy side so you're very well familiar with this, the country experienced cooler-than-normal temperatures throughout the third quarter.

Now we often talk about our geographical diversity across 16 states and how it helps mitigate things like weather impact and that was certainly the case this quarter in states like California where hotter weather caused higher usage. but even with that contribution we did experience an approximate $0.02 to $0.04 decrease in earnings per share from weather for this quarter, which when you add that to the $0.01 to $0.02 impact last quarter, you have a total of $0.03 to $0.06 total impact for the first nine months of the year.

Turning to the continued growth of our business, we've had successes that we want to report on briefly in both our core and on our enhanced growth through the quarter. We completed six tuck-ins during the quarter, four water and two wastewater systems. These were in the states of Iowa, Pennsylvania, Illinois, and Missouri. For the first nine months of 2013, these efforts have added approximately 6500 customers to the regulated footprint, and we have several small tuck-ins that are currently pending approvals, and we expect those to close within the next three to six months or so.

Continuing on slide 7 relative to the core growth, for the third quarter our military services group received contract modifications for infrastructure investments in every single one of the 9 military bases that we serve. These are for design and construction of water and wastewater system components to be completed over the next three years, and they vary in scale from small water reuse projects at one of the army fort places, Fort Sill, that is in Oklahoma, to a complete replacement of the two wastewater treatment facilities in Fork Polk in Louisiana. I will tell you that while there are still some things moving, it's the largest amount of awards for modification that we have received in the military operations since we started that business.

On the regulated front, we received a rate case decision in West Virginia that is worth an annualized $8.5 million. After the quarter ended, about $7.2 million in annualized revenue from infrastructure surcharges became effective in Pennsylvania and Illinois. And also after the quarter ended, we received the rate authorization in Kentucky for $6.9 million of additional revenues on an annualized basis. As of today, we're awaiting final rate decisions in three pending cases that request a total of $97.4 million in annualized revenues. In one of these cases, Pennsylvania, we have a settlement with the staff, the office of Consumer Advocate, and the office of Small Business Advocate. This settlement for $26 million plus the $29 million of DSIC revenues that are currently being recovered under DSIC and which will become part of base revenues under the proposed settlement, that settlement is currently pending regulatory approval with the rates geared to go into affect January 1.

On the enhanced growth side on October 30, we received approval from the Virginia State Corporation Commission to acquire Dale Services Corporation, and we expect that transaction to close later this month. This regulated wastewater acquisition will add approximately 20,000 customers, most of whom already receive their water service from Virginia, American Water. The reason why this transaction I think is important is not just its size, but it marks the kind of transactions that we talked with many of you about. Where wastewater is only about 4% of our business, but we, so most places where we serve water, someone's providing wastewater it's not us. This is the result of the kind of targeted focused acquisition efforts that we're moving on to expand our wastewater operation, and this transaction also marks our entry into the wastewater service arena in the state of Virginia.

Our Home Owner Services business continued to expand its water and sewer line protection programs to home owners in Florida and Washington, DC, and our service line protection programs in New York City we now have a total of about one out of every seven eligible home owners is enrolled. Most of them, virtually all of them, have opted for both water line and sewer line protection. So far this year, we have added over 250,000 new contracts for a total of more than 1.2 million contracts national.

Before turning the call over to Susan, let me just mention what I think is a historic initiative, that launched in October. American Water and several other leading water industry organizations from both the public and private sector, as well as a couple of other companies, have come together under the name of Value of Water Coalition.

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The coalition's education campaign is aimed at helping to increase the public's understanding and awareness of water services. The value these services provide us and the need to upgrade and maintain this vital infrastructure, so that we can continue to rely on it now and for generations to come.

This effort marks the first time such a broad coalition of water businesses and non-profit associations have come together in a single voice. And we're doing so because it's critical to address the current state of water infrastructure and the need for significant investment to keep water services at the levels of quality and safety Americans have come to expect. We're already hearing good feedback from this outreach effort from regulators, staff, and consumers.

Let me just also mention that we have been reconfirmed as a member of the Dow Jones sustainability North American index, which demonstrates recognition of our ongoing long-term commitment to sustainability. We're the only US water utility on the index and we are honored to be on it.

And with that, let me turn the call over to Susan for a more detailed report on our financials.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Thank you, Jeff, and good morning to you all. It's a pleasure to be here with you today to review the quarter and year-to-date results ending September 30. Jeff has already reviewed many of the key highlights. I will now take a few minutes to discuss the drivers of our third-quarter results in more detail.

Turning to slide 10, we reported a decrease in our third-quarter 2013 income from continuing operations and EPS over the third quarter of 2012. This decrease is mainly attributable to decrease regulated business revenues, due to lower customer usage related to weather, general taxes, and higher depreciation expenses, due to additional plants, slates, and service, including expenditures related to our SAP implementation. As Jeff mentioned, we had above-normal rainfall and below-normal temperatures in several of our states in June and July, which was followed by cooler weather in August, which impacted our sales.

These related decreases in usage, and accompanying revenue, net income, and earnings per share were in stark contrast to the unusually hot and dry weather we saw in the summer of 2012. Our consolidated O&M expenses for the three months ending September 30 decreased by $11.5 million, or 3.2% compared to the prior-year period. The variance is primarily due to lower O&M costs in our regulated business segment of $7.1 million, mainly due to a reduction in employee-related costs and in our market-based segment of $3.7 million mainly as a result of a $3.8 million relief of contract reserves due to the resolution of certain outstanding issues and uncertainties.

Now let's discuss on slide 11 the different components of our income from continuing operations starting with revenue. I also encourage you to read our 10-Q on file with SEC for a more detailed analysis of both revenues and expenses. Overall, our operating revenues decreased $2.6 million or 0.3% with revenues from our regulated business decreasing by $7.7 million or 1% from 2012. The decrease in revenues associated with the lower demands was approximately $35.2 million. The year-over-year comparison was significant due to the diametrically opposite weather affects of 2013 contrasted with 2012 that we all spoke of earlier.

This demand decrease was partially offset by revenue increases of $18.4 million from rate increases obtained through rate authorizations, awarded for a number of our operating companies, and increased surcharge and amortization of balancing account of $9.9 million. At a high level, our continued success in earning an adequate and timely return on the capital we invest in infrastructure, as well as implementing alternative regulatory mechanism, such as; surcharges and balancing accounts, helps us to close regulatory lag. And particularly in this quarter, has helped us to mitigate the adverse impact of declining sales due to weather and declining usage.

For our market-based businesses, revenues for the third quarter of 2013 increased by $4.7 million. Mainly due to an increase in our home owner's service revenue of $5.4 million, resulting from contract growth most notably in New York City. This increase was offset by lower contract operations group revenues of $900,000, predominantly related to the termination of certain municipal and industrial operations and maintenance contracts totaling approximately $2.4 million. The contracts were ended as part of our business optimization efforts designed specifically to optimize margins in our contract operations business.

Further, those contract terminations were offset by net increase of $1.7 million from price redeterminations from our military contract. You may recall that price redeterminations are periodic adjustments to our monthly service fees for O&M costs, plus the systemic renewal and replacement of aging assets. These are prospective price adjustment. But because price determination can take many months or even years to finalize, the government makes a one-time payment retroactive to the effective date of that price redetermination period.

On slide 12, operating expenses for the third quarter of 2013 increased by about $1.1 million from 2012, roughly flat compared with the prior-year period. Operation and maintenance expense and the regulated business decreased $7.1 million mainly as a result of lower production costs and lower employee-related costs, including decreased pension expense and group insurance. The market-based business operation decreased in total operating expenses of $3.7 million is mainly due to the

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termination of certain municipal and industrial operations and maintenance contracts in 2012 that I mentioned earlier. And a relief of a portion of the lost contracts reserve in the third quarter of 2013.

In the third quarter, we also reported a higher consolidated depreciation and amortization expense of $6.5 million, and higher general tax, parent elimination, and other expense of $5.4 million. The increase in depreciation and amortization was principally as a result of additional utility plant placed in service, including phase 1 and phase 2 of our business transformation SAP project that went into the service during the third quarter of 2012, and the second quarter of 2013 respectively. The increase in general tax expense is primary due to higher property taxes incurred, partially as a result of the inclusion in 2012 of credit adjustment to our Indiana and Missouri property taxes.

Turning now to slide 13, to more clearly explain the period-over-period difference in our earnings per share figures, we have broken these out per category similar to our presentation D last quarter. As you can see, we have adjusted for the positive $0.06 to $0.08 impact of weather for our 2012 results. Taken the mid-point of this adjustment for the unseasonably hot and dry weather, we have a normalized earnings starting point for the third quarter of 2012, $0.80 per share. From there, we lay out the various elements that explain the difference in our year-over-year earnings per share result. I think these are straight forward, so I'm not going to go through these, but I'll be happy and others will be happy to provide further clarifications during our question-and-answer session today if you do have questions.

Going to slide 14, we show our O&M efficiency ratio. For the 12 months ending September 30, we maintained a 40.3% ratio, which is in line with the 40.4% ratio we had last quarter for the 12 months ended June 30 and the earlier annual period shown here. On slide 15, as Jeff has already said, we have narrowed our guidance to $2.17 to $2.22 diluted EPS from continuing operations, which reflects our year-to-date performance and assumes no unusual events that would impact water sales volume for the remainder of the year. This includes the impact of the release of the lost contracts reserve in the third quarter of 2013 that I mentioned earlier, but excludes costs of our recent tender offer.

Slide 16 outlines some of the actions we have recently taken to increase our financial flexibility and reduce exposure to capital market volatility. To briefly summarize, on September 9, we announced we had increased our revolving credit facility from $1 billion to $1.25 billion under its original term. At the same time, we raised our commercial paper program from $700 million to $1 billion. The higher credit facility, along with the increase commercial paper program and cash from operation, provides for the Company's near-term financial liquidity. We also announced through our financing subsidiary, American Water Capital Corp, a cash tender offer for up to $300 million, a 6.085% senior note due in 2017, which represents a portion of what we typically referred to as our parent company debt.

On October 8, we retired $226 million of these notes, meaningfully reducing our exposure to the capital markets in 2017. Also, as a result of the retirement of this debt, and based upon our current commercial paper borrowing rate, we would expect to have a pretax interest expense savings of $13 million in 2014. On November 1, we issued a notice of redemption of securities with 8.25% and 10% coupons aggregating to approximately $150 million. These notes will be retired on December 1. Additionally, we have debt maturity and $101 million on December 21. We are really pleased with the results of our ongoing debt management program and from time to time, and as market conditions warrant, we may engage in additional long-term debt retirement via tender offers, open market repurchases, or other viable transactions.

Turning now to slide 17 and Jeff's mentioned several of these. I will just go back through some of the highlights. A number of our rates-related regulatory activities occurred during the third quarter of 2013. On July 1, 2013, additional annualized revenue of $3.7 million and $4 million resulting from infrastructure charges in our Pennsylvania and New Jersey subsidiaries, respectively, became effective.

Also on July 1, 2013 we filed an update to our proposed application in California that was originally filed on May 1 of this year, requesting $33.5 million of additional annualized revenue, which includes increases in 2016 and 2017 of $8.3 million and $2.7 million respectively. On October 9, California American filed an update to the final general rate case application adjusting the request to $32.4 million. On July 9, 2013 our West Virginia subsidiary entered into a joint stipulation in their water and wastewater general rate case that was filed on December 14, 2012.

On September 26, 2013, a final order consistent with the stipulation agreement was approved and provides for additional annualized revenue of $8.5 million, effective October 11, 2013. On August 30, 2013, our Missouri subsidiary filed for an infrastructure surcharge amounting to $2.4 million in additional annualized revenue. The surcharge is expected to be approved and would become effective in the fourth quarter of this year.

On September 16, 2013, our Pennsylvania subsidiary, as Jeff said, reached a settlement in principle for its general rate case filed on April 30 of this year with the PUC staff, the Office of Consumer Advocates and the Office of Small Business Advocates. The settlement agreement if approved would provide $26 million in additional annualized base rate revenue effective January 1, 2014, and as mentioned previously this is in addition to the $29 million of DSIC revenues currently being recovered, which will become part of the base revenue. This agreement is pending regulatory approval.

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Turning now to developments which have occurred following the end of the third quarter. On October 1, 2013, additional annualized revenue of $6.7 million and $500,000 resulting from infrastructure filing in our Pennsylvania and Illinois subsidiary respectively became effective. Also, on October 1 our Indiana subsidiary submitted an infrastructure charge filing to increase revenues by an additional $4.4 million on an annualized basis. On October 4, 2013, our Tennessee subsidiary filed four alternative mechanisms, requesting to increase revenues on an annualized basis of $500,000. These alternative rate mechanisms were filed and compliant with Tennessee House Bill 191 that was signed into law in April of this year. Finally, on October 25, a final order was received for new annualized revenue of $6.9 million for our Kentucky American Subsidiary.

So in summary, we have had a lot of regulatory activity in the third quarter, and we are currently awaiting $97.4 million in requested additional revenues in Pennsylvania, Iowa, and California from formal rate cases we filed this year. Last quarter, we created a new slide which you can find in the appendix, slide 25, entitled regulating utilities, rate base and allowed return on equity, which shows detailed regulatory information for our 10 largest states.

Many of you had requested this data to showing each of our regulated businesses, authorized rate base, authorized ROE, authorized equity, and the effective date of the rate case that we used. These are historic cases and we advise you to review the footnotes for a fuller understanding of the particular case in question. While you can never project how any new case will be determined, we hope this will help you understand better our rate environment.

Finally, as a part of our commitment to shareholder value on October 27, we announced that our board of directors declared a quarterly cash dividend payment of $0.28 per common share payable on December 2, 2013 to all shareholders of record as of November 15, 2013, which continues our commitment to an annual dividend payout goal of 50% to 60% of net income.

Now I will turn the call back to Jeff for his closing comments and your questions.

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Thanks Susan.

If you go to slide 19, this is the slide on expectations for the year that you have seen we use every quarter. We've really already spoken about the progress on each of these efforts, which will anchor our long-term earnings per share growth of 7% to 10%. Let me just expand on one item that Susan briefly talked about, and that is our business transformation effort. In October, the last phase of this effort went live; this has been a 4.5 year project to install SAP platform systems as we've talked about before. I got to tell you, while these kinds of conversions, and this is the third one I have been through, they're never pretty, there is always a big impact on productivity, so they talk about averages of 30% to 40%.

We certainly haven't incurred that kind of loss of productivity, but -- so they're messy but I am just really tickled and pleased with how well it's gone. And when you step up and look at it from the broad prospective, we've implemented new financial systems, new supply chain systems, new customer service systems, and new asset management systems. And it has gone quite well. So kind of hats off to all of our folks because it has impacted every single one of our employees.

Before we open the call for questions, I want to remind everyone that we're hosting our 2013 analyst day at the New York Stock Exchange on Tuesday, December 17. To confirm your interest in attending, please call the investor relations phone number you see on the slide. We certainly hope that you will be able to join us that afternoon and we'll talk about the future in that session.

With that, we'd be happy to take questions that you may have.

QUESTION AND ANSWER

Operator

(Operator Instructions)

Your first question will come from the line of Neil Mehta of Goldman Sachs. Please go ahead.

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Neil Mehta - *Goldman Sachs - Analyst*

Good morning.

Jeffry Sterba - *American Water Works Company Inc - President & CEO*

Hey, Neil.

Susan Story - *American Water Works Company Inc - SVP & CFO*

Morning.

Neil Mehta - *Goldman Sachs - Analyst*

Congratulations on being able to keep guidance despite this unfavorable weather here. I guess that is my question in a sense that, a big part of the reason you were able to maintain the guidance was cost management. How sustainable are the cost cuts or were you just putting thumb on the expenses this year to kind of offset the weather?

Jeffry Sterba - *American Water Works Company Inc - President & CEO*

No Neil as we talked about before, our whole focus in cost management is around driving excellence through business process and continuous improvement. So the things that we are doing they're not one offs, they're not slash and burns, they're not just headcount reductions, they're geared around changing what we pose as the three questions. Is what we're doing is it any value? If not, stop doing it. If it does add value is it being done through an efficient process? If not, let's change the process and once it's being done through an efficient process what's the error rate and how do we reduce the errors to zero? That helps create a systematic approach to the way in which we think about our costs and cost drivers and, you know, one of the things and Walter may want to make a few comments about it, we're still working on is this integration across all of our states to take the best practice in one place and move them in a standardized way across the other states.

Walter Lynch - *American Water Works Company Inc - Head of Regulatory Operations*

Thanks, Jeff. This is Walter. We're as Jeff said; taking best practices because we're doing things wonderfully in many parts of our company we're expanding that across our entire footprint in reg operations and throughout the entire business. Because we can learn back and forth in the market based businesses through regulated operations. One of the other things too, is the continuous improvement culture. Really focused on driving improvements long-term, and we have a lean leader program where we have more than 100 people throughout our company looking at ways to improve our processes and looking at ways that we can reduce errors. That is contributing significantly now and will contribute significantly in the future as we root out errors and we become more efficient.

Jeffry Sterba - *American Water Works Company Inc - President & CEO*

And just one other thing. While that is our, that is our baseline. And we believe that provides us a great deal of ability to minimize operational cost increases and add more capital to the base and that is the basis for rate increases. As we implement SAP just as end of last year we had some additional expenses incurred because of that recovery and that reduced productivity. We'll see some of that and we have seen some of that this year. You don't necessarily see it because we're even doing a better job in reducing our other costs so net-net, we're still down. But we will see those kinds of things and we'll make sure that we pay attention to them.

Neil Mehta - *Goldman Sachs - Analyst*

Perfect and the other question around dividend growth strategy, obviously a double digit dividend step up this year. How do you think about the pace of dividend growth from here and where you want to be relative to the 50% to 60% payout ratio?

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Susan Story - ***American Water Works Company Inc - SVP & CFO***

Yes Neil, this is Susan. As we've said before, we have two guiding principles. One is that we correlate the growth of our dividend along with our EPS growth, and we have been very transparent about that, and we have a target of saying between 50% and 60% payout. And as you know we're on the low end of that so we have head room.

Neil Mehta - ***Goldman Sachs - Analyst***

Okay, and then the final question of the California project in Monterey; can you provide an update of where you stand there?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Yes, I'll ask Walter to add a few things them me put a few on the table. Frankly, things are moving well. It's always, this is the project that will cause rates to increase in this double-digit fashion, so it's under a lot of scrutiny and it's obviously a water constrained area particularly in Monterey. But this project is in fact moving forward quite well. We would expect a commission-recommended decision by August next year.

Walter Lynch - ***American Water Works Company Inc - Head of Regulatory Operations***

August 2014. Right Jeff, and there is along the way obviously there's a lot of things that have to occur for that to happen, but there is informal hearings scheduled for early December and we have come to settlements with a number of parties out in the Monterey area and during the hearings, is when everyone will be able to put their case forward. We feel confident that we're working cooperatively with the people in Monterey to get the right solution.

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Two other things we're in the bid process right now for the constructor for that project, and so, that is going along quite well and the testing the initial results of testing relative to the aquifer are, have been very promising. So these pins, the pins that kind of stand in the way are getting knocked down we still have a few to go.

Neil Mehta - ***Goldman Sachs - Analyst***

Terrific. Thank you.

Operator

Your next question will come from the line of Jonathan Reeder of Wells Fargo. Please go ahead.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Hey, good morning, Jeff, and Susan, and Walter. Following up on Neil's question just a bit, so should we interpret the guidance revision or narrowing today as implying that results would have been in the upper half of the original range had it not been for the weather impact?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

You can probably look at it that way. I mean we said that weather is worth $0.03 to $0.06 a share and we narrowed it to basically the mid-point of the range.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

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What we prefer to say that we're closer to the end of the year, have a little more look into where we would end up, and so we are good with the range.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay. Essentially, what is keeping you in the midpoint of the range is not unsustainable stuff?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

No.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Like you mentioned before, right?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Right. When I think about Jonathan about some of the things we have gotten done this year, and both on the cost control efforts, the growth in the market-based business, and the success we're having on the tuck-in, and acquisition sides those are going along exceptionally well.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

And to add to that Jonathan, and Walter and Jeff talked about this the BT implementation, the SAP implementation, as Jeff mentioned, we actually had and we have shown this through the years, disclosed it in the Q, we have actually had increased costs in the contract services because we've had to back fill a lot of positions to get the ERP system working to the level that we want it to work to get to the point where it can generate the data and we could do more value added analytics. That will go away next year and as they both mentioned, in addition to the process improvement, the ability to have a integrated system, throughout our company, we're just now starting to look at some of the efficiencies and enhancements we can make as a result of that implementation.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

So when we look at costs next year, not from, I guess, the O&M Efficiency ratio standpoint, but just an absolute basis with implementation costs falling off, I mean where do you expect it to be? Is it flat is it still modestly up?

Walter Lynch - ***American Water Works Company Inc - Head of Regulatory Operations***

I assume, I trust that you will be with us on December 17, and we'll talk about that.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

How did I know that answer was coming? (Laughter) Okay. Quickly, just going to the military services group and the contact modifications. It sounds like they're kind of meaningful, something that is going to provide a boost in 2014 and maybe 2015 results. Is that accurate and then does that kind of cause a head wind potentially in 2016 or so, if, you know, you get similar size and contracts moving forward?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Well, I guess, two things. You're right about the timing. Most of these projects are two, one to two and occasionally three years so for example; the major rebuild on the wastewater system at one of the installations that could slip beyond two years. So, but you know, we're always hoping, and looking, and working with our customers on the bases as to what will occur in the next year. The other piece is, as we've said before, there are a number of military installations that are out for bid today. Now we

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don't go after every single military installation we go after the ones where we believe we truly can add value and that value can be recognized through the size of the contract. We have quite a lot going on in that area and we want to make sure that the ones we take on we can truly excel at, and we have a number of those out in the bid stage today with awards that could happen as early as, let's say early first of next year through 2014, so what we look to is to be able to expand the base of business through the addition of new bases to the portfolio, and that this additional modification capital is really supplemental to the fundamentals that we have within the business.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay, so any kind of falling off from the contract modification you think would be replaced by a larger number of bases operated and everything?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Yes and probably more than offset.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

And then last question on the parent debt balance. What is it, I guess, to not associate the subsidiary rate base. Where are you going to be year-end and how does that compare to where you were say Q2 before taking some of these actions?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Right, well, Jonathan, if you remember, it was about $1.2 billion, which we reported $750 million, matured, matures in 2017 and another $450 million matures in 2018. What we did was take out $226 million of the $750 million that was set to mature in 2017.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

And then you said later in the quarter by year-end, you are going to take out some more, is that correct?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Well what we had, not necessarily of that parent company debt, what I mentioned is that we have, we issued redemption notices on November 1, last Friday, for about $149.8 million, $150 million of bonds that or debt that has coupon rates at 8.25% and 10%. That is going to be a nice pickup and we have maturing debt of about $101 million by December 21.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay, so you'll be refinancing that and not taking it out?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Yes.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay. Great. Thank you so much.

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Operator

Your next question comes from the line of Kevin Cole of Credit Suisse. Please go ahead.

Kevin Cole *- Credit Suisse - Analyst*

Good morning.

Jeffry Sterba *- American Water Works Company Inc - President & CEO*

Hi, Kevin.

Susan Story *- American Water Works Company Inc - SVP & CFO*

Good morning.

Kevin Cole *- Credit Suisse - Analyst*

Just with home owner services becoming increasingly important and a bigger part of your business, can you talk about the risk profile of the business? Meaning, are you wearing the event risk or are simply offering a product that is wrapped by a third party insurer and then do your policies cover like systematic or any catastrophic events that could impact a large number of your customers at once?

Jeffry Sterba *- American Water Works Company Inc - President & CEO*

Good questions Kevin, a couple of things; no we don't use third party reinsurance we basically self insure, but most of these are capped. There is a cap on the total amount that we're exposed too so we'll do the repair or replacement up to X dollars, so that is the way that we manage the ultimate exposure but really, the primary exposure, is our contractor management process, which is a very thorough vetting of both, what's done, how it's done, the oversight of that, and who's doing it. We don't have unlimited exposure for situations we also, obviously will look at, we price differently in different areas. There is not a uniformed price across the United States, and that is because systems are different. Their age is different; the soil chemistry will be different. So, they will have different risk patterns. That gets taken into account and as well as the cost of repairs gets taken into account in that pricing strategy.

Are there limitations on the coverage? Absolutely. And then they run from things like you have to have been a customer for usually a 30 days sometimes it's longer than that before any claim can be processed and that is to help ensure that we don't have somebody who realizes they have a leak and try to pick up, I'm sorry, I didn't use that word, warranty for it. And then it also goes to, you know, certain limitations relative to acts of God and things of that nature so we protect ourselves in a variety of different ways relative to what that exposure can be.

Susan Story *- American Water Works Company Inc - SVP & CFO*

And added to what Jeff said, we have a robust system where we evaluate frequency and severity of each of the events and we look at where those events are, we look at severity, in fact this year we disclosed in an early Q at the end of the first quarter, that we had a spike in severity so we started managing looking at where that was, evaluating contractors, and we actually were able to remedy that and it's back to its historic rates. We have a really strong system around managing those risks by looking at what is happening, where it's happening, and to just point how we process.

Jeffry Sterba *- American Water Works Company Inc - President & CEO*

Some of you met Sharon Cameron who runs our market based business. She came out of home owner services and was instrumental in its start-off and bringing it to this level. She'll be with us at the December 17 meeting so you get a chance to visit with her.

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Kevin Cole - ***Credit Suisse - Analyst***

Great. And just so I'm clear on the final part of what you said, you do not insure against like act of God, right, like hurricanes and earthquakes, and large-scale events like that?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Yes there is always definitions about what is included and which kind of thing, but the answer to that is generally yes.

Kevin Cole - ***Credit Suisse - Analyst***

Do you have like a notional like value at risk measurement that we could follow?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

You know that is a good question. We do not put one forward but, you know what, Kevin that is something we want to think about because there are things that we look at but we don't make those available. And part of it is the business size, but we want to think about that. Good, good job.

Kevin Cole - ***Credit Suisse - Analyst***

Thank you, guys. Have a good day.

Operator

Your next question will come from the line of Heike Doerr of Robert W. Baird. Please go ahead.

Heike Doerr - ***Robert W. Baird & Company, Inc. - Analyst***

Thank you, good morning.

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Hi Heike.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Good morning, Heike.

Heike Doerr - ***Robert W. Baird & Company, Inc. - Analyst***

It should come as no surprise that I would like to talk about regulatory strategy. If I look at the last two years the amount of rate awards you have gotten in total has been 100 to 120 of rate cases separate from the surcharges even if we assume that the Pennsylvania settlement is completed we're looking at a total amount of rate increases awarded of only about a third of that, I am wondering is this just an off year are we looking at the new normal? How should we think about your rate case cycle and how you manage rate increases versus infrastructure surcharge increases?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

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Good question, Heike. Let me pose it in I guess three ways. Remember, if I go back 3, 4 years ago, the amount we were generating from automatic adjustment clauses was about 13% of the capital investment every year. That was a lower level of capital investment than we're at today and today it's about 40% of all invested capitals coming back through those mechanism. So, the importance of those mechanisms has, and this has been very targeted and strategic, has increased relative to the total amount of rate relief, if you will. The second one is we went through a period of rate-case catch up as we've talked about before, and we're largely out of that today and our focus is in moving the rate cases that we do file to a much higher percentage of capital cost recovery rather than operating cost recovery.

You'll remember the slide that Susan used that would show if you go back through 2008 though 2010 the, I think it was 56% of the recovery was really operating costs and only about 44% was capital costs whereas now, it's 94% is capital cost, so I guess the point there would be its I am not sure it's effective to look just at the dollars of rate recovery, it's what is driving those dollars, is it capital or operating costs? Also, then what are the other ways in which that revenue is picked up? Because one of the things we're very focused on is to ensure we can drive efficiency in our business to minimize the rate-of-rate increase while getting the capital investment that needs to made in the ground.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

And remember, if most of your rate case is capital the more of that you can actually recover through surcharges, then you can extend out your general rate cases, and again, not to be another advertisement, but on December 17, we will give a look into incentive that we think can be covered next year.

Heike Doerr - ***Robert W. Baird & Company, Inc. - Analyst***

Great. Thank you. And kind of as a follow-up question, we used to think of you as loosely on a two-year rate case cycle for most states outside of California. Has that strategy been revisited now or if we're capital focused on rate increases, does the two-year cycle still make sense.

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Well it's not just; it also involves the DSIC treatment in that state, et cetera. I think you will see slightly longer because we really were on an 18- to 24-month. You will see slightly longer periods in some states it may go to 3 years and other states, in other states it will be 2.5, some states will still, will have to, may stay in the 2-year range because we don't have those kinds of cost recovery mechanisms or we also have an issue, of it's not a future test year state, we've got declining usage, so it will vary by state, but I think the drum beat of 18 to 24 months is broken. That's not our future.

Heike Doerr - ***Robert W. Baird & Company, Inc. - Analyst***

Got it. Great. Thank you. Appreciate it.

Operator

(Operator Instructions)

The next question will come from the line of a Steven Fleishman of Wolfe Research. Please go ahead.

Steve Fleishman - ***Wolfe Research - Analyst***

Yes, hi, good morning.

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

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Hi Steve.

Steve Fleishman - ***Wolfe Research - Analyst***

Hey Jeff, just a little more color on the military business then the homeowner services, relative to this year could you give us events of how they're coming through are they kind of on plan, ahead of plan? Just a little color there would be helpful.

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Well I think home owner services has done better than we really expected in terms of the rate of subscriptions in the New York area. I just, we really didn't expect that it would be as well-received as it has been and I think part of that is because of the strength of the partnership with New York City in the administration that it has been, they have done a lot to help promote it. And then picking up Nashville, which is another opportunity for a 175,000 customers, we're pleased with the way home owner services has come long and their strong performance. On the military side, you know I tell you, the folks that we have that run that business do a very, very strong job on behalf of their customers, the military, and both in terms of holding cost down and also in terms of quality of performance and bringing home enough of a return that we say this is a good business to be in. I would say that the issues of federal budgets, sequestration to some of extent and then the stand down for awhile does, did impact some timing issues, and so for example; there is an award we thought may have already originally it would have been made by now it's delayed a bit. And it has nothing to do with policy it's all got to do with people being able to be at the office and do the things necessary to issue awards so it has that side maybe has moved a little slower, but it really hasn't impacted the performance of our overall business and as I said the mods that we received recognize that these bases are old and they need capital investment and we're going to be there to provide it, so we're pleased with the kind of awards that we received in that regard. So both of those business lines have had a very good year so far.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

And to add to that, Steve, you know after the first quarter we talked about that some of the capital projects were delayed, there still will be a certain amount of those that will roll over into 2014. We have made up some of the ground, but we feel our folks in that area feel like that which won't get done this year will all roll over in 2014.

Steve Fleishman - ***Wolfe Research - Analyst***

Okay. One other question, we saw over the last I think few weeks an Illinois law that might support more privatization of distressed water companies and then Indiana might be looking at one. Can you talk more about is that something that you're seeing and could be significant for you? Or more marginal?

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

You know Steve, one of the things that we have got built into our strategy and we will talk a little bit about this in December, but is we have our key strategic objectives and metrics associated with it, but we have enablers. It's the enablers that we strategically focus on because without those enablers, that objective is really interesting but you can't get there, so for example, having legislation pass that allows the, a premium to be paid on a troubled system in order to get that under good control and under the state's oversight is one of the enablers. Another enabler is the law that we got passed in Pennsylvania that was geared around being able to roll wastewater rate bases into overall rates to be able, so that the repair work that you have to do with a newly acquired wastewater system doesn't cause such rate shock by a 1005 rate increase just on the few customers that are served by that wastewater system, or the legislation that we got passed this year down in Tennessee which opens the door for frankly, the filing that we just made requesting a number of different elements of cost recovery and capital recovery, so these enablers are very targeted. We look at each state, so we have general theorems about what we want to get done, but what you need to do in each state will be different. In some states, we may not make it the first time so we go back, or we work with the commission and find out that the commission understands it. They may not be willing to do it unless the legislature speaks, okay, so we go work with the legislature, so there is a very specific plan around those items, and they're all geared to open up the pathways for what we believe can be that continued strong growth. Not only of our business, but of frankly, better service to customers.

Steve Fleishman - ***Wolfe Research - Analyst***

Great. Thanks a lot.

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Operator

And Mr. Sterba, there are no further questions at this time. Please continue.

Jeffry Sterba - ***American Water Works Company Inc - President & CEO***

Well thank you all very much for joining us today. Have a great rest of the week and for those of you that we see in December, we'll look forward to talking then. And if you have any questions, you all, obviously, you know who to call, Ed. If anything comes up in between. Take care.

Operator

And thank you. Ladies and gentlemen, this does conclude the conference call for today. Again, we thank you for your participation, and you may now disconnect your line.

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PRESENTATION

Operator

Thank you for holding, ladies and gentlemen. Good morning, and welcome to American Water's second-quarter 2013 earnings conference call. As a reminder, this call is being recorded and is also being webcast with accompanying slide presentation through the Company's website www.AMwater.com. Following the earnings call, an audio archive of the call will be available through August 15, 2013, by dialing 303-590-3030 for US and international callers. The access code for the replay is 4628550. The online archive of the webcast will be available through September 6, 2013, by accessing the Investor Relations page of the Company's website located at www.AMwater.com. I would now like to introduce your host for today's call, Ed Vallejo, Vice President of Investor Relations. Mr. Vallejo, you may begin.

Ed Vallejo - ***American Water Works Company Inc - VP, IR***

Thank you, and good morning, everyone. And thank you for joining us for today's call. As usual, we'll keep our call to about an hour, and at the end of our prepared remarks we will have time for questions. But before we begin, I'd like to remind everyone that, during the course of this conference call, both in our prepared remarks and in answers to your questions, we may make statements related to future performance. Our statements represent our most reasonable estimates. However, since these statements deal with future events, they are subject to numerous risks, uncertainties, and other factors that may cause the actual performance of American Water to be materially different from the performance indicated or implied by such statements, and such risk factors are set forth in the Company's SEC filings. And now I'd like to turn the call over to American Water's President and CEO, Jeff Sterba.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Thanks, Ed. Good morning to you all, and I appreciate you joining us today. Before Susan Story, our CFO, goes through our financial performance in detail, let me just hit upon some highlights. As you've probably seen from yesterday's press release, our year-over-year second-quarter results were influenced by the above-average rainfall and cooler temperatures we've been experiencing versus the record-breaking drought and heat that was seen and felt in the second quarter of 2012. As you can see on slide 5, this caused a decrease in revenues and earnings per share as compared to the same quarter in 2012. Other items that impacted the quarter-over-quarter comparison include higher depreciation expense, which Susan will touch on, and a retroactive regulatory adjustment that occurred in the second quarter of last year.

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In addition, looking at slide 5, it appears that our 2013 year-to-date cash flow from operations is lower than the first half of last year, but this is really due to how our bank overdraft is now being treated, as a reduction to operating cash flow as opposed to a financing activity. This is the result of a conscious decision last year to internally manage cash activities as part of our continuous improvement efforts. Year to date, this change in cash flow classification amounts to about $35 million.

Now, obviously, the weather has a significant impact on our business. Our quarterly results really reflect a tale of two springs. Much of the country experienced above-average rainfall and cooler temperatures in the second quarter of 2013, in sharp contrast to the same quarter in 2012 when much of the country was experiencing record-breaking drought and heat. If you look on slide 6 at the precipitation charts, which by the way come from NOAA, the same large swath of the Northeast and Midwest that experienced severely dry weather in second quarter of 2012 had either normal or, as is the case with the better part of the Northeast, much wetter than normal and even record wet weather this April to June, so clearly this was an impact on customer usage. However, due to our geographic diversity across 16 states, that impact was somewhat mitigated by increased water consumption in others of the states. Nonetheless, we do attribute approximately $0.01 to $0.02 decrease in earnings per share from weather when compared -- which, when you compare that to the $0.06 to $0.09 increase in earnings per share we attributed to weather during the second quarter of '12, that results in a total $0.07 to $0.11 impact of weather when you compare second quarter of last year to the second quarter of 2013.

Now, turning to the continued growth of our business, we introduced slide 7 to you last quarter to illustrate our growth drivers. We have core growth, which includes efforts to reduce regulatory lag and achieve appropriate returns on capital investment, as well as the tuck-in acquisitions that we make and the continued improvement of our regulated O&M efficiency ratio, as well as the execution in our current military contracts and the homeowner services business. Enhanced growth includes larger acquisitions, new expansion into the military business, as well as expanding into new territories and providing new services on our homeowner services business, providing products and services that are new in the municipal and industrial space, as well as continued expansion of the shale gas opportunities that we see in certain territories. Combined, these are the opportunities that we are confident will deliver 7% to 10% long-term earnings per share growth goal.

On the core growth side, during the quarter we completed a wastewater tuck-in, the Koppel Borough tuck-in, in Pennsylvania, which has got about 400 customers and received regulatory approval on the water acquisition of Whitwell, Tennessee, that's about 2,800 customers. And in July we received regulatory approval for the Pratt, West Virginia, water system acquisition of about 450 customers. Those last two we expect will close later this year. But we also made progress on regulatory approval of our pending acquisition of Tri State Utility, which provides water service to about 3,500 customers in the growing Branson, Missouri, area. On the regulatory front, as you know, we filed rate cases in California, Iowa, and Pennsylvania for a total of about $98 million in annualized revenue. While the final rate authorizations have not yet been received, we reached a settlement agreement in West Virginia for an $8.5-million increase in revenues, that's sitting before the regulator for approval, and we implemented interim rate increases in Kentucky for the full $12.3 million just at the end of July and in Iowa for $2.7 million of that request. We've also received a total of $16 million in additional annualized revenues from infrastructure surcharges that become effective in Pennsylvania, Missouri, and New Jersey in the April-through-July period.

On enhanced growth, in May we announced an agreement to acquire Dale Services Corporation. This is one of the larger acquisitions. It's a medium-sized wastewater utility that serves 20,000 customers. We expect that transaction to close late this year. On the homeowner services front, recall that the name of that -- of the company, our subsidiary, is American Water Resources. It announced the non-exclusive partnership with the city of Houston to offer water and sewer line protection programs to more than 550 homeowners. And, last month, American Water Resources was notified by the city of Nashville of the intent to award the company an exclusive partnership to provide its protection programs to approximately 176,000 eligible homeowners. That's very similar to what we've done in New York, the program that we launched earlier this year. And just as an update on the service line protections in New York -- recall that's being offered in partnership with the city's Department of Environmental Protection -- we've seen just really good growth in that program. We've now got close to 100,000 customers enrolled, so that's a penetration rate of getting close to 20%, and nearly all of the customers are opting for both water and sewer line contracts.

Moving to slide 8, we've made some significant progress in two large projects in our California subsidiary since our last call that I want to raise to your attention. Last week, California American Water reached formal settlements with a number of parties, including major environmental stakeholders, in our plans to bring a stable water supply to the Monterey peninsula. These settlements recognize the value of the portfolio approach to the water supply challenge that's presented in that area, which includes an aquifer storage and recovery, groundwater replenishment, and a desalination plant. The range of capital investment that's reflected on this slide reflects the ultimate sizing of the de-sal plant and whether groundwater replenishment moves forward, as well as contingencies on the capital cost estimates. The next step is a pre-hearing on the settlement, which happens in a couple of weeks, and then going forward with the PUC approval, which we would not expect until towards the end of the summer next year. But we're very pleased to have this moving forward and real progress being made on this very critical project for the Monterey peninsula area.

In addition, in June, we broke ground on our landmark San Clemente Dam Removal and Carmel River Reroute Project -- and if you think that's not a mouthful for a project name, they were challenged on how many words they could fit in it. This will be a three-year construction project and is the largest dam removal project ever to occur in California. That's something we're really pleased to be involved in. It includes an innovative engineering approach of rerouting the river around accumulated sediment to restore it to its natural state. Removing the seismically unfit dam will provide many benefits to the region and its residents. First and foremost, it obviously removes a public safety risk posed by potential collapse of the dam in the event of a large flood or earthquake, but it also aids in the recovery of threatened south central

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California coast steelhead -- and as a fly fisherman that's something I'm particularly care about -- by restoring the natural sediment flow and providing an unimpaired access to over 25 miles of essential spawning and rearing habitat.

The neat thing about this is this really is an innovative partnership between our Company, state and federal governments, and NGOs. Our hats and thanks go out to the California State Coastal Conservancy, the National Marine Fishery Services, the Planning and Conservation League, the Nature Conservancy, and a number of others that we've worked with. We're grateful to our partners in this effort and pleased to see it moving forward. Between these two California projects, we will invest around $200 million or more over the next 3 to 5 years.

Now, turning to slide 9, combining our performance in the second quarter with the strong results of the first quarter, we are reaffirming our 2013 earnings guidance range of $2.15 to $2.25 per diluted share for continuing operations. This represents an 8% to 13% increase over the weather-normalized earnings per share for 2012 at $1.99. With that, let me turn the call over to Susan for more detail on our finance.

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Thank you, Jeff, and good morning to you all. It's a pleasure to be with you here today to review the quarter and the year-to-date results ending June 30. Jeff has already reviewed some of the key highlights. I will now take a few minutes to discuss the drivers of our results for the second quarter in greater detail.

Turning to slide 11, as Jeff mentioned, our second-quarter results reflect the impact from unusually cool, wet spring weather with related decreases in revenue, net income, and earnings per share. During the second quarter, we reported operating revenues of approximately $724 million compared with $746 million reported for the second quarter of last year. Looking back at the exceptionally hot, dry spring we experienced in 2012 versus the weather in spring 2013 and so far this summer, this year-over-year impact on demand is not surprising. Also impacting this quarter's results versus last year's corresponding quarter was a significant one-time retroactive adjustment due to the California rate case effective in June 2012. Additionally, this past quarter, we experienced increased depreciation expenses due to additional utility plant placed in service, including approximately $3.3 million in expenses related to the implementation of our business transformation project. Lastly, the decrease in revenues is also attributable to a decrease in market-based operations, primarily due to the termination of certain municipal and industrial O&M contracts as a result of our on-going business portfolio optimization efforts. Our consolidated O&M expenses for the three months ended June 30 were roughly flat, decreasing [$4.3 million] (corrected by company after the call), or 1.3% over the same period last year.

Now, let's discuss, on slide 12, the different components of our income from continuing operations, starting with revenue. I also encourage you to read our 10-Q on file with the SEC for a more detailed analysis of both revenues and expenses. Overall, operating revenues decreased $21.3 million with revenues from our Regulated Business decreasing $19.7 million, or 3%, from 2012. The decrease in revenue associated with the lower demand was approximately $31 million, the year-over-year comparison obviously impacted predominantly by the weather effects, which we spoke of earlier. This demand decrease was partially offset by revenue increases of $15.8 million from rate increases obtained through rate authorizations awarded for a number of our operating companies and additional revenues associated with acquisitions of $2.2 million. Additionally, as I mentioned earlier, in the second quarter of 2012 we benefited from a retroactive adjustment totaling $7.2 million as a result of a California rate increase.

For our Market-Based Businesses, revenues for the second quarter of 2013 decreased by approximately $2 million. The net decrease in revenues is primarily attributable to lower contract operations group revenue of $5.1 million. These decreases are predominantly related to the termination of certain municipal and industrial operations and maintenance contracts, which amount to around $6.9 million for the three-month period. These contracts were ended as a part of our business optimization effort, designed specifically to optimize margins in our contract operations business. Additionally, revenues from capital project activities associated with military construction decreased $900,000 for the three-month period due to lower levels of work as compared to the prior year.

As we mentioned last quarter, when the military construction revenues were more significantly impacted, the majority of this work should take place later in the year and we have every reason to believe that these projects will be completed as they already have been awarded and approved for construction. Also contributing to the decreases were lower revenues in our residual operations group of $1 million for the three months ended June 30, 2013, compared to the same period in 2012 due to lower levels of work performed. These decreases were offset, however, by a $2.3 million increase due to price re-determinations for three of our military contracts, as well as increases of $4.5 million for the three months ended June 30, 2013, in our homeowner services revenue associated with both customer and contract growth, most notably in New York City.

On slide 13, total operating expenses for the second quarter of 2013 increased by about $7.4 million, or 1.6%, from 2012. Operation and maintenance expense in the Regulated Business increased $2.3 million, or about 0.8%, roughly flat compared to the prior-year period. Production expense decreased approximately 3.4% for the three months ending June 30 as a result of the lower production in sales during the second quarter. Operating supplies and services increased $8.6 million, or 18.3%.

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It's important to note this is primarily due to higher contracted services resulting from about $6.2 million of incremental temporary labor costs related to the continued maturing of the ERP process implementation related to Phase I of our business transformation project. These enhancements are necessary for ongoing and future efficiency improvement resulting from our new SAP system. Also contributing to increases in operating supplies and services in the second quarter of 2013 were operating costs associated with the New York acquisition. Partially offsetting these increases were lower transportation expenses due to a reduction in leased-vehicle cost.

Maintenance, materials and supplies decreased $1.8 million, or 11.1%, for the three months ended June 30, 2013, mainly due to lower tank painting costs in our New Jersey subsidiary of $1.4 million. Employee-related and other decreased $2.2 million, primarily due to decreased pension expense. The decrease in pension expense for the three and six months ended June 30, 2013, was primarily due to decreased contributions in certain of our regulated operating companies whose costs are recovered based on our funding policy, which is to fund at least the minimum amount required by the Employment Retirement Income Security Act, or ERISA Act, of 1974. Other operation and maintenance expenses include casualty and liability interest premium and regulatory costs. For the three months ended June 30, 2013, cost decreases were primarily driven by lower casualty interest costs as a result of historical claims experience and retroactive adjustment.

In the second quarter, we also reported a higher depreciation and amortization expense of $8.8 million and a higher general tax expense of $2.1 million. The increase in depreciation and amortization is primarily due to additional utility plant placed in service, including a depreciation expense of approximately $3.3 million for our business transformation project, which has a much shorter depreciation schedule than most of our other utility assets. None of our basic costs have been disallowed from rates at this time. The increase in general tax expense is primarily due to higher property taxes incurred as a result of our New York acquisition in the second quarter of 2012. The Market-Based Business operations decrease in total operating expenses corresponds with the decreases in revenues, which I have previously described.

Turning now to slide 14, we have included a new slide to better explain the period-over-period difference in our earnings per share figures. As you can see from this chart, we have broken out the positive $0.06 to $0.09 impact of weather for our 2012 results, as well as the net impact of the retroactive adjustment of $0.03 from the California rate case, which was booked in June of 2012. After taking these extraordinary events into account and using the midpoint of our weather impact, we get to what we consider a normalized earnings starting point for the second quarter of 2012 -- $0.555 per share, or $0.56 rounded up. From there, we have laid out various elements that explain the difference in our year-over-year earnings per share results.

I'm not going to go through each one, but I do want to point out a few things here. First, just for clarification, you do note here a $0.02 impact to earnings due to depreciation and we had shown a $9 million expense increase in the expense slide. For all of you modelers out there, the impact of a $9 million in depreciation expense is split on this slide between the $0.02 decrease in the depreciation bar, as well as being reflected in the 2012 California rate case decision and the New York acquisition bars. Second, we have broken out the weather impact for the second quarter of 2013 from declining customer usage from other factors on this chart. And lastly, you also see a teeny increase quarter over quarter due to lower interest expense, and this is due to us taking a proactive approach to looking at refinancing alternatives. For the quarter, our interest expense was reduced $2 million. For the June 30 year to date, it has been reduced by $3.5 million.

Now, let's look at the regulatory highlights for the quarter. Slide 15 utilizes the expanded rate base -- rate case template we introduced last quarter, showing formal rate cases awaiting final order, which we separated between those filed for 2013 versus those filed in 2012, and also any step increases or DSIC filings which impacted the quarter or are still pending. Including Pennsylvania, Iowa, and California, we now have approximately $98.5 million in requested additional revenues from formal rate cases filed this year. And, looking at the timing of these rate cases versus previous years, the rate cases we expect to resolve in 2013 should be towards the end of the year versus mid-year in 2012 when we had three rate cases finalized in the second quarter.

As Jeff noted earlier, West Virginia's water and wastewater cases have a settlement agreement in place reached by West Virginia American Water, the PSC staff, and the Consumers' Advocate Division, subject to the formal PSC ruling expected in the fourth quarter. Kentucky rates were increased $12.3 million on an interim basis, subject to refunds effective in July. Under Kentucky regulation, if an interim increase is put into effect, only the full amount of the rate increase request is allowed prior to the formal PSC decision, which we expect in October of this year. Of note, our first infrastructure charge in New Jersey took effect on July 1 for $4 million in additional annualized revenues.

In our continuing efforts for transparency, we have created a new slide, which you can find in the appendix, slide 25, entitled Regulated Utilities -- Rate Base and Allowed Return on Equity. Many of you have requested this data showing each of our regulated businesses' authorized rate base, authorized ROE, authorized equity, and the effective date of the rate case used. We have included this information for our 10 largest regulated subsidiaries on this slide. These are historic cases and we advise you to review the footnotes for a fuller understanding of the particular case in question. While you can never project how any new case will be determined, we hope this will help you understand our rate environment.

Turning now to slide 16, this is a slide we introduced to you last quarter, which illustrates our commitment to keep our cost structure efficient and utilize the majority of our requested customer rate increases to fund capital investments, which improves infrastructure, system resiliency, and customer service. This is also a validation of

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our continuing efforts to meet our O&M efficiency ratio goal as shown on slide 17. You will note that, despite the revenue challenges we faced in 2013's second quarter, we have maintained a 40.4% ratio for the last 12 month ended June 30. And, finally, as part of our commitment to shareholder value, last week we announced that our Board of Directors declared a quarterly cash dividend payment of $0.28 per common share, payable on September 3, 2013, to shareholders of record as of August 19, 2013. This continues our commitment to an annual dividend payout goal of 50% to 60% of net income. With that, I'll turn the call back over to Jeff.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Thanks, Susan. If you go to slide 19, this is a slide on expectations for the year that we use every quarter. Nothing's changed. We've already really spoken about our progress on all of these efforts, which will anchor our long-term earnings per share goal of 7% to 10%, which we continue to be committed to and believe is achievable. Let me call your attention to one item and that's the issuance of our new corporate responsibility report, which covers the years 2011 and 2012 in terms of data, and you can find this on our website. Our commitment as a Company, from the Board level down, to Corporate responsibility and sustainability is truly one of our Company's guiding beacons, and we're proud to be the only water company in the US that's included in the Dow Jones sustainable index. Lastly, let me also just remind you, I know a number of you probably have it already marked off on your calendars, but we will be hosting our 2013 Analyst Day at the New York Stock Exchange on Tuesday, December 17, and we'll provide you more information about this in the coming months. With that, we'd be happy to take any questions you may have.

QUESTION AND ANSWER

Operator

Thank you, sir.

(Operator Instructions)

Kevin Cole, Credit Suisse.

Kevin Cole - ***Credit Suisse - Analyst***

I see in June the EPA released another study indicating that the US will acquire about $400 billion in clean water infrastructure -- I think it was next 15 years or so -- but I guess if I look back those dollars are rarely spent. Do you see any changes in federal or state policy, either on the policy front or the enforcement front, to actually require action going forward on either the clean or the wastewater side?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Kevin, I think, frankly, it's enforcement actions being taken largely through consent decreases on the wastewater side that are really starting to create some challenges and tension for a lot of municipalities. On the water side, the drinking water side, probably a little less so. There isn't a driving issue like arsenic was a few years ago that's mandating investment, although probably the next one that has attracted some attention is the chrome 6 issue, which is one that we've really got our hands around already. So again, it's this notion of -- that infrastructure is out of sight out of mind the level of investment is trailing. That's why you see the average investment cycle of 250 years really going up to 350 years whereas we as a Company are about 125. It's an issue that's attracting attention, but I don't think there's a solution. Well, there's not necessarily a solution that a lot of municipalities are yet facing up to and that solution is really you've got to bring private capital in because the federal money is just not going to be there.

Kevin Cole - ***Credit Suisse - Analyst***

I guess I saw a couple weeks ago like San Antonio, I guess the EPA forced San Antonio to spend around $1.2 billion given they were -- they didn't scale up their systems to population growth so they're viewing waste waters, I guess just raw waste into the water. So are you seeing that as the most actionable vehicle of growth given the EPA is actually fining those systems?

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Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Yes, the wastewater site is the one that is more susceptible to enforcement and you've got -- gosh, I can't -- I saw recently the number of cities that are under enforcement action. I don't remember the number but whether it's Kansas City, which is a large metropolitan area, or a smaller city like Chattanooga, Tennessee they've got multi $100 million enforcement actions. The challenge will be how strongly does the EPA enforce the timing of it. Do they give them slack so that instead of it needing to be done in the next five years, oh well, we'll give you seven or 10? That's where we've seen slippage in the past.

I would say one of the things Sandy brought to light was the risk when you have increased volatility of weather and the risk of flooding and the like, whether it be from storm surge or rain or what have you, is the amount of untreated or only partially treated wastewater that got dumped, and that is, I think, a risk that is starting to attract a lot more attention. Just with Sandy it was over 11 billion gallons of raw sewage that was dumped and so that's a broader-base challenge but it puts a focus on the issue of adequate wastewater treatment and doing the right things relative to storm water. So I'm hopeful that the EPA will keep the pressure up to ensure that we as a country are doing the right things. I think it's important that environmental groups and others help support that.

Kevin Cole - ***Credit Suisse - Analyst***

Thanks. Actually I have an obnoxious question for slide 23 just because I know somebody's going to ask me this question later.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

How obnoxious? (laugher)

Kevin Cole - ***Credit Suisse - Analyst***

Is your 7% to 10% -- is it right to think about your 7% to 10% EPS growth rate being anchored to 2012, or if I'm looking at 2014 should I re-anchor it to the midpoint of 2013?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Yes, we've always talked about it as long-term growth rate and so that's the anchoring in 2012. I know every year we get pushed about, well, so is it off the new base and we're trying to say, look, 7% to 10% is the long-term growth rate and yes, we're anchoring it off 2012, even though our range is above that and, of course, we'll provide you a range for 2014 as we get -- probably in the December session.

Kevin Cole - ***Credit Suisse - Analyst***

Okay. And then is this chart to scale, because if I look at -- if I apply a 10% growth rate to the $1.99 I get $2.19 and that's kind of close to the midpoint of this year's guidance not at the bottom. So am I just not understanding the chart or is it just not to scale?

Ed Vallejo - ***American Water Works Company Inc - VP, IR***

Hey, Kevin, it's Ed. Yes, it should be up to scale so let me know when you have that service that sees if it is to scale if it doesn't work out or not, but on our side it is.

Kevin Cole - ***Credit Suisse - Analyst***

Okay, great. Thank you.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

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I always get nervous because we've got both engineers and financial players and whether it's something they put it on logarithmic paper or what I always get a little nervous. Just kidding, Kevin.

Operator

Ryan Connors, Janney Montgomery Scott.

Ryan Connors *- Janney Montgomery Scott - Analyst*

So I wanted to get some thoughts on the regulatory side and we're coming off of the recent NARUC summer meetings, I'm sure you had folks there and you got some briefings, Jeff. Anything jumping out at you in terms of the evolution of the regulatory environment in water, either positive or negative and either specific to any mechanism in a specific state or just the terms of the overall tone?

Jeff Sterba *- American Water Works Company Inc - President & CEO*

I guess the ones -- a couple that I'd just touch on. We are getting increased understanding and recognition about the issue of declining use. I think this is one where the industry was slow on the up take but is rapidly trying to move this forward. So frankly, there hadn't been much of anything done up until really probably the last three years or so, except in California where there's an overall policy mandate. So I think that's on the positive side.

I think on the risk side is, okay, so what does -- where do returns go and how successful are we in helping people understand that when you have artificially held down risk-free rates that that doesn't necessarily change the cost of equity and I think we've seen what's probably best described as mixed results. There are some states that have gone fairly low. I think the majority of our states have approached that with a more reasoned and tempered response in thinking about what that cost of eq -- what's an appropriate cost of equity. I think the two things that we keep a real ear on are the issue of degree of rate change so that we don't push that frontier too hard, yet at the same time we have great reception to the investment of capital. And so as we've talked to regulators about the chart that Susan has talked to you all about how we've shifted how much rate increases are capital versus O&M base that's something that they perceive as positive. I think those are the issue of declining use and now, frankly, you're starting to hear a lot of electrics say, oh, we no longer have growth and so they're starting to scramble on that issue.

Ryan Connors *- Janney Montgomery Scott - Analyst*

How do you see that evolving, Jeff? Will it be -- is the talk of a California-style ram based decoupling, or are there other approaches that you see prevailing?

Jeff Sterba *- American Water Works Company Inc - President & CEO*

I think each state has to approach this on the basis of its own regulatory background and philosophy. There are some that they look at the California ram mechanism and they wonder if it's too complex for them, is there a different way do it, is there a way we can build it in the base rates? What is it we're trying to protect against? Is it all changes in consumption, or is it just the intrinsic on-going reduction in use per customer so what is it that we normalize at? So I think we'll see and we are seeing states take a number of different approaches. I think the one that most states move to most readily is, okay, let's take into account what you've seen over the last set of years -- five years, eight years, whatever it might be -- and build that into your future and let's try to step and then we negotiate how far forward do we step to get the billing determinants, if you will, the denominator right.

I think automatic adjustment mechanisms create some nervousness of regulators unless they come out of that mechanism. For example, Florida has a number of mechanisms, California has a number of mechanisms and New York has a number of mechanisms that has just been part of their regulatory psyche. Other states a fuel and power adjustment clause, and on the water side maybe an electric energy supply clause or something like that. That may be about all they're comfortable with so I don't know how many states will adopt an automatic mechanism as opposed to recognizing the pressing nature but do it in a different way. Susan, do you have anything to add?

Susan Story *- American Water Works Company Inc - SVP & CFO*

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I think consistent with what Jeff said, we take very seriously our responsibility on water efficiency and so we are proactively working with all of our states in terms of how we can promote water efficiency and to address the kind of usage through, as Jeff has said, either decoupling tight mechanisms, looking at revenue adjustment for future test years, looking at performance incentives for some of the water efficiency programs, so we're really looking at lots of different options to address the same issue. And also on the key elements coming from NARUC and looking at some of the commentary, as well as hearing from some of the people there, the commitment of state regulators to the replacement of aging infrastructure may be as strong as it's ever been. The recognition that this is something we have to address and that if we begin to address it today that it will be far better than waiting until we have more severe problems in terms of main breaks, leaks and the economic impact of that. So I think that we've seen increasing and growing commitment to that and as Jeff said, what that means to us is how do we find a way to promote that investment while also controlling price increases to the customers and that is through our control of O&M so that any, or most the majority of price increases will be for investment and -- the CapEx investment and not O&M expense.

Jeff Sterba *- American Water Works Company Inc - President & CEO*

One of the things that I think that all that says is -- and of course, we may have bias but if I was going to focus on communities that have the greatest potential for growth and expansion because they're going to be able to provide service to customers and not have main breaks, et cetera, I'd look to those communities that are -- have provided service by privately-held companies that are regulated. Because Susan's exactly right, we're seeing recognition of that on the regulatory side, unfortunately not in all communities but in a number of communities your a politician elected today that's an out of sight out of mind investment, it's a little harder to make or a little easier to set aside and not necessarily keep up with that infrastructure. I think there are some cities, which -- and I commend. I'll commend Chicago for what they're trying to do and Philadelphia for what they're trying to do in terms of their green cities initiative. I don't mean solely them, I think New York also is there and there are others that are there. But boy, there is a whole host of that 50,000 communities, or individual utilities that that's not necessarily getting done.

Operator

Heike Doerr, Robert W. Baird.

Heike Doerr *- Robert W. Baird & Company, Inc. - Analyst*

First off, thank you for the added details in your earnings material, I know it's high effort, it's much appreciated by all of us.

Jeff Sterba *- American Water Works Company Inc - President & CEO*

We try to listen to you all, Heike.

Heike Doerr *- Robert W. Baird & Company, Inc. - Analyst*

We like to keep you busy, Jeff.

Jeff Sterba *- American Water Works Company Inc - President & CEO*

(laughter) You're succeeding.

Heike Doerr *- Robert W. Baird & Company, Inc. - Analyst*

Can you share with us what ROE was stipulated in the settlement that's pending in West Virginia?

Jeff Sterba *- American Water Works Company Inc - President & CEO*

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Well, yes, sort of. What happened is that the party submits as part of their testimony a basis for the cost of service that's been agreed to. It is a black box settlement so there isn't a formal ROE. What we have submitted and what -- and I'm trying to remember which party it is that joined us with that --Consumer Advocate submitted -- we submitted a cost of service and the Consumer Advocate did that the ROE is at 9.9% whereas the staff has submitted a cost of service that uses a 9.75%. They get to the same revenue requirement, so it gets to the same rate levels, they just go about it in a different way. So I think it's --

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Heike Doerr - ***Robert W. Baird & Company, Inc. - Analyst***

Understood.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

We've (inaudible) 9.9%, but it's in that range.

Heike Doerr - ***Robert W. Baird & Company, Inc. - Analyst***

Okay. Can you give us an update on where you are on portfolio optimization? Are there still states you're weighing whether or not it makes sense to be in and where on the contract operations side are we on that process?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Well, on a regulated side, as we've said before, the lions' share of any optimization has been done. We will remain open to looking at whether it's interstate or intrastate opportunities. I can't tell you that there's a state -- we're not in the process of saying there's a state we want to exit. We're comfortable with what we've got but we will always look at opportunities to optimize that. On the contract operations side, by and large most of it has been accomplished, moving us into a set of contracts that we can operate in a much more profitable way, starting to shift the way that we're thinking -- we're looking at how that business expands and being very specific and focused about what we won't go back into. We had to work -- our people did a heck of a job in extracting ourselves out of some contracts and arrangements that just were not profitable and the last thing we'll do is go back into those.

Heike Doerr - ***Robert W. Baird & Company, Inc. - Analyst***

Okay, that's helpful. How should we think about your CapEx budget and this Monterey Peninsula water supply project? Will that project -- I know it's spread over a longer time period, will it just push you up within that band, or may there be some years that you'll need to spend above that $1 billion we've been talking about at the top end?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

Heike, this is Susan. The expenditures for those projects are included in our forecast for -- we this year have said we will spend about $950 million in CapEx. We are looking and there is a range you saw based on some things that haven't been decided yet; the size of the plant, how we're going to approach I believe it's 6.4 million gallons per day versus 9.6 million and 6.4 million would have bigger groundwater replenishment. So we're really working through right now what that will be based on some of the final decisions on that project, but we anticipate those will be rolled into our CapEx guidance for each year.

Operator

Jonathan Reeder, Wells Fargo.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

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Following up on Heike's question there a little bit. So on a going forward basis is $950 million, is that going to be the bottom end of the range or can we get above the $1 billion, especially when I guess you're looking at the rate cases that are driven more on the CapEx side than the O&M side. Do you have room to get more aggressive with the CapEx budget?

Jeff Sterba *- American Water Works Company Inc - President & CEO*

Jonathan, I guess -- the answer I'm going to give you is we're certainly looking at the level of CapEx given what we think our future expenditure level will be that we can put in and maintain the kind of rate levels that we think we can sell with our commissioners and customers. We'll talk more about that in December in terms of what that really looks like, but is there a potential for an $800 million -- the $800 million to $1 billion that we've used for the last couple years to shift over the next five years? The answer to that is yes. What it shift -- what it might shift to and how much it shifts, if it shifts at all, we'll talk more about it in December.

Right now we've got a plan that, as Susan said, has California included in it. Remember, one of the things that's happening is we've been spending about $100 million a year on BT. That disappears this year so there's $100 million there that was going to that project which now is going to be available to go into hard infrastructure on the regulated side so that's still at the current -- at the same current level. But we are -- we're still not spending for a 100-year replacement cycle, for example, and that's our goal, to get to a 100-year replacement cycle because that's really the outer limit of what we think the life of most of these systems are.

Susan Story *- American Water Works Company Inc - SVP & CFO*

And there's a lot of things we look at, Jonathan, on this. Part of it is, again, not just the flat amount but what does that mean in terms of our equity needs. We've gone on the record that we do not anticipate issuing equity under normal business operations for the foreseeable future so we run a lot of scenario now. We also are looking, for example to Jeff's point, of next year not having to be key expenditures. What does that mean in terms of our distribution system infrastructure charge, which reduces regulatory lag? This year about 39% of our CapEx will be (inaudible) just as a matter of the DQ rolling off, which isn't eligible, that percent could go up next year. When we run the analysis of the overall target we look at a lot of factors, including both the reg side and the market (inaudible).

Jonathan Reeder *- Wells Fargo Securities, LLC - Analyst*

Okay, then I guess as we are looking out our cash flows continue to improve if CapEx doesn't meaningfully increase, what's the balance you're looking at between, I guess, equity -- appropriate equity ratio at the consolidated level, dividend increases, redeploying the cash, everything like that?

Jeff Sterba *- American Water Works Company Inc - President & CEO*

Well, you kind of gave what the basket of opportunities are. We are clearly not going to weaken our cap structure, but as we've talked about before we don't necessarily see an over riding need to strengthen it necessarily either. So the 44% equity that we're at today will by nature go up a bit, but we've got room to issue debt to the extent that our total CapEx or other expenditures, for example the kinds of acquisitions like the one we're doing in Virginia that's a little larger, more of those, so we've got head room to do that. If you are poking around at so is there a stock buy back on the horizon, those are things -- we do not have stock buy back planned at this stage. Those are things that are an ongoing part of the business. We're focused on the right amount of capital first to invest in the business and that's a function of both what we can afford through rate making process and the amount of free cash flow that we have in head room on the debt side so I kind of leave it there. We'll give you more color about -- of a forward look at the five years as we hit December.

Susan Story *- American Water Works Company Inc - SVP & CFO*

And that's December 17th, analyst day.

Jonathan Reeder *- Wells Fargo Securities, LLC - Analyst*

Okay, and, yes, Jeff, you're right. And then I guess last question, maybe more for Susan. As we look at the operating expenses and everything, why weren't production costs maybe down a little more than what they were given the large decrease in customer demand?

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Susan Story - ***American Water Works Company Inc - SVP & CFO***

Most of the -- most of our biggest expenses in production is in energy and chemicals and we did see a decrease in both of those. Chemicals we did have in some areas a little bit of an increase due to just some of the operations but they were consistent. Production cost decreases were relatively consistent with the sales decrease. Remember, on the revenue the $15.8 million make up in the revenue we only showed $8.6 million on the slide because that netted out to $7.2 million from 2012 from the California retro, so in terms of anything else on the production.

Jonathan Reeder - ***Wells Fargo Securities, LLC - Analyst***

Okay. So you're saying the production costs were down in line with the decreased customer demand as you would have expected?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

They were down in line, mostly energy chemicals. Chemicals may not have gone down as much on a straight-line correlation because we did have some chemical increased costs in a few areas, but energy was and chemicals were down and those are the two predominant components of those expenses.

Operator

Spencer Joyce, Hilliard Lyons.

Spencer Joyce - ***Hilliard Lyons - Analyst***

I'll also thank you for the additional slide color out there this morning.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Good.

Spencer Joyce - ***Hilliard Lyons - Analyst***

Two hopefully pretty concise questions for you. One, on the New Jersey [desic] that we had go into effect in July how often should we look for reups on that? Is it going to be a little bump every three months like PA, or maybe semi-annually like the [isserus] in Missouri? How often can we look for a bump there?

Susan Story - ***American Water Works Company Inc - SVP & CFO***

That's a great question and I'm glad you asked. The regulations say we can file up to twice a year in New Jersey for the desic. Some of you may have noticed there was some earlier material that said we filed for $6.3 million and I just noted that have annualized increase of $4 million. Because of the way that the regulation was worded it appeared that we could go in and so we had anticipated doing seven months on our first filing, five months on our second. The staff really -- and rate counsel really preferred that we do six and six so that accounts for difference in six, three and the four, but rather than being affective August the 1st it was effective July the 1st. So short answer, it's twice a year, up to twice in 12 month, and we have further guidance that the preference is every six months.

Spencer Joyce - ***Hilliard Lyons - Analyst***

Okay, fantastic. Second other question, totally switching gears. Congrats on the Nashville and Houston awards there on the market base side. What's the roll out time on those, how soon can we -- or should we be expecting some material revenue impact from those?

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Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Well, Nashville, we've got go through the con -- the formal contract and so that can take 30, 60 days, something like that so it takes a little while and then we have to put together the plan with the city because in that instance this is an exclusive arrangement and it will go on their bill. It won't be until close to the end of the year before it could get rolled out.

On Houston, frankly, I think that's already out there. We are starting to take customers into it, we've had advertisements and releases that have gone out and it's hit the newspapers in Houston. It is non-exclusive and so it's a little easier. They're basically just endorsing a couple of programs. That one's moving forward. Nashville one, because it is exclusive, has more potential, probably won't really be out and customers signing up until the end of the year.

Spencer Joyce - ***Hilliard Lyons - Analyst***

Another question just popped up. On the exclusive or non-exclusive, looking over some of the historical places that you've serviced what's the penetration rate difference between places you serve exclusively and non-exclusively?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

In those areas where we are on the bill, so we're on the water or a wastewater bill, we see penetration rates that are up into the 30s and we have disclosed that before, so in the low 30s kind of range.

Spencer Joyce - ***Hilliard Lyons - Analyst***

Okay.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

When you're not on a bill it noticeably drops off.

Spencer Joyce - ***Hilliard Lyons - Analyst***

Okay.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

But we don't give specific penetrations.

Operator

Angie Storozynski, Macquarie.

Angie Storozynski - ***Macquarie Research Equities - Analyst***

I wanted to talk about two things about your enhanced growth. So first of all, the military contracts I know that you are awaiting a number of them to be announced, do you see any impact from the federal sequestration on the timing of those tenders being announced?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

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Well, it's always hard to tell on the timing. The schedule -- the optimistic schedule is 18 months from the time first bids are made to the time that awards are made and that hasn't necessarily ever happened. So honestly, we are still seeing strong activity, in fact it's picked up. The challenge is now there is a 20% sequestration in a number of the areas the we work with because they didn't do it until the second half so they're having -- they're a little higher on the furlough side, and so we are seeing a little bit of a slow down. But I can't -- it doesn't seem like it's significant. Things are still moving forward and we're seeing a pick-up of activity, particularly in the Air Force. In one sense I wish I could tell you we're still seeing strong response but we keep the eye out about are they really going to be able to keep the pace.

Angie Storozynski - ***Macquarie Research Equities - Analyst***

Secondly, you mentioned potentially larger acquisitions as the way to the enhanced growth of earnings going forward. Could you put it a bit of in a context? We have some sour memories from the large acquisitions and how dilutive they used to be, equity needs and regulatory lag, how can you avoid these and also how can you convince the big sellers to give their assets at book value without any goodwill issues and things like that?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Very good question and there's a couple pieces to it. In the sense I would give is the Dale Service. In the send of how big our Company is it doesn't seem large, but 20,000 customer is a large acquisition in this world. Those kind -- these acquisitions, we're very disciplined about the ability to get what we pay in rates. If we don't think we can get it into rates we're not paying it. Now, that does not mean there won't be a premium because there are some states that allow a premium under certain circumstances.

So if we're able, by virtue of that acquisition, to avoid a capital investment or to lower overall costs then acquisitions can be allowed. Now we're still sitting on acquisition premiums made with the Citizens, for example. You're not going to see something like that. Neither Susan nor I nor anybody else in this Company has any appetite for paying major premiums that you're basically going to be accepting a lower return on because that's just not our philosophy about this. But things -- you are seeing certain communities that get challenged and we have a very disciplined approach about what is it that that state will specifically allow and if they want more than that, well, that's interesting. We're not going to pay more.

Andrew Weisel - ***Macquarie Capital Securities - Analyst***

Is it easier for you to buy large wastewater systems as opposed to fresh water?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Easier? None of this stuff's easy because it's got politics wrapped around it and all sorts of other stuff. To me, and I think to us, wastewater is much more of an area that's got greater growth potential because wherever we serve water someone's providing wastewater and so we're already known in those communities and that most of the time is not us. We think that provides a market, particularly given that wastewater is not necessarily held as dear on the municipal side as drinking water is even though it's all one water, so we think that wastewater has significant potential for us.

Operator

[Brian Chin], Merrill Lynch.

Brian Chin - ***BofA Merrill Lynch - Analyst***

On the Monterey Peninsula water supply project, obviously this has been a long-running project, could you give us a sense in the settlement to what extent you have cost over-run protections and/or are there monitoring requirements as the project is underway that help give regulators and yourselves a sense of how expensive the project cost is projected to be?

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

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Yes, at this stage we only have estimates and that's what's reflected in the agreement and part of that is because there are some -- a couple of outstanding issues in terms of the recharge project so there isn't the ability to have certainty on what those costs are yet. As we get those resolved -- those kinds of significant issues resolved then I would expect that we'll have much firmer -- that's why we're giving you a range at this stage, so there isn't a number that someone can say, oh, well, it can't exceed this because its specifics of the project are not yet fully resolved.

Operator

Thank you, sir, that was your final question.

Jeff Sterba - ***American Water Works Company Inc - President & CEO***

Let me just thank you all very much for your questions and for your interest and we look forward to talking to you next quarter and don't hesitate to call Ed if you've got any questions in the interim. Thanks much.

Operator

Thank you. That concludes the American Water second-quarter 2013 results conference call. Thank you for participating, you may now disconnect.

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EDITED TRANSCRIPT

AWK - Q1 2013 American Water Works Company, Inc. Earnings Conference Call

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MAY 08, 2013 / 01:00PM GMT, AWK - Q1 2013 American Water Works Company, Inc. Earnings Conference Call

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PRESENTATION

Operator

Good morning and welcome to American Water's first-quarter 2013 earnings conference call. As a reminder, this call is being recorded and is also being webcast with accompanying slide presentation through the Company's website, www.amwater.com. Following the earnings call, an audio archive of the call will be available through May 15, 2013 by dialing 303-590-3030 for US and international callers. The access code for the replay is 4613407. The online archive of the webcast will be available through June 7, 2013 by accessing the Investor Relations page of the Company's website located at www.amwater.com. (Operator Instructions).

I would now like to introduce the host for today's call, Ed Vallejo, Vice President of Investor Relations. Mr. Vallejo, you may begin.

Ed Vallejo - ***American Water Works Company, Inc. - VP, IR***

Thank you and good morning, everybody, and welcome to American Water's first-quarter 2013 conference call. As usual, we will keep our call to about an hour, and at the end of our prepared remarks, we will have time for questions.

So, although we do have a new CFO on the call today, we do have our same cautionary statements concerning forward-looking statements. So before we begin, I'd like to again remind everyone that during the course of this conference call, both in our prepared remarks and in answers to your questions, we may make statements related to future performance. Our statements represent our most reasonable estimates. However, since these statements deal with future events, they are subject to numerous risks, uncertainties, and other factors that may cause the actual performance of American Water to be materially different from the performance indicated or implied by such statements. And such risk factors are set forth in the Company's SEC filings.

Now I'd like to turn the call over to American Water's President and CEO, Jeff Sterba.

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Thanks, Ed. Good morning to you all and appreciate you joining us for the call this morning.

Besides Ed, I'm joined in our presentation by Susan Story, our Senior Vice President and CFO, whom a number of you I know have had a chance to meet, and she certainly looks forward to visiting with you -- each of you all over the coming months.

In addition, Walter Lynch, Head of our Regulated Operations, and Mark Chesla, our Controller, are here to help as needed with with your big questions.

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Though we're pleased to present our first-quarter results, let me start by hitting on a few key themes for the quarter centered around our overall financial performance, execution of our regulatory strategy, and third, the success we've had in growing both our reg ops and our Market-Based business. Because, obviously, all three are important drivers of our long-term growth.

So going to slide five, you can see that we are off to a good start for 2003 with strong financial results. For the first quarter, we reported a 17% increase in income from continuing operations and a 14% increase in earnings per share from continuing ops, as well as increases in revenues and cash flows. Our consolidated return on equity for the 12 months ending March 31 was 8.29%, an 83 basis point improvement from the 7.6% return for the comparable previous last 12 months. As Susan will go into more detail about those results in a moment, let me move to slide six and talk a bit about our regulatory strategy.

As you are probably aware, we have filed rate cases in Pennsylvania, Iowa, and California requesting approximately $98 billion in annualized revenues. With all three of these requests, the main driver is the needed investment in our system. As wastewater service and water providers, we have a responsibility to invest wisely, updating and maintaining the many components that assure the reliability of service for our customers. So, for example, in Pennsylvania, we've invested approximately $731 million since the last rate case in April of 2011. In Iowa we've invested $26 million since our last case, and in California, which remember has a three-year forward-looking rate case process, we anticipate a total investment of $130 million over the next three years.

Two of these filings, Pennsylvania and California, are future test year cases. And this is important because obviously what we've been talking about is, how do we reduce regulatory lag so we are promoting the expansion of future tests years and other mechanisms? So in Pennsylvania, Acta 11, which was passed last year, enabled full future test year cases. California has had them for a while.

In Iowa, the filing uses known and measurables for a forward period of investment, costs and usage to take into account the continued decline in usage from our residential customers.

In Pennsylvania, additionally, Acta 11, which was passed by the legislature last year, allows us to consolidate water and wastewater costs and rates, and this enables the rolling in of wastewater systems into our overall system and costs and facilitates wastewater system acquisitions. This will be the first case filed that implements those provisions of Acta 11.

Now, that said, we're also very mindful about the need to balance needed investments with the customer impact and we remain and will continue to be diligent about managing our costs. Our Regulated Businesses continue to increase operating efficiency, resulting in an O&M efficiency ratio over the last 12 months of 40% compared to 41.8% over the same previous 12 months. Now Susan will talk a bit more on how this focus on expense controls allows us to more efficiently use our capital and the headroom that we believe we've got under what would be appropriate rates.

We also continued to utilize mechanisms that reduced regulatory lag and maximized our ability to replace existing aging infrastructure. Our largest three states have the ability to recover CapEx costs through infrastructure surcharges, and that's certain CapEx elements, not all. It is typically the distribution infrastructure side where we are replacing infrastructure that doesn't add incremental revenues.

And, so, now that we have the DSIC mechanism in place for New Jersey, we anticipate about 39% of this year's CapEx spending, which is about $950 million, will qualify for recovery through these mechanisms. I think three years ago you'll go back and it was in the high teens. We are now at 39%, and I think that that shows the significant progress we've made in our regulatory strategy.

Turning to slide seven, let me just talk about the growth of our business a bit, and let's break it into two parts, as shown in the water picture slide that you can see, and I credit whoever came up with a water picture for a water company. It's so unique, so innovative. Just kidding.

We have core growth, which includes efforts to reduce lag and seek appropriate returns on our capital investments, tuck-in acquisitions, the continued improvement of our Regulated operating efficiency, as well as continuing to grow our military contracts and homeowner services business. And then there's our enhanced growth, which includes medium to large acquisitions providing new products and services and expanding into new territories in our homeowner business, pursuing concessions and longer-term contracts and continuing the expansion of our shale gas opportunities and other new business lines. Combined, these are the opportunities that will deliver our 7% to 10% long-term earnings per share growth.

Since the beginning of this year, we've had a number of successes in both buckets. We've completed five tuck-in acquisitions already in the first quarter and also signed two agreements for acquisitions, which all added together will add more than 22,000 customers to our base.

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One of these agreements, which we show under the enhanced growth area, is the acquisition of Dale Service Corporation, a regulated wastewater utility in Virginia that serves approximately 20,000 customers. That's a sizable wastewater acquisition expanding our operations in this important sector.

As we've talked to many of you, we view the wastewater area as an area of significant growth potential for us. It's something that we're very heavy in on our Market-Based side, but it only accounts for about 4% or so of our Regulated operations.

Our Homeowner Services business reached its 1 millionth contract milestone this quarter, partly due to the launch of the partnership with New York City to provide service line protection programs to its 650,000 eligible homeowners. I've got to tell you. Response to this has been very strong. We now have more than 80,000 customers. So about a 12% penetration rate in only one quarter of marketing, and we have got nearly 160,000 contracts, which means that almost all of the customers signing up are taking two products.

On the shale energy front, we added five new connections with shale drilling companies and signed an additional agreement with XTO Energy. That's the third pipeline extension in Butler County to support drilling operations in the Marcellus shale area. And it also, as we've talked before when we extend our Regulated pipelines, it provides us the opportunity to provide the public in that area with much-needed treated water service.

So it's a positive for the environment also. XTO has told us that with those three pipeline extensions that we've done with them, they will have over 500,000 fewer water truck hauls on the roads of only one county, Butler County. So just within Butler County, it will be 0.5 million fewer water truck hauls over the next five years or so.

In addition, because they're using our treated water, one of the other things that they have told us is that they are able to use less chemicals in their injection fluids. Because they don't have to put in as much biocide, and that's important because biocide is the only non-food grade material that they use in the creation of their fluids. So we think there are some really positive environment environmental aspects to that.

Turning now to slide eight, this week our Board of Directors authorized a 12% increase in the quarterly dividend from $0.25 to $0.28 per share. This is in line with the dividend policy we articulated this time last year that more closely tied dividend growth to growth in earnings per share while targeting a 50% to 60% payout ratio.

With the strong results of the first quarter, as you can see on slide nine, we are reaffirming our 2013 earnings guidance range of $2.15 to $2.25 per diluted share for continuing ops.

And with that, let me turn the call over to Susan for a more detailed discussion of our financials.

Susan Story - ***American Water Works Company, Inc. - SVP & CFO***

Thank you, Jeff, and good morning to those who are listening to our first-quarter 2013 earnings call. I'm excited to be here with you today, and I look forward to working with all of you.

Jeff has already reviewed some of our key highlights. I will now take a few minutes to describe in greater detail the drivers of our results for the first quarter.

Turning to slide 11, as Jeff mentioned, we experienced solid financial results for the first quarter of 2013 with increases in revenue, net income and earnings per share. These results were driven by our team's commitment to strategies that focus around delivering value to our customers, investing in needed infrastructure and controlling costs.

During the first quarter, we reported operating revenues of approximately $636 million or a 2.8% increase over the approximate $619 million recorded for the first quarter of last year. Growth in revenues was strong in our Regulated Businesses as we will discuss further in a few minutes.

But our Market-Based business was down for the quarter. This is primarily due to timing delays in starting some projects in our Military Services Group, which we fully expect will catch up during the latter half of the year.

Net income from continuing operations for the first quarter was $57.6 million or $0.32 per share, representing a 17% growth over the prior year. Net cash also improved quarter over quarter, increasing to $149.6 million compared to $148.1 million for the first quarter in 2012.

Now, let's discuss on slide 12 the various components of our income from continuing operations, starting with revenues. I also encourage you to read our 10-Q on file with the SEC for a more detailed analysis of both revenue and expenses.

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Overall, operating revenues increased $17.6 million with revenues from our Regulated business increasing $31.4 million or 5.8% from 2012. This increase in revenue is primarily due to new rates in a number of our subsidiaries with an impact of approximately $25.3 million. Additional revenues of about $5 million were related to acquisitions, the most significant of which was our New York acquisition in the second quarter of 2012 and our increased surcharge and balancing account revenues of $5.2 million. These increases were partially offset by lower customer demand, which impacted revenues by approximately $3.6 million in the first quarter of 2013 compared to the first quarter of 2012.

For our Market-Based businesses, revenues for the first quarter of 2013 decreased due to lower contract operations group revenues by $14.7 million. Of this decrease, about $9.8 million was due to delayed activities in our military-based contracts, which we expect to make up in the latter half of the year.

The remaining decrease was due to the termination of certain other contracts continuing our rationalization of the municipal and industrial contracts business. This decrease in Contract Operations Group revenues was somewhat offset by a $1.5 million increase in Homeowners Services revenues, which Jeff talked about earlier.

On slide 13, total operating expenses for the first quarter of 2013 increased by about $13 million or 2.9% from 2012. Operation and maintenance in the Regulated business increased $11 million or 4.3% in the first quarter of 2013 compared with the prior year period.

Production expense increases include an increase in chemical costs related to the acquisition in New York and price increases and increased chemical dosages as a result of some unfavorable water conditions in our Illinois subsidiary due to drought.

Operating supplies and services increased $6.3 million or 13.2%, primarily due to higher contracted services. This was mainly a result of incremental contractor costs related to the stabilization of our ERP projects, as well as costs involving projects that improve our processes and our operating efficiencies over the long-term also due to the ERP implementation.

Maintenance, materials, and services, which include emergency repair, as well as costs for preventive maintenance, increased $2.1 million or 12.9%. This was mainly a result of higher than normal main breaks in a number of our subsidiaries, increased costs as a result of the New York acquisition and an increase in tank cleaning costs in California.

Customer billing increased $1.3 million due to an increase in uncollectable expense, and we also experienced a $1.8 million increase in casualty and liability insurance premiums. Employee-related costs decreased $2.5 million or 2.1%, driven by decreased group insurance and pension expense. The reduction in group insurance costs was mainly attributable to higher capitalization grants. Salaries and wages expense were relatively flat compared with the prior year period. The Market-Based business operations decrease in total operating expenses coincides in part with the decreases in revenue which I have described previously.

Turning now to regulatory highlights of the quarter. Slide 14 shows our new expanded rate case update template. We wanted to make it a bit easier for you folks to look at the rate case activity in the quarter, be it formal rate cases awaiting final order, which we separate on this slide between those filed in 2013 versus those filed in 2012, and also any step increases or district filings which impacted the quarter or are still pending.

Including Pennsylvania, Iowa, and California, we now have approximately $135 million in requested additional revenues from formal rate cases, and looking at the timing of these rate cases versus previous years, the rate cases we expect to resolve in 2013 should hit towards the end of the year versus midyear in 2012 when we had three rate cases finalized in the second quarter.

Turning now to slide 15, as you all know, internally we challenge ourselves to build a culture of continuous improvement and excellence as a way of providing a path for sustainable earnings growth. As part of that effort, we strive to manage our cost structure as efficiently as possible. And this slide shows that the results of that focus are paying off for our customers. We've graphed for you the incremental revenue requirements across our state for three different time periods.

As you can see, just a few years ago, about 60% of our rate case filings were to recover operating costs. Thanks to our focus on operating efficiency and expense control, we began to see a change, and in subsequent filings in 2011 through 2012, we lowered by more than a third the level of operating expenses we were seeking to recover to just 16%. And, in fact, if you look at the most recent rate cases filed, that percentage is now approximately 6%. Fully 94% of our recent cases filed are driven by needed capital expenditures in our infrastructure. This is a solid and sustained improvement and a testament to the discipline and cost controls that I see at American Water, which provide a tremendous benefit to our customers.

In fact, on slide 16, this continued effort to drive operating efficiencies also translates into an improved O&M efficiency ratio, which Jeff mentioned earlier, now at 40% for the 12 months ended March 31, 2013, compared with 41.8% during the same timeframe last year. I have to tell you as a new member of the American Water team, it's great to see this type of commitment across the business to continuous improvement to benefit our customers.

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And now I'll turn the call back to Jeff for his closing comments and for your questions.

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Thanks, Susan. If you go to slide 17, this is the slide that you see each quarter. It shows the expectations of what you can hold us accountable to and kind of measure our progress. Since we are really only into the first quarter, let me talk about our plans for the rest of the year.

We'll pursue the completion of our pending rate cases in West Virginia, Kentucky, Pennsylvania, Iowa, and California, as well as continue to evaluate appropriate timing for additional rate cases that could be filed possibly later this year or in 2014. We'll continue to focus on operational excellence and increased efficiencies, and we expect to beat our five-year goal, which is to have an O&M efficiency ratio of 40% or below in 2015. We'll beat that by one or two years.

We'll also begin to leverage some of the efficiencies gained through our business transformation project, though the real savings associated with that really won't come into play until about 2015 or very late 2014.

The second phase of our BP project which involves the customer information system and enterprise asset management, which is obviously the management of all of the assets that we are putting in place, should be substantially complete by the end of this year.

We'll also maintain our investment in our systems with an estimated spend of about $950 million in 2013, and we'll further leverage our supply chain initiatives to realize additional improvements in both our capital and O&M efficiencies.

We'll continue to leverage our IDP offerings. As you will recall that we've talked about what we've been doing on the innovation and development side because we've developed some very interesting technologies that we are starting to use and are starting to be put into place elsewhere in the industry. They are small. They are meant to be small. They don't consume our capital. But they have the potential for growing significantly in the future.

So we'll continue to push that through the commercialization process. And in the Marcellus shale space, we expect our number of connections to steadily increase as we continue to have discussions with numerous energy companies about opportunities to expand our pipelines to improve water service to these growing areas. So far, these have all been on the regulated side, though as we've said before, we are open to both regulated and unregulated pipeline expansion to meet market needs with the right risk return profiles for those.

These efforts will anchor our long-term earnings per share growth of 7% to 10%. We seek to provide investors with a long-term double-digit total return investment on a thesis centered around investing in our country's infrastructure in an industry whose product is essential to all people.

Before we go into the Q&A side, just a reminder that our annual stockholder meeting will be held here in Voorhees New Jersey and also online through the virtual stockholder meeting this coming Monday the 13th. I believe it's at 10 a.m. All stockholders are invited to attend, and if you all have not voted your proxy for any of the holders that are online, we certainly encourage you to do so.

And with that, we'd be happy to take any questions that you all may have.

QUESTION AND ANSWER

Operator

(Operator Instructions). Ryan Connors, Janney Montgomery Scott.

Ryan Connors - ***Janney Montgomery Scott - Analyst***

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One sort of tactical question and two bigger picture items. Just in the short term, obviously 1Q is a seasonally slow quarter, and then now we move into 2Q, 3Q and more of a stronger seasonal demand period, and last year was a real strong year. So can you kind of update us with your perspective on obviously the challenging comparisons and how we should be looking at year-over-year growth potential and you know maybe even any early perspective a little over a month into second quarter on how that issue of tough comparisons is playing out?

Jeff Sterba *- American Water Works Company, Inc. - President & CEO*

Yes, Ryan, let me just touch on that briefly. Remember, this is the reason why last year we provided a sense of what the impact on earnings from continuing operations was from the unseasonable weather. We indicated it was about $0.13 to $0.16 so that you could kind of normalize out the impact last year.

So our suggestion is to kind of look at that from a trending side to look at the performance as we go through this year. We're not going to give you much -- say much about what's going on in any quarter until the end of the quarter. But I'll just say that certainly April, it didn't give us any cause for concern on the sales side at all. We'll have to see what happens to weather.

You know, the thing that's -- this is one of the things that we are really starting to focus on. Regardless of what your views on climate change are and whether you believe in anthropogenic causes or not, the reality is, we're going to face significantly more volatile and variable weather patterns. They will be extreme. So we will see significant changes. And so one of our real focuses is building resiliency into our system, both physically and financially so that we can manage these kinds of swings while maintaining the same kind of financial risk profile and ensuring that we have systems that will allow us to meet those customers' needs.

So we'll just have to wait and see what happens in the second and third quarters, but at this stage, we're very comfortable with the earnings guidance we've given.

Ryan Connors *- Janney Montgomery Scott - Analyst*

Okay. That's great. Thanks, Jeff. And then can you just update us on your assessment of the regulatory climate broadly as it relates to awarded ROEs? Obviously interest rates remain low. That puts downward pressure on cost of capital calculations. Economic backdrop is mixed. And so how do you see commissions responding to that environment here as you gear up for a few fairly significant rate cases in the pipeline as you talked about?

Jeff Sterba *- American Water Works Company, Inc. - President & CEO*

Well, let me put in a few words, and then I'd like Susan to add her thoughts coming out of the same kind of regulated marketplace.

You know, clearly it's been down downward pressure on returns. You know, one of the things we remind regulators is, look, you have to be very careful about looking at what the -- what an artificially held down risk-free rate is and use that as the basis for calculating what a cost of equity capital is because it's being artificially held down through monetary policy for specific broad-based governmental reasons.

But, that said, the other thing that we share with our regulators is the notion that more than probably any other company in the utility industry, we have a capital allocation decision. And it's not that we're not going to do what is essential, but in terms of the variable capital, which is a big chunk of capital, it will move where there is the opportunity to earn our full returns in a timely manner.

I think the clearest example is the additional commitment that we made into New Jersey once the DSIC was put into place, the incremental capital that we committed into Missouri, and where, frankly, some capital has been extracted. Again, we're going to make sure we provide service to customer, but it's an issue of investment in the longer term.

Okay. That must be someone's phone ringing. Anyway. So, we certainly see returns coming down a bit, and we've factored that in in our game plan going forward. But we think we can without -- certainly not in a threatening way help people understand that we've only got so much capital spend, and it's got to be allocated where it's going to get the greatest return.

Susan Story *- American Water Works Company, Inc. - SVP & CFO*

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Absolutely. I agree with Jeff. And I think also remember that when you look at the rate cases that we have filed, we are holding the line on O&M expenses. We're trying to be good stewards of going into the Public Service Commissions and Public Utilities Commissions so that when we go into these, it's for infrastructure improvement. We know from several reports from the Society of civil Engineers, the water infrastructure is struggling nationally, we believe, and we have continued to make investments in that. We know that utility commissions recognize management efficiency, which we think that we are showing by how we are controlling our O&M costs so that we are going in for recovery basically for the investment that we're making to improve reliability, safety, and making sure that the water is available when it needs to be available.

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Susan raises something that we're going to start helping make sure our regulators understand more fully. If you look how far this Company has come in a pretty short period of time about improving its cost structure and really getting focused on how we serve customers in different ways, the kinds of things that we do that others don't do about helping ensure continuation of service where we have had very little lost service during these weather events and have been lauded in virtually every state where we've had those events because of the way we manage our field force and what we do relative to the loss of electric power. So, that's something that we think can help move up for a little bit of the lower natural returns to regulators.

Ryan Connors - ***Janney Montgomery Scott - Analyst***

That's great perspective. Thank you. And then one last question for me. Pretty big privatization opportunity in Allentown, Pennsylvania that did not go to either yourselves or any of your investor-owned peers. Can you just talk a little bit to us about that process and what you learned from it as regards to both the appetite for privatization and then also how you will approach that type of opportunity in the future?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Sure. You know, I would tell you that I am exceptionally proud of the team that we had working on that project, the way they conducted themselves, the development of the proposal, and I'm very comfortable with what we did. We would not have paid what someone else is saying they will pay.

So, in terms of the process, that's fine.

I guess a couple editorial comments. I think from a public policy side, there is a real issue to be had about an entity being able to use subsidized tax-exempt financing. It is being subsidized by all tax payers to buy assets or enter into an agreement where you're paying for lease assets at above cost -- above the original costs. The notion of using tax-exempt debt to enhance a public system that already exists is one thing. But to acquire a system and to effectively compete by using something that is subsidized by other taxpayers I think is a public policy issue that's going to end up being addressed in Congress.

You know, in the kind of economic conditions that this country is in, to continue to allow those kinds of subsidizations I think are the things that the policymakers ought to look at. And I think we also have to recognize that they are paying whatever the price is. $220 million, I guess, was the price. You know, it's a heck of a lot more debt that they don't have to issue, the $220 million, because of the bond reserve funds and everything else. They don't have any equity capital associated with that.

So I hope it works for them. They made a decision. We'll see what happens. I'm very comfortable with how we conducted ourselves and the price that we put forward. It does not dissuade us from pursuing the right kinds of opportunities for the future, approaching it with the same care and deliberation that we did this with.

Ryan Connors - ***Janney Montgomery Scott - Analyst***

So it will be interesting -- we will watch to see how it plays out. Thanks for your time this morning.

Operator

Neil Mehta, Goldman Sachs.

Neil Mehta - ***Goldman Sachs - Analyst***

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In California, one of the things we've seen with some of the electric utilities are general cases are taking a lot longer to resolve. You just filed in California. How should we think about the timing of final resolution, and do you think there is any readover from the timeline in California for some of the electric needs to how we should think about water case resolution?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

We have Walter to answer that.

Walter Lynch - ***American Water Works Company, Inc. - President & COO, Regulated Operations***

Yes, Neil, it's Walter. In California there is a three-year cycle. So we file on that on that timing. We filed in May. The rates are going to be effective in January 1 of 2015 based on that three-year cycle. So we expect to take a good portion of it and have the rate case finalized before January 1, 2015. So it's on a regular cycle, and all the water companies are on those cycles.

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

You know, Neil, if you look at the flat rate base, the decision was about what, five or six months late? But there is the risk because you are right. They are running behind. There is the risk that case could slip, but it's -- the rates are retroactive. That's what gives us a little comfort is that it's not an issue where we won't make that revenue. And it may be delayed where the actual flow comes a little bit late, but it will be retroactive to that date.

Neil Mehta - ***Goldman Sachs - Analyst***

Got it. All right. And then on your comments on dividends, obviously you had a nice dividend bump a couple of days ago. To get to the midpoint of your 50% to 60% payout, you'd likely have to grow your dividend by faster than EPS growth. So just to get back to your dividend philosophy, is it possible that you grow your dividend in excess of that 7% to 10% to get closer to the midpoint of your payout range?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

You know, I just love it when a 12% dividend increases -- a nice dividend increase. You know, there is a balance, as I know you understand, between the rate of growth that we have in that, and we're going to always be a little conservative on this because -- and looking forward, it's -- we had balanced that issue of the what the opportunities we have for investment.

And I guess the short answer to your question is, certainly there is the potential that it will grow at a rate faster than earnings maybe in any one year. But, remember, that we talk about 7% to 10% as a long-term growth rate. Not every year on year. So, you know, a year in which we have, let's say, 7% growth or 7.5%, the dividend rate will be higher than that. In a year in which we have 15% growth as we had for the last three years, it probably wouldn't be or probably likely wouldn't be above that.

So, as we go forward, we'll keep looking at that. I think the key for us is to provide a predictable, stable level of growth in the dividend. We've increased it by $0.01 in each of the last three years because it was appropriate to do so. Whether we're now at a $0.03 per quarter level increase, so that is 12%. Whether we go above that, we'll wait and see how our future continues to unfold.

Neil Mehta - ***Goldman Sachs - Analyst***

Got it. Okay. Thank you very much.

Operator

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Kevin Cole, Credit Suisse.

Kevin Cole - ***Credit Suisse - Analyst***

I guess with the shale development, can you, I guess, help me think how the earnings levels will work when you invest in the business, and is it purely a rate-based business, or do you get some volume kicker from it as well? Then also with the XTO agreement and similar agreements, how much CapEx will you be thinking that you're investing?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Yes, let's take that in two parts. First, let me do the second part first. In most of these agreements, frankly, what we've got is the driller investing a good chunk of the capital or providing a good chunk of the capital as a contribution today. And then the whole investment is rolled into our rates, and the property is deeded to us. So they then end up paying for treated water. That's what we've done on the regulated side.

So, in between rate cases, we get a bump from those additional revenues and sales. We also have the opportunity to then serve the retail growth that can prop up around that pipeline or for, in many of those areas, customers that are having well water difficulties, to have them come onto the line so that is additional revenue. And then, if the drillers end up leaving, then we don't have any risk associated with those investments that are rolled into rates, and we'll stay in there for the long term.

So that's how the ones that have happened so far are being treated, and I think that the value of that, remember, is twofold. First, we're getting the revenues from that driller today. In the longer term, we are getting additional certificated territories. So when we make those extensions, the Pennsylvania commission actually certificates additional territories for us. And that will put us in the position if, for example, this cracker is built to be able to serve what the people estimate from anywhere from 15,000 to 40,000 new jobs in that area.

So, now, as I said and we've said for at least the last year or so, while we focus on regulated investments to serve drillers, we will also consider market-based investments if the risk reward profile is right and it meets what the customer needs and wants. So far, that hasn't been what the customers have preferred. It hasn't been necessary or appropriate. But those things can change, and that obviously has to have the right risk reward relationships.

Kevin Cole - ***Credit Suisse - Analyst***

So, this is a zero-like business then given the contribution you made?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

We've put in some capital, but I've got to tell you, we haven't put in -- I don't know what the number is, Kevin. I couldn't tell you what the specific is, but it's not much. It may be $1 million or a couple of million dollars. It's probably a couple of million dollars so far. Because a big chunk of it is put up by the driller, and then they deed the property to us at no cost. They don't get a deduction in their rates. So they pay for the pipeline, and then they pay the regular price for the water.

Kevin Cole - ***Credit Suisse - Analyst***

Have you provided the rate base growth opportunity for this?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

I am sorry. Can you speak up?

Kevin Cole - ***Credit Suisse - Analyst***

Have you provided the rate base growth opportunity for, I guess, the shale development shift?

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Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

No, no, we have not.

Kevin Cole - ***Credit Suisse - Analyst***

And then, Susan, with your comments on the non-reg side, I'm sorry if I missed this, but was the revenue and the net income decrease a function of a slowdown in ability to get new businesses, or was it -- this kind of more of a contract issue, and then also how do you expect to backfill later on this year?

Susan Story - ***American Water Works Company, Inc. - SVP & CFO***

Yes, thanks for that question, Kevin. Actually the military services group -- just for a little background, these contracts are O&M contracts, but they are actually full scale -- we're the EPC contractor, and we provide the O&M services with 50-year contracts.

So we're the ones who get the permit. We actually also get a bill of sale for the asset, but because it's on the government installations and we can't make any decisions that the government doesn't approve, we don't carry those on the American Water book.

So, what happens is, we have projects that are already awarded. These are not projects we're hoping will happen. They've been budgeted. They've been awarded. We're in process. There was small delay in terms of getting some construction permits on the majority of these sites.

So we fully expect these projects to continue for this year. It will probably be more toward the third or fourth quarter and also understanding how this works because we are EPC, we have an agreement that we actually book revenue during certain percentages of the completion of the project. So once we start the project, based on where we are in the design field, we are able to bring revenues in. So it's merely a matter of the timing, and most of that is due to the construction permit.

Kevin Cole - ***Credit Suisse - Analyst***

Great. Thank you. That is helpful. Appreciate it.

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Let me add one thing to that, Kevin. I think as people are finding out, there is an impact of sequestration that is kind of the hidden impact, and it is that even if there aren't -- people aren't being furloughed or anything, or even if they are, you're losing some effectiveness there. But what really happens is everyone in the government talks about what's going on, and that produces effectiveness efficiency. And so stuff has just gotten slower, and that's a natural thing to happen. But it isn't going to stop moving forward at this time.

Susan Story - ***American Water Works Company, Inc. - SVP & CFO***

Yes, I mean the sequestration should not affect the projects that we've got, and also, even going forward, because we are doing water and wastewater infrastructure, these are critical elements. So as long as there are military bases, the work will be done. The question is, who's going to do it, and we're going to compete most effectively for those projects.

Kevin Cole - ***Credit Suisse - Analyst***

Great. Thank you. And Jeff, I like the slide seven. So now I can end the call with, may your cup runneth over.

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

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(laughter) I like that! I like that!

Operator

Angie Storozynski, Macquarie.

Angie Storozynski - ***Macquarie - Analyst***

I just wanted to clarify comments, Susan, about the timing of rate cases and the revenue contributions and how it ties into your guidance. So, is this just purely about the quarterly allocation of revenue increases, or that's -- I mean the timing of those rate case resolutions, together with the delay in the military contracts, should weigh on your results in 2013 versus your guidance?

Susan Story - ***American Water Works Company, Inc. - SVP & CFO***

Angie, that's exactly correct. Last year, the three rate cases were finalized, and we received the orders in the second quarter. When you look, for example, at Kentucky and West Virginia, the water and wastewater in West Virginia and the case in Kentucky, of course, we don't know. We would hope that by the third and fourth quarter, we would get a final order on those. With Pennsylvania, you know, it could be through the first quarter of 2014, but there's a chance it could be the latter part of this year and Iowa probably 2014. So a lot of it is due to the timing from last year compared to this year.

Angie Storozynski - ***Macquarie - Analyst***

But you already knew about it, and it is embedded in your guidance, right?

Susan Story - ***American Water Works Company, Inc. - SVP & CFO***

Yes, for the year guidance. That's why we reaffirmed our guidance, the annual guidance we reaffirmed our guidance.

Angie Storozynski - ***Macquarie - Analyst***

Okay. Now how much of a help did you guys have in the realized ROE over the last 12 months from the weather? So if I were to look at the weather normalized realized ROE?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Yes, I'm trying to remember the number. Something like about 40 basis points?

Walter Lynch - ***American Water Works Company, Inc. - President & COO, Regulated Operations***

Yes. It was around 30 basis points, and Angie, I can give that to you after the call.

Angie Storozynski - ***Macquarie - Analyst***

Okay. And then when we think about your earnings drivers going forward, how big of an ROE lag we should assume, and especially as it ties into potential refinancings of debts and further bridging of the gap between allowed and realized ROEs from -- through rate cases?

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Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Well, if we look at the regulated return, which I think it was on a weather adjusted basis, was somewhere just at or under 9.0%, right around 9%. We are seeing -- we've got a regulatory lag, but it has shrunk considerably. Our goal is to drive it to 0. We think that's appropriate.

As we go forward, what helps us get us there? Well, expansion of DSIC. If you look at the 39% of our CapEx that qualifies for DSIC, remember that of the $950 million we've got this year, a chunk of that is for BT. BT doesn't qualify for DSIC. As we go forward next year, at this stage, into 2014, we are subject to further decisions. But we don't see backing away from the total level of investment, so probably a greater amount of investment will be eligible for DSICs.

We've got more future test year rate cases moving forward. So we're doing the things that will help close that gap. I certainly don't expect it to increase from what we've got right now, which just looks to be about 80% -- 80 basis points.

Angie Storozynski - ***Macquarie - Analyst***

Okay. And that's on the regulated side. How about on the corporate level?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Well, on the corporate level, Angie, the major piece, as we've talked about before, is the parental level debt. Its impact is declining just because our earnings are becoming much bigger, not that the total hit associated with that interest is shrinking. It's really not.

Remember, we did hedge off a piece of that. There's no -- through a swap. Not really an ability to do much more of that today, but -- and remember that the biggest chunk of that, I think, is about $750 million is subject to -- comes up in 2017.

So we will always look for opportunities to manage that debt in a better way. We did a lot of refinancings about $500 million or so last year of other debt, which has helped reduce our overall cost of debt. But the substitutes at the parent we have limited capacity to do anything before we face the issue of it coming up in 2017.

Angie Storozynski - ***Macquarie - Analyst***

Okay. So and then the last question, so you keep showing us the 7% to 10% earnings growth, and when I look at your drivers of earnings and the level of CapEx that you keep deploying, I kind of struggle with the 7% growth. What would be -- how can I get comfortable with that low case of earnings growth? Because it's hard to imagine, is this more a function of -- are you basically giving yourself a cushion, and that's why it's a 7% the low end of the range? Or is there something long-term that I'm missing that could actually weigh on your earnings growth?

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Well, Angie, since we're talking long-term, I think it's appropriate to think about a range. And, you know, obviously we're going to drive as long as it's based on long-term decision-making, we are going to drive to be on the higher end, but there's a lot of things that can happen. You know, if we get in a period of as some people think will happen where we've got an inflationary period, you know, monetarily driven, then, for entities like us, that forces interest costs, as well as other costs up at a higher rate. So it exacerbates whatever regulatory lag you have.

So there's a lot of things that can happen on the Regulatory side and as well as on the Market-Based side. So I think it's appropriate to think about a range, and that's where you all get to kind of make your own judgments and decide where within that range we may fall long-term. Because we'll run a bunch of sensitivities that can drive us -- remember, the tornado chart that we've used with you all before that can show how things can affect us, and a number of them can drive us inside or outside of that range very, very quickly whether it's on the sales side or particularly on the level of sales side. So, I think we are comfortable with the 7% to 10% range.

Angie Storozynski - ***Macquarie - Analyst***

Okay. Thank you very much.

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Operator

Heike Doerr, Robert W. Baird.

Heike Doerr - ***Robert W. Baird - Analyst***

I wanted to return to this topic of military-based business for a moment. Can you perhaps comment on how the sequestration impacts the trend towards further privatization of military bases?

Susan Story - ***American Water Works Company, Inc. - SVP & CFO***

You know, it's interesting because in looking and talking with the people that we've got working on that, the issue of sequestration has a lot of questions, first of all. So we don't want to speculate. We know that there were talks of furloughs that did not happen. What we do know is that originally -- and I think we have reported in early earlier earnings calls -- the Department of Defense was planning about $11 billion worth of water and wastewater project privatization from 2012 to 2016. We have not gotten information that says that has significantly changed. Again, when you look at a lot of spaces, many were built around post-World War II different areas. Water, wastewater infrastructure -- if you're going to have bases, you're going to need those services.

So, anything we talk about is speculation. However, in some respects, the military I know, for example, on renewables and different things has actually said that because of things like sequestration and budget cuts, they would prefer to privatize because they take that risk off, and that's not their core competency. We don't know that for sure. We are monitoring closely. We work with the Department of Defense frequently. We have a team that does that, and at this point the projects that we have, we don't see an impact from sequestration but from what Jeff mentioned, which is if things happen a little more slowly because the discussion and talks about sequestration.

Looking forward, if we need to revise our forecast, we will. But at this point, we still see projects on the table that will be awarded to someone.

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Let me add one other piece of color. I think the probability of a BRAC -- another BRAC is very high, probably in the 2014 to 2015 timeframe. Those are very difficult and exhaustive processes. And consolidation and efficiency of overall deployment is one of the keys.

So I think you can think about the likelihood that we will see some baseloads.

Now, when they do consolidation, there is always an issue about one of the big bases going by the wayside. Frankly, what typically happens is you see consolidation of smaller bases. A lot of the smaller outposts, frankly, we don't even bid on because they are just not big enough for us to mess with. We tend to focus on the larger scale bases, and there are some large scale bases that are on the blocks for this privatization today. You never know when a BRAC process goes through what the outcome might be. But I think you know two things. A), it takes a while because it's a political process and that they're going to be driving for efficiency gains. I don't think anyone can prejudge today whether that means we could lose one of our bases or we could have a greater opportunity to serve a new base that's bigger than it otherwise would be. I don't -- I agree with Susan. I don't think that sequestration in and of itself is going to impact the privatization, except it may just slow down because of the process and people being distracted because of just the general notion of sequestration. But they will come back after a period a couple of months or whatever of settling down and get back on stride.

Susan Story - ***American Water Works Company, Inc. - SVP & CFO***

And tagging onto what Jeff said, not only the issue that we serve the larger bases but because of our size and scale and the fact that we have a national marketplace, it would provide us more opportunities because we are not constrained by regional lines. So it actually could provide us even more opportunities.

Heike Doerr - ***Robert W. Baird - Analyst***

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And can you remind us what that process is? If tomorrow they opened up these projects -- forbid -- what's the process, what's the quote-unquote normal timing of that process?

Jeff Sterba *- American Water Works Company, Inc. - President & CEO*

Well, the timing that the federal government will talk about is an 18-month period. We haven't seen one get done in 18 months. So, there is always something that slips. But it is a very structured process that's multistage. (multiple speakers)

Heike Doerr *- Robert W. Baird - Analyst*

So it would be a 2015 earnings event at the earliest?

Jeff Sterba *- American Water Works Company, Inc. - President & CEO*

Yes. Except that there are some that are in process now. So, there is already some that are on the table, and we're started in 2012.

So, when will they come to a conclusion? Well, it really depends. Do we see 18 months, or do we see 24 or 26 months? So we don't talk about which ones that we bid on that are currently in process, but they are some very attractive faces.

Heike Doerr *- Robert W. Baird - Analyst*

And then as a final question, can you, Jeff, provide us with an update on the New York City contract services contract?

Jeff Sterba *- American Water Works Company, Inc. - President & CEO*

Yes, as I mentioned earlier, we started the market marketing process in early to mid-January. So through the first round of mailings to about 650,000 people, we've got 80,000 customers. So that's over about a 12% penetration rate, and almost all of them are taking two products. So we've got about 160,000 contracts out of it.

So, it's going well. It's certainly exceeding what we expected.

Heike Doerr *- Robert W. Baird - Analyst*

Can you share with us what the target is for that by the end of the year or --?

Jeff Sterba *- American Water Works Company, Inc. - President & CEO*

No. We won't give specifics on targets and stuff like that. But I'll just tell you that we are pleased with how it's going. But there's also shakedowns that occur -- maybe that's not the best choice of words -- shakeouts that occur when you go into a new territory because, remember, that our key -- the two key things that make that business work are contractor management and customer care.

And so, on the customer care side, we had to significantly expand our capacity to take on New York City, and on the contractor management side, these are a bunch of new contractors because we didn't really serve in New York City before. So we've got to go through the process that you always will have a little shakeout as we bring new people onto the customer care side, and we have new contractors that we are serving.

So we are pleased with how it's going, and there probably isn't much more to say about that.

Operator

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(Operator Instructions). And I show no further questions in queue at this time. I'd like to turn it back to management for any closing remarks.

Jeff Sterba - ***American Water Works Company, Inc. - President & CEO***

Well, let me again thank you for joining us this morning. We'll see some of you at the Brean conference on Monday, and thanks, again, for your following and support. Take care.

Operator

Ladies and gentlemen, that does conclude our conference call for today. We'd like to thank you for your participation, and you may now disconnect.

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KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2015-00418
ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

Witness: **Scott W. Rungren**

22. Reference the Kentucky American Water application generally. Provide the authorized and earned return on common equity for Kentucky American Water and the other operating utility subsidiaries of American Water over the past five years. Provide copies of all associated work papers and source documents. Provide copies of the source documents, work papers, and data in both hard copy and electronic (Microsoft Excel) formats, with all data and formulas intact.

Response:

Please refer to the attachments for the authorized return on common equity for American Water's operating subsidiaries and the earned return on common equity for KAWC. Pursuant to KAWC's objection filed on March 18, 2016, KAWC is not providing the earned return on common equity for the other operating utility subsidiaries.

Kentucky-American Water
General Rate Case
ROE's Allowed

Date Filed	Docket/Case Number	Notes	Company	Effective Date For New Rates	ROE Granted
7/1/2010	Case No. 10-07-007		California	6/7/2012	10.20%
5/1/2013	Case No. 13-07-002		California	1/1/2015	9.99%
2/22/2011	Case No. 2010-0313	1	Hawaii	11/21/2011	10.20%
10/27/2011	Case No. 11-0767		Illinois	10/1/2012	9.34%
5/2/2011	Case No. 44022		Indiana	6/15/2012	9.70%
1/24/2014	Case No. 44450		Indiana	1/28/2015	9.75%
4/29/2011	Case No. RPU-2011-0001	2	Iowa	3/13/2012	9.40%
4/30/2013	Case No. RPU-2013-0002	3	Iowa	4/18/2014	9.41%
12/28/2012	Case No. 2012-00520	4	Kentucky	7/27/2013	9.70%
4/29/2011	Case No. 11-W-0200	5	New York	4/1/2012	9.65%
12/19/2014	Case No. 9372		Maryland	6/19/2015	10.00%
1/25/2012	N/A		Michigan	2/1/2012	10.50%
5/21/2013	N/A		Michigan	6/15/2013	10.50%
6/30/2011	Case No. WR-2011-0337		Missouri	4/1/2012	10.00%
4/9/2010	Case No. WR-10040260		New Jersey	1/1/2011	10.30%
7/29/2011	Case No. WR11070460		New Jersey	5/1/2012	10.15%
1/9/2015	Case No. WR-15010035		New Jersey	9/21/2015	9.75%
4/29/2011	Case No. R-2011-2232243		Pennsylvania	11/11/2011	10.25%
4/30/2013	Case No. R-2013·2355276		Pennsylvania	1/1/2014	10.25%
4/23/2010	Case No. R-2010-2166208		Pennsylvania-Clarion WW	1/1/2011	10.60%
4/23/2010	Case No. R-2010-2166210		Pennsylvania-Claysville WW	1/1/2011	10.60%
4/23/2010	Case No. R-2010-2166212		Pennsylvania-Coatesville WW	1/1/2011	10.60%
4/23/2010	Case No. R-2010-2166214		Pennsylvania-Northeast WW	1/1/2011	10.60%
9/17/2010	Case No. 2010-00189		Tennessee	4/5/2011	10.00%
6/1/2012	Case No. 2012-00049		Tennessee	11/1/2012	10.00%
3/8/2010	Case No. PUE-2010-00001		Virginia	3/6/2011	10.20%
2/6/2012	Case No. PUE-2011-00127	6	Virginia	12/12/2012	9.75%
6/18/2010	Case No. 10-0920-W-42T		West Virginia	4/19/2011	9.75%
12/14/2012	Case No. 12-1648-S-42T		West Virginia	10/11/2013	9.90%
12/14/2012	Case No. 12-1649-W-42T		West Virginia	10/11/2013	9.90%
4/30/2015	Case No. 15-0675-S-42T		West Virginia	2/24/2016	9.75%
4/30/2015	Case No. 15-0676-W-42T		West Virginia	2/24/2016	9.75%

Notes:

1) Wastewater only
2) IUB authorized 10.3% but was reduced through the application of double leverage
3) IUB authorized 9.90% but was reduced through the application of double leverage. This case was s a settlement.
4) Rates Under Bond were effective July 27, 2013 and received final Order October 25, 2013
5) Information pertains only to the former company of Long Island American Water
6) Rates Under Bond were effective July 12, 2012 and received final Order December 12, 2012

Kentucky-American Water
Authorized and Earned Returns on Common Equity

(In Thousands)	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Net Income Available to Common Stock		$18,052	$14,564	$12,766	$15,712	$14,755
Common Equity	$150,715	$155,273	$159,213	$163,767	$167,713	$171,249
ROE Achieved		11.80%	9.26%	7.90%	9.48%	8.71%
Authorized ROE by KY PSC		9.70%	9.70%	9.70%	9.70%	9.70%

Notes:

1. The values for "ROE Achieved" all reflect non-utility income and expenses.

2. Calculation of the "ROE Achieved" based upon average common equity.

3. Effective date of authorized ROE for 2010 was 12/14/2010.

4. Effective date of authorized ROE for 2013 was 10/25/2013.

KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2015-00418
ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

Witness: **Linda C. Bridwell**

23. Reference the Kentucky American Water application generally. Provide copies of the financial statements (balance sheet, income statement, statement of cash flows, and the notes to the financial statements) for American Water and Kentucky American Water for the past two years. Provide copies of the financial statements in both hard copy and electronic (Microsoft Excel) formats, with all data and formulas intact.

Response:

The audited financial statements for 2015 are not yet complete. Please see attached which provides the audited financial statements for Kentucky American for the years 2014 and 2013. The financial statements for American Water were provided in KAW_APP_EXH28_012916 in the initial filing. The Excel files for both Kentucky American and American Water are attached.

Kentucky-American Water Company, Inc.

(a wholly-owned subsidiary of
American Water Works Company, Inc.)

Financial Statements

As of and for the years ended December 31, 2014 and 2013

Independent Auditor's Report

To the Board of Directors and Stockholder of
Kentucky-American Water Company, Inc.

We have audited the accompanying financial statements of Kentucky-American Water Company, Inc., which comprise the balance sheets as of December 31, 2014 and 2013, and the related statements of income, of changes in shareholder's equity and of cash flows for the years then ended.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on the financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the Company's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Kentucky-American Water Company at December 31, 2014 and 2013, and the results of its operations and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

PricewaterhouseCoopers LLP

March 27, 2015

KENTUCKY-AMERICAN WATER COMPANY, INC.
Balance Sheets
December 31, 2014 and 2013
(Dollars in thousands)

Assets	2014	2013
Property, plant and equipment		
Utility plant - at original cost, net of accumulated depreciation	$ 530,011	$ 519,037
Utility plant acquisition adjustments, net	226	234
Nonutility property	250	250
Total property, plant and equipment	530,487	519,521
Current assets		
Cash	193	209
Accounts receivable	5,541	5,249
Allowance for uncollectible accounts	(766)	(1,052)
Unbilled revenues	4,229	4,965
State income tax receivable	814	284
Materials and supplies	950	638
Deferred income taxes	1,475	382
Accounts receivable – affiliated company	703	-
Other	272	351
Total current assets	13,411	11,026
Regulatory and other long-term assets		
Regulatory assets	15,427	13,812
Prepaid pension expense	2,439	2,134
Other	130	150
Total regulatory and other long-term assets	17,996	16,096
Total assets	$ 561,894	$ 546,643

The accompanying notes are an integral part of these financial statements.

KENTUCKY-AMERICAN WATER COMPANY, INC.
Balance Sheets
December 31, 2014 and 2013
(Dollars in thousands)

Capitalization and Liabilities	2014	2013
Capitalization		
Common stockholder's equity	$ 167,716	$ 163,769
Preferred stock with mandatory redemption requirements	4,500	4,500
Long-term debt	195,749	195,749
Total capitalization	367,965	364,018
Current liabilities		
Notes payable - affiliated company	22,489	20,174
Accounts payable	5,192	4,510
Accrued interest	2,090	2,090
Accrued taxes, including federal income taxes of $10 in 2014 and $43 in 2013	136	106
Refunds due to customers	482	1,189
Other	3,731	3,374
Total current liabilities	34,120	31,443
Regulatory and other long-term liabilities		
Regulatory liabilities	16,924	15,785
Deferred income taxes	71,509	65,290
Deferred investment tax credits	624	709
Advances for construction	12,202	12,192
Accrued postretirement benefit expense	712	656
Other	1,882	2,595
Total regulatory and other long-term liabilities	103,853	97,227
Contributions in aid of construction	55,956	53,955
Commitments and contingencies (see Note 16)	-	-
Total capitalization and liabilities	$ 561,894	$ 546,643

The accompanying notes are an integral part of these financial statements.

KENTUCKY-AMERICAN WATER COMPANY, INC.
Statements of Income
For the Years Ended December 31, 2014 and 2013
(Dollars in thousands)

	2014	2013
Operating revenues	$ 88,746	$ 83,618
Operating expenses		
Operation and maintenance	32,160	33,028
Depreciation	11,917	11,566
Amortization	2,014	1,822
General taxes	5,762	5,058
	51,853	51,474
Operating income	36,893	32,144
Other income (expenses)		
Interest on long-term debt	(12,132)	(11,905)
Interest on short-term debt to affiliated company	(51)	(46)
Allowance for other funds used during construction	317	778
Allowance for borrowed funds used during construction	145	363
Amortization of debt issuance costs	(91)	(89)
Other, net	(72)	(81)
Total other expenses	(11,884)	(10,980)
Income before income taxes	25,009	21,164
Provision for income taxes	9,296	8,398
Net income available to common stockholder	$ 15,713	$ 12,766

The accompanying notes are an integral part of these financial statements.

KENTUCKY-AMERICAN WATER COMPANY, INC.
Statements of Cash Flows
December 31, 2014 and 2013
(Dollars in thousands)

	2014	2013
Cash flows from operating activities		
Net income	$ 15,713	$ 12,766
Adjustments		
Depreciation and amortization	13,931	13,388
Amortization of debt issuance costs	91	89
Deferred income tax benefit	5,548	7,734
Amortization of deferred investment tax credits	(85)	(85)
Provision for losses on accounts receivable	1,042	1,092
Allowance for other funds used during construction	(317)	(778)
Pension and non-pension postretirement benefits	626	1,766
Deferred programmed maintenance expense	(2,873)	(2,131)
Other, net	(817)	(605)
Changes in assets and liabilities		
Accounts receivable and unbilled revenues	(884)	(2,859)
Federal income tax payable - affiliated company	(33)	(2,698)
Other current assets	(754)	400
Pension and non-pension postretirement benefits contribution	(931)	(1,871)
Accounts payable	584	(1,051)
Accrued taxes	63	(1,792)
Other current liabilities	(242)	875
Net cash provided by operating activities	30,662	24,240
Cash flows from investing activities		
Capital expenditures	(23,116)	(36,900)
Acquisition	(520)	-
Removal costs from property, plant and equipment retirements, net of salvage of $226 in 2014 and $ 303 in 2013	(762)	(86)
Net cash used in investing activities	(24,398)	(36,986)
Cash flows from financing activities		
Proceeds from issuance of long-term debt to affiliated company	-	7,859
Debt issuance costs	-	(32)
Net borrowings of short-term borrowings-affiliated company	2,315	9,151
Advances and contributions for construction, net of refunds of $1,154 in 2014 and $1,187 in 2013	3,254	3,884
Dividends paid	(11,849)	(8,291)
Net cash provided by (used in) financing activities	(6,280)	12,571
Net decrease in cash and cash equivalents	(16)	(175)
Cash at beginning of year	209	384
Cash at end of year	$ 193	$ 209
Cash paid during the year for:		
Interest, net of capitalized amount	$ 10,120	$ 11,970
Income taxes	$ 1,395	$ 3,710
Non-cash investing activity		
Capital expenditures acquired on account but unpaid as of year end	$ 2,115	$ 2,512
Non-cash financing activity		
Capital contribution (See Note 12)	$ 83	$ 80

The accompanying notes are an integral part of these financial statements.

KENTUCKY-AMERICAN WATER COMPANY, INC.
Statements of Changes in Shareholder's Equity
December 31, 2014 and 2013
(Dollars in thousands)

	Common Stock Shares	Par Value	Paid-in Capital	Retained Earnings	Total
Balance at December 31, 2012	1,567,391	$ 36,569	$ 78,846	$ 43,799	$ 159,214
Net income	-	-	-	12,766	12,766
Capital contributions	-	-	80	-	80
Common stock dividends	-	-	-	(8,291)	(8,291)
Balance at December 31, 2013	1,567,391	36,569	78,926	48,274	163,769
Net income	-	-	-	15,713	15,713
Capital contributions	-	-	83	-	83
Common stock dividends	-	-	-	(11,849)	(11,849)
Balance at December 31, 2014	1,567,391	$ 36,569	$ 79,009	$ 52,138	$ 167,716

The accompanying notes are an integral part of these financial statements.

Note 1: Organization and Operation

Kentucky-American Water Company, Inc. (the "Company") provides water and wastewater service to customers in the state of Kentucky. As a public utility operating in Kentucky, the Company functions under rules and regulations prescribed by the Kentucky Public Service Commission (the "Commission"). The Company is a wholly-owned subsidiary of American Water Works Company, Inc. ("AWW").

Note 2: Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States ("U.S. GAAP") requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from these estimates. The Company considers benefit plans assumptions, the estimates used in impairment testing of other long-lived assets, including regulatory assets and liabilities, revenue recognition and accounting for income taxes to be its critical accounting estimates. The Company's significant estimates that are particularly sensitive to change in the near term are amounts reported for pension and other postemployment benefits and contingency-related obligations.

Regulation

The Company is subject to regulation by the Commission and the local governments of the State of Kentucky (collectively the "Regulators"). The Commission has allowed recovery of costs and credits which the Company has recorded as regulatory assets and liabilities. Accounting for future recovery of costs and credits as regulatory assets and liabilities is in accordance with authoritative guidance provided by U.S. GAAP. Regulated utilities defer costs and credits on the balance sheet as regulatory assets and liabilities when it is probable that those costs and credits will be recognized in the rate making process in a period different from the period in which they would have been reflected in operations by a non-regulated company. These deferred regulatory assets and liabilities are then reflected in the statements of income in the period in which the costs and credits are reflected in the rates charged for service.

Property, Plant and Equipment

Property, plant and equipment consist primarily of utility plant. Additions to utility plant and replacements of retirement units of property are capitalized. Costs include material, direct labor and such indirect items as engineering, supervision, payroll taxes, benefits, transportation and an allowance for funds used during construction. Repairs and maintenance are charged to operation and maintenance expense as incurred.

When units of property are replaced, retired or abandoned, the recorded value thereof is credited to the asset account and charged to accumulated depreciation. To the extent the Company recovers costs of removal or other retirement costs through rates, a regulatory asset or liability is recorded when timing differences exist between when the Company incurs costs of removal and when the Company recovers such costs in rates. Removal costs, net of salvage, are recorded as reductions to the regulatory liability or an increase to the regulatory asset, as applicable.

The cost of utility property, plant and equipment is depreciated using the straight-line average remaining life using the composite method.

The costs incurred to acquire and internally develop computer software for internal use are capitalized as a unit of property. The carrying value of these assets amounts to $9,063 at December 31, 2014 and $8,892 at December 31, 2013.

Utility plant acquisition adjustments represent the difference between the fair value of plant at the date of purchase and its original cost when first devoted to public service (less accumulated depreciation) and are amortized to expense over the remaining useful lives of the corresponding purchased plant assets. Amortization of utility plant acquisition adjustments was $8 and $9 for 2014 and 2013, respectively. The remaining lives range from 26 to 31 years.

Cash

Substantially all of the Company's cash is invested in interest-bearing accounts.

Accounts Receivable

The majority of the Company’s accounts receivable is due from utility customers and represents amounts billed to the Company’s customers on a cycle basis. Credit is extended based on the guidelines of the applicable Regulators and collateral is generally not required.

Allowance for Uncollectible Accounts

Allowance for uncollectible accounts is maintained for estimated probable losses resulting from the Company’s inability to collect receivables. Accounts that are outstanding longer than the payment terms are considered past due. A number of factors are considered in determining the allowance for uncollectible accounts, including the length of time receivables are past due and previous loss history. The Company writes off accounts when they become uncollectible.

Unbilled Revenues

Unbilled revenues are accrued when service has been provided but has not been billed to customers.

Materials and Supplies

Materials and supplies are stated at the lower of cost or net realizable value. Cost is determined using the average cost method.

Long-Lived Assets

Long-lived assets held and used by the Company are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. If the sum of the future cash flows expected to result from the use of the assets and their eventual disposition is less than the carrying amount of the assets, an impairment loss is recognized. Measurement of an impairment loss would be based on the fair value of the assets. A regulatory asset is charged to earnings if and when future recovery in rates of that asset is no longer probable.

Advances for Construction and Contributions in Aid of Construction

The Company may receive advances for construction (“advances”) and contributions in aid of construction (“contributions”) from customers, home builders, real estate developers, and others to fund construction necessary to extend service to new areas. Advances are refundable for limited periods of time as new customers begin to receive service or other contractual obligations are fulfilled.

Advances that are no longer refundable are reclassified to contributions. Contributions are permanent collections of plant assets or cash for a particular construction project. For rate-making purposes, the amount of such contributions generally serves as a rate base reduction, since it represents non-investor supplied funds.

The Company depreciates utility plant funded by contributions and amortizes its contribution balance as a reduction to depreciation expense, producing a result which is functionally equivalent to reducing the original cost of the utility plant for the contributions. Amortization of contributions was $1,573 and $1,548 for the years ended December 31, 2014 and 2013, respectively. For the years ended December 31, 2014 and 2013, no non-cash advances or contributions were received.

Recognition of Revenues

Revenues are recognized as water and wastewater services are provided and include amounts billed to customers on a cycle basis and unbilled amounts based on estimated usage from the date of the meter reading associated with the latest customer invoice to the end of the accounting period. Other operating revenues are recognized when services are performed.

The Company accounts for sales tax collected from customers and remitted to taxing authorities on a net basis.

Income Taxes

AWW and its subsidiaries participate in a consolidated federal income tax return for U.S. tax purposes. Members of the consolidated group are charged with the amount of federal income tax expense determined as if they filed separate returns. Federal income tax expense for financial reporting purposes is provided on a separate return basis.

Certain income and expense items are accounted for in different time periods for financial reporting than for income tax reporting purposes. Deferred income taxes have been provided on the difference between the tax basis of assets and liabilities and the amounts at which they are carried in the financial statements. These deferred income taxes are based on the enacted tax rates anticipated to be in effect when such temporary differences are projected to reverse. Anticipated tax rates are the currently enacted tax rates, as the Company is not aware of any tax rate changes. In addition, regulatory assets and liabilities are recognized for the effect on revenues expected to be realized as the tax effects of temporary differences previously flowed through to customers reverse.

Investment tax credits have been deferred and are being amortized to income over the average estimated service lives of the related assets.

Allowance for Funds Used During Construction (“AFUDC”)

AFUDC is a non-cash credit to income with a corresponding charge to utility plant, which represents the cost of borrowed funds and a return on equity funds devoted to plant under construction. AFUDC is recorded to the extent permitted by the Regulators.

New Accounting Standards

The following recently issued accounting standards have been adopted by the Company and have been included in the results of operations, financial position or footnotes of the accompanying Financial Statements:

Obligations Resulting from Joint and Several Liability Arrangements

In February 2013, the Financial Accounting Standards Board (“FASB”) issued guidance for the recognition, measurement and disclosure of obligations resulting from joint and several liability arrangements for which the total amount of the obligation is fixed at the reporting date. Examples of obligations within the scope of the updated guidance include debt arrangements, other contractual obligations and settled litigation and judicial rulings. The update requires an entity to measure obligations resulting from joint and several liability arrangements for which the total amount of the obligation is fixed at the reporting date as the sum of the following: (a) the amount the reporting entity agreed to pay on the basis of its arrangement among its co-obligors and (b) any additional amount the reporting entity expects to pay on behalf of its co-obligors. The updated guidance also includes additional disclosures regarding the nature and amount of the obligation, as well as other information about those obligations. The update was effective on a retrospective basis for interim and annual periods beginning after December 15, 2013, which for the Company was January 1, 2014. The adoption of this updated guidance did not have an impact on the Company’s results of operations, financial position or cash flows.

The following recently issued accounting standards are not yet required to be adopted by the Company:

Service Concession Arrangements

In January 2014, the FASB issued guidance for an operating entity that enters into a service concession arrangement with a public sector grantor who controls or has the ability to modify or approve the services that the operating entity must provide with the infrastructure, to whom it must provide the services and at what price. The grantor also controls, through ownership or otherwise, any residual interest in the infrastructure at the end of the term of the arrangement. The guidance specifies that an operating entity should not account for the service concession arrangement as a lease. The operating entity should refer instead to other accounting guidance to account for the various aspects of the arrangement. The guidance also specifies that the infrastructure used in the arrangement should not be recognized as property, plant and equipment of the operating entity. This update should be applied on a modified retrospective basis to service concession arrangements that exist at the beginning of an entity's fiscal year of adoption. This requires the cumulative effect of applying the update to be recognized as an adjustment to the opening retained earnings balance for the annual period of adoption. The update is effective for interim and annual periods beginning after December 15, 2014, which for the Company is January 1, 2015. The adoption of this updated guidance will not have an impact on the Company's results of operations, financial position or cash flows.

Reporting Discontinued Operations

In April 2014, the FASB issued guidance that changes the criteria for determining which disposals can be presented as discontinued operations and modifies related disclosure requirements. Under the updated guidance, a discontinued operation is defined as a component or group of components that is disposed of or is classified as held for sale and represents a strategic shift that has or will have a major effect on an entity's operations and financial results. A strategic shift could include a disposal of a major geographical area of operations, a major line of business, a major equity method investment or other major part of the entity. A component comprises operations and cash flows that can be clearly distinguished, operationally and for financial reporting purposes, from the rest of the entity including a reportable segment, an operating segment, a reporting unit, a subsidiary or an asset group. The update no longer precludes presentation as a discontinued operation if there are operations and cash flows of the component that have not been eliminated from the reporting entity's ongoing operations or if there is significant continuing involvement with a component after its disposal. The updated guidance is effective on a prospective basis for interim and annual periods on or after December 15, 2014, which for the Company is January 1, 2015. In general, this guidance is likely to result in fewer disposals of assets qualifying as discontinued operations, but will ultimately be based on the Company's future disposal activity.

Revenue from Contracts with Customers

In May 2014, the FASB issued a comprehensive new revenue recognition standard that supersedes most current revenue recognition guidance, including industry-specific guidance. The core principle of the new guidance is that a company will recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled in exchange for those goods or services. The guidance is effective for annual and interim periods beginning December 15, 2016, which for the Company is January 1, 2017. Early adoption is not permitted. The new guidance allows for either full retrospective adoption, meaning the guidance is applied to all of the periods presented, or modified retrospective adoption, meaning the standard is applied only to the most current period presented in the financial statements. The Company is evaluating the new guidance, the best transition method and the impact the new standard will have on its results of operations, financial position or cash flows.

Accounting for Stock-based Compensation with Performance Targets

In June 2014, the FASB issued guidance for the accounting for stock-based compensation tied to performance targets. The amendments clarify that a performance target that affects vesting of a share-based payment and that could be achieved after the requisite service period is a performance condition. As a result, the target is not reflected in the estimation of the award's grant date fair value and compensation cost would be recognized over the required service period, if it is probable that the performance condition will be achieved. The updated guidance may be applied either: (a) prospectively to all awards granted or modified after the effective date or (b) retrospectively to all awards with performance targets that are outstanding as of the beginning of the earliest annual period presented in the financial statements and to all new or modified awards thereafter. The updated guidance is effective for annual periods and interim periods within those annual periods beginning after December 15, 2015, which for the Company is January 1, 2016. Early adoption is permitted. The Company is evaluating the impact the updated guidance will have on its results of operations, financial position or cash flows.

Disclosures of Uncertainties about an Entity's Ability to Continue as a Going Concern

In August 2014, the FASB issued guidance that explicitly requires an entity's management to assess the entity's ability to continue as a going concern. The new guidance requires an entity to evaluate, at each interim and annual period, whether there are conditions or events that raise substantial doubt about the entity's ability to continue as a going concern within one year after the date the financial statements are issued (or are available to be issued) and to provide related disclosures, if applicable. The new guidance is effective for annual periods ending after December 15, 2016 and for interim and annual periods thereafter, which for the Company is January 1, 2017. Early adoption is permitted. The adoption of this updated guidance is not expected to have a material impact on results of operations, financial position or cash flows.

Hybrid Financial Instruments Issued in the Form of a Share

In November 2014, the FASB updated the derivatives and hedging guidance requiring issuers of, or investors in, hybrid financial instruments to determine whether the nature of the host contract is more akin to a debt instrument or an equity instrument by considering the economic characteristics and risks of the entire hybrid financial instrument, including the embedded derivative feature that is being evaluated for separate accounting from the host contract. This update should be applied on a modified retrospective basis to hybrid financial instruments issued in the form of a share that exist at the beginning of an entity's fiscal year of adoption. The updated guidance is effective for annual periods and interim periods within those annual periods beginning after December 15, 2015, which for the Company is January 1, 2016. Early adoption is permitted. The adoption of this updated guidance is not expected to have a material impact on results of operations, financial position or cash flows.

Extraordinary and Unusual Items

In January 2015, the FASB issued guidance that eliminates the concept of an extraordinary item. As a result, an entity will no longer segregate an extraordinary item and present it separately from the results of ordinary operations or separately disclose income taxes or earnings per share information applicable to an extraordinary item. The presentation and disclosure guidance for items that are unusual in nature or occur infrequently has been retained and expanded to include items that are both unusual in nature and infrequently occurring. The updated guidance is effective for annual periods and interim periods within those annual periods beginning after December 15, 2015, which for the Company is January 1, 2016. Early adoption is permitted. The updated guidance may be applied prospectively or retrospectively to all periods presented in the financial statements. The adoption of this updated guidance is not expected to have a material impact on results of operations, financial position or cash flows.

Note 3: Acquisitions

During 2014, the Company acquired one regulated water and wastewater system for a total aggregate purchase price of $520. Assets acquired, principally plant, totaled $742 and liabilities assumed totaled $222.

Note 4: Utility Plant

The components of utility plant by category at December 31 are as follows:

	Range of Remaining Useful Lives	2014	2013
Land and other non-depreciable assets	-	$ 9,686	$ 9,664
Sources of supply	34 to 75 Years	52,639	51,061
Treatment and pumping	4 to 53 Years	104,442	117,433
Transmission and distribution	40 to 72 Years	301,212	278,368
Services, meters and fire hydrants	34 to 84 Years	114,101	109,542
General structures and equipment	5 to 52 Years	46,031	48,600
Wastewater assets	5 to 50 Years	6,646	4,043
Construction work in progress	-	9,513	20,596
		644,270	639,307
Less: Accumulated depreciation		(114,259)	(120,270)
		$ 530,011	$ 519,037

The provision for depreciation expressed as a percentage of the aggregate average depreciable asset balances was 2.38% and 2.40% in 2014 and 2013, respectively. The Company records depreciation in conformity with amounts approved by state regulators after regulatory review of information the Company submits to support its estimates of the assets remaining lives.

Note 5: Regulatory Assets and Liabilities

Regulatory Assets

Regulatory assets represent costs that are expected to be fully recovered from customers in future rates. Except for income taxes, regulatory assets are excluded from the Company's rate base and generally do not earn a return.

The components of regulatory assets are as follows:

	2014	2013
Income taxes recoverable through rates	$ 3,721	$ 4,104
Programmed maintenance expense	7,755	5,325
Debt and preferred stock expense	1,592	1,663
Bluegrass water project	1,484	1,541
Other	875	1,179
	$ 15,427	$ 13,812

The Company has recorded a regulatory asset for additional revenues expected to be realized as the tax effects of temporary differences reverse. These temporary differences are primarily related to the difference between book and tax depreciation on property placed in service before the adoption by the Commission of full normalization for rate-making purposes. The regulatory asset for income taxes recoverable through rates is net of the reduction expected in future revenues as deferred taxes previously provided, attributable to the difference between the state and federal income tax rates under prior law and the current statutory rates, reverse over the average remaining service lives of the related assets.

Programmed maintenance costs are deferred and amortized to current operations on a straight-line basis over a fifteen year period, as authorized by the Commission in their determination of rates charged for service.

Debt expense is amortized over the lives of the respective issues. Unamortized debt expense is deferred and amortized to the extent it will be recovered through future service rates. Expenses of preferred stock issues without sinking fund provisions are amortized over the life of the issuance, whereas expenses of issues with sinking fund provisions are charged to operations as shares are retired.

The Company has recorded a regulatory asset for the Bluegrass water project source of supply costs in the amount of $2,283 to be amortized over a forty year period.

Other regulatory assets are mostly comprised of deferred rate case expense, certain employee related benefits and deferred waste disposal costs.

Regulatory Liabilities

Regulatory liabilities represent amounts that are expected to be refunded to customers in future rates or amounts recovered from customers in advance of incurring the costs.

The components of regulatory liabilities are as follows:

	2014	**2013**
Cost of removal	$ 16,924	$ 15,764
Debt extinguishment	-	21
	$ 16,924	$ 15,785

Cost of removal represents amounts where the Company recovers retirement costs through rates during the life of the associated assets and before the costs are incurred. These amounts result in a regulatory liability being reported based on the amounts previously recovered through customer rates, until the costs to retire those assets are incurred.

Debt extinguishment relates to the 4.75% note payable due 2014 issued to AWCC, which was redeemed in October, 2007 by the Company. As agreed with the Regulators, the difference between the book value of the note and the cash consideration required to extinguish it was deferred as a regulatory liability. The regulatory liability of $827 is amortized as a component of net interest expense through 2014.

Note 6: Long-Term Debt

The components of long-term debt at December 31 are as follows:

	Rate	Weighted Average Rate	Maturity Date	2014	2013
General mortgage bonds	6.96%-7.15%	7.03%	2023-2028	$ 23,500	$ 23,500
Notes payable to affiliated company	4.00%-6.59%	5.88%	2037-2040	172,249	172,249
Preferred stock with mandatory redemption requirements	8.47%	8.47%	2036	4,500	4,500
Total long-term debt				$ 200,249	$ 200,249

The general mortgage bonds are issuable in series. No bonds senior to the general mortgage bonds may be issued so long as the general mortgage bonds are outstanding. Based on the calculation methodology specified by debt agreements, the amount of bonds authorized is limited only to the extent that long-term debt cannot exceed 65% of total capitalization and adjusted net income of the Company must be equal to or greater than 1.5 times the aggregate annual interest charges on all long-term debt of the Company. At December 31, 2014, long-term debt was 57% of total capitalization and net income excluding gains or losses on property sales, amortization of debt issuance costs, interest on long-term debt, and provision for income taxes was 3.1 times the aggregate annual interest charges on all long-term debt. General mortgage bonds are collateralized by utility plant.

The senior notes payable to affiliate are unsecured and were issued to American Water Capital Corporation (“AWCC”), a subsidiary of AWW, for the principal amount. AWCC provided the funding for these notes by issuing senior notes to institutional investors at a price equal to the principal amount.

In 2013, the Company issued a $7,859 long-term note payable to AWCC, at a rate of 4.00% due in 2037. The proceeds were used to pay down outstanding short-term debt.

Maturities of long-term debt, including sinking funds, will amount to $0 in 2015 through 2019, and $200,249 thereafter. Preferred stock agreements contain provisions for redemption at various prices on thirty day notice at the Company’s discretion. In the event of voluntary liquidation, the 8.47% series is redeemable at $100 per share plus the make-whole premium, together with accrued dividends.

Note 7: Short-Term Debt

The Company maintained a line of credit through AWCC of $40,000 and $30,000 at December 31, 2014 and 2013, respectively. The Company may borrow from, or invest in, the line of credit. No compensating balances are required under the agreements. Funds were primarily used for short-term operating needs. Short-term borrowings are presented as notes payable-affiliated company in the accompanying balance sheets

At December 31, 2014 and 2013, there was $22,489 and $20,174 of short-term borrowings outstanding, respectively. The weighted average annual interest rates on the borrowings at December 31, 2014 and 2013 were 0.32% and 0.40%, respectively.

AWW, through AWCC, has committed to make additional financing available to the Company, as needed, to pay its obligations as they come due.

Note 8: General Taxes

Components of general tax expense for the years presented in the statements of income are as follows:

	2014	2013
Property	$ 5,116	$ 4,419
Payroll	489	483
Other	157	156
	$ 5,762	$ 5,058

Note 9: Income Taxes

Components of income tax expense for the years presented in the statements of income are as follows:

	2014	2013
State income taxes:		
Current	$ 743	$ 578
Deferred		
Current	(17)	(18)
Non-current	662	512
	1,388	1,072
Federal income taxes:		
Current	3,090	171
Deferred		
Current	(91)	(91)
Non-current	4,994	7,331
Amortization of deferred investment tax credits	(85)	(85)
	7,908	7,326
Total income taxes	$ 9,296	$ 8,398

The primary components of the net deferred tax liability of $70,033 and $64,908 at December 31, 2014 and December 31, 2013, respectively, include basis differences in utility plant, partially offset by advances and contributions.

No valuation allowances were required on deferred tax assets at December 31, 2014 and 2013, as management believes it is more likely than not that deferred tax assets will be realized.

As of December 31, 2014 and 2013, the reserve for uncertain tax position is $2,635 and $3,359, respectively, excluding accrued interest and penalties. The Company does not expect a material change in this estimate in the next twelve months. The reserve for uncertain tax positions could increase or decrease for things such as the expiration of statutes of limitations, audit settlements, or tax examination activities.

The Company recognizes interest and penalties related to income tax matters in income tax expense. The Company recognized a net benefit of $1 and $20 for 2014 and 2013, respectively, related to interest and penalties on income tax matters in income tax expense.

The federal tax years that remain open are 2012 to 2013, with the earliest year's statute expiring in 2015. The Company is subject to state taxes. The state tax returns from 2010 to 2013 are currently open and will not close until the respective statutes of limitations expire. The statute of limitations will begin to expire in 2015.

Note 10: Employee Benefit Plans

Savings Plan for Employees

The Company maintains a 401(k) savings plan, sponsored by AWW that allows employees to save for retirement on a tax-deferred basis. Employees can make contributions that are invested at their direction in one or more funds. The Company makes matching contributions that are based on a percentage of an employee's contribution, subject to certain limitations. Due to the Company's discontinuing new entrants into the defined benefit pension plan, on January 1, 2006 the Company began providing an additional 5.25% of base pay defined contribution benefit for union employees hired on or after January 1, 2001 and non-union employees hired on or after January 1, 2006. The Company expensed contributions to the plans totaling $261 and $338 for 2014 and 2013, respectively. All of the Company's contributions are invested in one or more funds at the direction of the employee.

Note 11: Postretirement Benefits

Pension Benefits

The Company participates in a Company funded defined benefit pension plan sponsored by AWW covering eligible employees hired before January 1, 2006. Benefits under the plan are based on the employees' years of service and compensation. The pension plan was closed for most employees hired on or after January 1, 2006. Union employees hired on or after January 1, 2001 had their accrued benefit frozen and will be able to receive this benefit as a lump sum upon termination or retirement. Pension cost of the Company is based on an allocation from AWW of the total cost related to the plan. The allocation is based upon the Company's participants' pensionable earnings as a percentage of AWW's total plan pensionable earnings. Information regarding accumulated and projected benefit obligations is not prepared at the subsidiary level. The Company was allocated costs of $314 and $1,044 for 2014 and 2013, respectively.

AWW's funding practice is to contribute at least the greater of the minimum amount required by the Employee Retirement Income Security Act of 1974 or the normal cost. Further, AWW will consider additional contributions if needed to avoid "at risk" status and benefit restrictions under the Pension Protection Act of 2006. AWW may also consider increased contributions based on other financial requirements and the plan's funded position. Pension contributions of the Company are based on an allocation from AWW of the total contributions related to the plan. Contributions are allocated to the Company from AWW based upon the Company's participants' pensionable earnings as a percentage of AWW's total plan pensionable earnings. The Company made contributions to the AWW plan of $619 in 2014 and $1,149 in 2013. The Company expects to contribute $496 to the AWW plan in 2015.

Postretirement Benefits Other Than Pensions

The Company participates in a Company-funded plan, sponsored by AWW, that provides varying levels of medical and life insurance to eligible retirees and certain health care benefits for retired employees and their dependents. The retiree welfare plans are closed for union employees hired on or after January 1, 2006, and non-union employees hired on or after January 1, 2002.

Costs of the Company are based on an allocation from AWW of the total cost related to the plan. The allocation is based upon the Company's covered participants as a percentage of AWW's total plan covered participants. Information regarding accumulated and projected benefit obligations is not prepared at the subsidiary level. The Company was allocated costs and made contributions of $312 and $722 for 2014 and 2013, respectively.

The Company's policy is to fund postretirement benefits costs accrued. The Company expects to contribute $661 to the AWW plan in 2015.

Note 12: Stock Based Compensation

Stock Options and Restricted Stock Units
In 2014 and 2013, AWW granted restricted stock units, both with and without performance conditions, and stock options to certain employees of the Company under the AWW 2007 Omnibus Equity Compensation Plan ("Omnibus Plan"). The restricted stock units without performance conditions vest ratably over the three-year service period beginning January 1 of the year of the grant. The restricted stock units with performance conditions vest ratably over the three year performance period beginning January 1 of each year (the "Performance Period"). Distribution of the performance shares is contingent upon the achievement of certain thresholds over the Performance Period. The thresholds are based on achievement of internal performance measures and separately certain market factors over the Performance Periods. The stock options vest ratably over a three year service period beginning January 1, 2014 and 2013, respectively.

The grant date fair value of restricted stock unit awards with performance conditions is amortized through expense over the requisite service period using the graded-vesting method. The value of stock options and the restricted stock unit awards without performance conditions at the date of the grant is amortized through expense over the requisite service period using the straight-line method.

Costs of the Company are based on the cost of the Company's employees participating in the AWW Omnibus Plan. The Company recorded compensation expense of $73 and $71, included in operation and maintenance expense, during the years ended December 31, 2014 and 2013, respectively. As the Company does not reimburse the cost of the awards to AWW, the offsetting entry to paid-in-capital is a capital contribution from AWW.

Employee Stock Purchase Plan
Under AWW's Nonqualified Employee Stock Purchase Plan ("ESPP"), the Company's employees can use payroll deductions to acquire AWW common stock at the lesser of 90% of the fair market value of a) the beginning or b) the end of each three-month purchase period. AWW's ESPP is considered compensatory. The Company's costs are based on an allocation

from AWW of the total cost for the Company's employees in the plan. Compensation costs of $10 and $9 were included in operation and maintenance expense for the years ended December 31, 2014 and 2013, respectively. As the Company does not reimburse the cost of the awards to AWW, the offsetting entry to paid-in capital is a capital contribution from AWW.

Note 13: Related Party Transactions

American Water Works Service Company, Inc. ("AWWS"), a subsidiary of AWW, provides certain management services to the Company (administration, accounting, data processing, engineering, etc.) and other operating water companies in the AWW system on an at-cost, not-for-profit basis in accordance with a management and service agreement.

Purchases of such services by the Company were accounted for as follows:

	2014	2013
Included in operation and maintenance expense as a charge against income	$ 8,776	$ 9,164
Capitalized primarily in utility plant	2,217	2,947
	$ 10,993	$ 12,111

The Company provided workspace for certain associates of AWWS. Charges for direct costs and indirect overhead costs associated with these associates are billed to AWWS on an at-cost, not for profit basis, which amounted to $120 in 2014 and 2013.

The Company maintains a line of credit through AWCC. The Company also participates in AWCC's centralized treasury function whereby the Company transfers its cash to AWCC and the Company's checks are issued out of AWCC. Under this arrangement, available cash is used to pay-down the line of credit and issued checks increase the Company's line of credit balance. The Company paid AWCC fees of $72 in 2014 and $67 in 2013 and interest expense on borrowings of $51 in 2014 and $46 in 2013. Interest expense on long-term debt due to AWCC, net of capitalized amount, was $10,120 in 2014 and $10,002 in 2013. Accrued interest on the accompanying balance sheets included interest due to AWCC of $1,746 as of December 31, 2014 and 2013.

The Company pays dividends to AWW on a periodic basis. The amount of the dividend is based on a percentage of net income adjusted for certain items.

KENTUCKY-AMERICAN WATER COMPANY, INC.
Notes to Financial Statements
December 31, 2014 and 2013
(Dollars in thousands)

Note 14: Fair Values of Financial Instruments

Fair Value Measurements

To increase consistency and comparability in fair value measurements, FASB guidance establishes a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value into three levels as follows:

- Level 1 – quoted prices (unadjusted) in active markets for identical assets or liabilities that the Company has the ability to access as of the reporting date. Financial assets and liabilities utilizing Level 1 input include active exchange-trade equity securities, exchange-based derivatives, mutual funds, and money market funds.

- Level 2 – inputs other than quoted prices included within Level 1 that are directly observable for the asset or liability or indirectly observable through corroboration with observable market data. Financial assets and liabilities utilizing Level 2 inputs include fixed income securities, non-exchanged-based derivatives, commingled investment funds not subject to purchase, and sale restrictions and fair-value hedges.

- Level 3 –unobservable inputs, such as internally-developed pricing models for the asset or liability due to little or no market activity for the asset or liability. Financial assets and liabilities utilizing Level 3 inputs include infrequently-traded non- exchange-based derivatives and commingled investment funds subject to purchase and sale restrictions.

Current assets and current liabilities: The carrying amounts reported in the Balance Sheets for current assets and current liabilities approximate their fair values.

The following methods and assumptions were used by the Company in estimating its fair value disclosures for financial instruments:

Preferred stock with mandatory redemption requirements and long-term debt: The fair values of preferred stock with mandatory redemption requirements and long-term debt are categorized within the fair value hierarchy based on the inputs that are used to value each instrument. The fair value of long-term debt classified as Level 1 is calculated using quoted prices in active markets. Level 2 instruments are valued using observable inputs and Level 3 instruments are valued using observable and unobservable inputs. The fair values of instruments classified as Level 2 and 3 are determined by a valuation model that is based on a conventional discounted cash flow methodology and utilizes assumptions of current market rates. As a majority of the Company's debts do not trade in active markets, the Company calculated a base yield curve using a risk-free rate (a U.S. Treasury securities yield curve) plus a credit spread that is based on the following two factors: an average of the Company's own publicly-traded debt securities and the current market rates for U.S. Utility BBB+ debt securities. The Company used these yield curve assumptions to derive a base yield for the Level 2 and Level 3 securities. Additionally, the Company adjusted the base yield for specific features of the debt securities including call features, coupon tax treatment and collateral for the Level 3 instruments.

The carrying amounts and fair values of the financial instruments are as follows:

		At Fair Value as of December 31, 2014			
	Carrying Amount	Level 1	Level 2	Level 3	Total
Preferred stock with mandatory redemption requirements	$ 4,500	$ -	$ -	$ 6,207	$ 6,207
Long-term debt (excluding capital lease obligations)	195,749	-	92,808	141,023	233,831

		At Fair Value as of December 31, 2013			
	Carrying Amount	Level 1	Level 2	Level 3	Total
Preferred stock with mandatory redemption requirements	$ 4,500	$ -	$ -	$ 5,397	$ 5,397
Long-term debt (excluding capital lease obligations)	195,749	-	82,554	137,235	219,789

Note 15: Leases

The Company has entered into operating leases involving certain facilities and equipment. Rental expenses under operating leases were $33 in 2014 and $126 in 2013.

At December 31, 2014, the minimum annual future rental commitments under operating leases that have initial or remaining non-cancelable lease terms in excess of one year are $4 in 2015, $1 per year in 2016 through 2019 and $21 thereafter.

Note 16: Commitments and Contingencies

Commitments have been made in connection with certain construction programs. The estimated capital expenditures required under legally binding contractual obligations amounted to $4,174 at December 31, 2014.

The Company has entered into certain service agreements in excess of one year duration. As of December 31, 2014 the future annual commitments under these agreements are estimated to be $65 in 2015 through 2017, with none thereafter.

The Company is also routinely involved in legal actions incident to the normal conduct of its business. At December 31, 2014, the Company has not identified any loss contingencies that are either probable or reasonably possible.

Note 17: Subsequent Events

The Company performed an evaluation of subsequent events for the accompanying financial statements through March 27, 2015, the date this report was issued, to determine whether the circumstances warranted recognition and disclosure of those events or transactions in the financial statements as of December 31, 2014.

KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2015-00418
ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

Witness: Scott W. Rungren

24. Reference the Kentucky American Water application generally. For the past ten years provide the dates and amount of:

a. cash dividend payments paid to American Water by Kentucky American Water and,

b. the cash equity infusions made by American Water into Kentucky American Water.

Response:

a - b. Please refer to the attachment.

Kentucky-American Water Company
Dividend Payments & Equity Infusions
AGDR1_NUM024

Date	Note	Dividend Payments
2006	1	$ 2,006,260.00
3/31/2007		971,782.42
6/29/2007		235,108.65
9/28/2007		1,050,151.97
12/31/2007		1,912,217.02
3/31/2008		1,097,173.70
6/30/2008		956,108.51
9/30/2008		1,394,977.99
12/31/2008		2,554,847.33
3/31/2009		1,708,456.19
6/30/2009		1,489,021.45
9/30/2009		2,006,260.48
12/31/2009		2,899,673.35
3/31/2010		1,473,347.54
6/30/2010		1,818,173.56
9/30/2010		2,366,760.41
12/31/2010		3,275,847.19
3/31/2011		2,460,803.87
6/30/2011		1,551,717.09
9/30/2011		2,445,129.96
12/31/2011		7,115,955.14
3/31/2012		5,266,433.76
6/30/2012		1,426,325.81
9/30/2012		3,322,868.92
12/31/2012		4,686,499.09
3/31/2013		1,426,325.81
6/28/2013		1,332,282.35
9/27/2013		1,880,869.20
12/27/2013		3,652,021.03
3/31/2014		2,727,260.34
6/27/2014		2,037,608.30
9/26/2014		2,727,260.34
12/29/2014		4,357,346.98
3/31/2015		2,680,238.61
6/29/2015		2,272,716.95
9/29/2015		2,304,064.77
12/31/2015		4,028,194.87

Date	Note	Equity Infiusions
2006	2	$ 8,000,000
2007		-
3/31/2008		8,000,000
6/27/2008		8,000,000
3/31/2009		22,500,000
11/30/2009		10,000,000
5/31/2010		9,000,000
12/31/2010		9,000,000
7/31/2012		4,000,000

Note:
1) Dividend amount shown is total for the year. Quarterly breakdown not available.
2) Equity infusion shown is total for the year. Specific date was not available.

KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2015-00418
ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

Witness: Dr. James H. Vander Weide

25. Reference the testimony and schedules of Dr. James H. Vander Weide to answer the following questions:

a. Provide a copy of Dr. James H. Vander Weide's testimony and appendices in Microsoft Word.

b. Provide copies of all source documents, articles, cited documents listed in footnotes, regulatory decisions, work papers, and other sources used in the development and preparation of the testimony and appendices of Dr. James H. Vander Weide.

c. Provide an electronic copy of Schedules 1-9 of Dr. James H. Vander Weide in Microsoft Excel, with all data and equations left intact.

d. Provide: (1) Microsoft Excel copies of all data, tables, charts, source documents, regression results and statistical tests, and work papers used in the development and preparation of the Schedules of the testimony and appendices of Dr. James H. Vander Weide; and (2) an index with files names and/or page or tab numbers associated with the materials provided in (1). For the Microsoft Excel copies of the data, work papers, regressions, and statistical tests, keep all formulas intact.

e. With respect to page 19, line 5 to page 6, line 20, line 22, and Appendix 2, provide copies of all theoretical and empirical studies known to Dr. Vander Weide which compare and contrast the quarterly and annual DCF models.

f. With respect to page 24, lines 10-13, provide: (1) a copy of the updated study by State Street Financial Advisers; and (2) copies of the work papers, data, and analyses used in the updated study. Provide the data in Microsoft Excel format, with all data and formulas in intact.

g. With respect to page 25, line 3 to page 27, line 2, provide: (1) the total flotation costs (direct expenses as well as market pressure costs) of the equity issued by American Water on behalf of Kentucky American Water over the past five years and/or expected equity issuance in the test year; (2) the flotation costs allocated to Kentucky American Water for each of the past and projected equity issues.

h. With respect to page 27, lines 9-17, indicate: (1) the water companies eliminated by each of the screens applied to the companies listed in the Value Line Investment Survey; (2) the reason each was eliminated.

i. With respect to page 30, lines 7-17 indicate: (1) all companies considered as part of the natural gas industry groups; (2) what gas companies were eliminated by each of the screens applied to the companies listed in the Value Line Investment Survey; (3) the reason each was eliminated.

j. With respect to pages 31-35 and Schedule 3, provide: (1) copies of all source documents, data, and work papers used in Dr. Vander Weide's ex ante risk premium study; (2) an electronic version (Microsoft Excel) of the data used in the analysis, with all data and equations left intact; and (3) copies of the regressions run on the data.

k. With respect to pages 36-39 Schedules 4, 5, and 6, provide: (1) copies of all source documents, data, and work papers used in Dr. Vander Weide's ex post risk premium study using the S&P 500, (2) the sources of the data items employed, (3) an electronic version (Microsoft Excel) of the data used in the analysis, with all data and equations left intact, and (4) copies of the regressions run on the data.

l. With respect to pages 40-49, and Schedules 7 and 8, provide: (1) all source documents, data, and work papers used in Dr. Vander Weide's CAPM study; (2) the sources of the data items employed; and (3) an electronic version (Microsoft Excel) of the data used in the analysis, with all data and equations left intact.

m. With respect to page 51, provide: (1) all source documents, data, and work papers used in the development of Table 3; and (2) an electronic version (Microsoft Excel) of the data used (1), with all data and equations left intact, and (4) copies of the regressions run on the data.

n. With respect to page 52, provide: (1) all source documents, data, and work papers used in the development of Table 4; and (2) an electronic version (Microsoft Excel) of the data used (1), with all data and equations left intact, and (4) copies of the regressions run on the data.

Response:

a. Dr. James H. Vander Weide's testimony and appendices in Microsoft Word are provided by e-mail from KAW counsel as the Commission's uploading process does not accept Word files.

b. To the extent to which they are available, copies of all source documents, articles, cited documents listed in footnotes, regulatory decisions, work papers, and other sources used in the development and preparation of the testimony and appendices of Dr. James H. Vander Weide are provided.

c. An electronic copy of Schedules 1-9 of Dr. James H. Vander Weide in Microsoft Excel, with all data and equations left intact, is provided (see Attachment to PSC 2nd Set, No. 77).

d. The requested data are provided in response to subpart c.

e. Dr. Vander Weide's use of the quarterly DCF model is based on the theoretical discussion contained in Appendix 2 of his direct testimony. Dr. Vander Weide does not rely on other studies that compare quarterly and annual DCF models, and he does not maintain copies of articles that discuss the use of quarterly and annual DCF models.

f. A copy of the updated study by State Street Financial Advisers is provided in response to subpart b. Dr. Vander Weide does not have the data requested in part (2) of this request because State Street's advanced research center conducted the study.

g. (1) American Water Works issues equity on behalf of its entire enterprise, not on behalf of its subsidiaries. However, American Water Works will not recover its flotation costs if its flotation costs are not included in determining its subsidiaries' revenue requirements. With regard to American Water Works' flotation costs, Dr. Vander Weide is not aware of any common stock offerings in the past five years. However, Dr. Vander Weide is aware that American Water Works issued shares in June, August, and November 2009. With regard to the 2009 share offerings, the information available in SEC filings indicates that the total expenses as a percent of net proceeds in the three offerings were 3.7 percent, 3.3 percent, and 3.3 percent, respectively; and flotation costs as a percent of the pre-issue price in each offering were 4.9 percent, 6.5 percent, and 6.17 percent, respectively (see **Table 1**). As described in his direct testimony and in, Appendix 3, a flotation cost adjustment is required whether or not a company has issued stock during the test year:

> Previously incurred flotation costs have not been recovered in previous rate cases; rather, they are a permanent cost associated with past issues of common stock. Just as an adjustment is made to the embedded cost of debt to reflect previously incurred debt issuance costs (regardless of whether additional bond issuances were made in the test year), so should an adjustment be made to the cost of equity regardless of whether additional stock was issued during the test year.

Table 1
American Water Works Flotation Costs for Equity Issuances
(Source of Data: Sec.gov)

AWK June 10, 2009 Public Offering	**Price per Share**	**No. of shares**	**Total**
Closing Price at Date Just Prior to Issuance (06/04/2009)	17.4900		
Public Offering Price	17.2500	14,500,000	$ 250,125,000
Underwriting discounts, commissions	0.5175	14,500,000	$ 7,503,750
Proceeds before other expenses to the Company	16.7325	14,500,000	$ 242,621,250
Other Expenses			$ 1,421,250
Total Commissions, expenses			$ 8,925,000
Net proceeds	16.63	14,500,000	$ 241,200,000
All expenses as percent of proceeds			3.7%
Flotation costs as % of pre-issue price			4.9%
AWK August 14, 2009 Public Offering	**Price per Share**	**No. of shares**	**Total**
Closing Price at Date Just Prior to Issuance (08/13/2009)	19.3400		
Public Offering Price	19.2500	35,000,000	$ 673,750,000
Underwriting discounts, commissions	0.5775	35,000,000	$ 20,212,500
Proceeds before other expenses to the Company	18.6725	35,000,000	$ 653,537,500
Other Expenses			$ 470,000
Total Commissions, expenses			$ 20,682,500
Net proceeds	18.08	35,000,000	$ 632,855,000
Expenses as percent of proceeds			3.3%
Flotation costs as % of pre-issue price			6.5%
AWK November 18, 2009 Public Offering	**Price per Share**	**No. of shares**	**Total**
Closing Price at Date Just Prior to Issuance (11/17/2009)	21.6300		
Public Offering Price	21.6300	37,351,617	$ 807,915,476
Underwriting discounts, commissions	0.6489	37,351,617	$ 24,237,464
Proceeds before other expenses to the Company	20.9811	37,351,617	$ 783,678,011
Other Expenses			$ 505,000
Total Commissions, expenses			$ 24,742,464
Net proceeds	20.32	37,351,617	$ 758,935,547
Expenses as percent of proceeds			3.3%
Flotation costs as % of pre-issue price			6.1%

(2) Dr. Vander Weide does not have any information with regard to the flotation costs allocated to KAWC.

h. No water companies were eliminated by each of the screens applied to the companies listed in the Value Line Investment Survey.

i. (1) Dr. Vander Weide considered all companies included in the Value Line natural gas utility group. (2) Dr. Vander Weide’s Excel work papers indicate which companies were eliminated by the screens applied to the companies; (3) Dr. Vander Weide’s Excel work papers indicate the reason each company was eliminated.

j. (1)The requested data are shown in the Excel work papers provided; these data are downloaded electronically and are as shown; (2) the requested Excel files are provided in Dr. Vander Weide’s work papers; and (3) the regressions run on the data are provided in Dr. Vander Weide’s work papers.

k. With respect to pages 36-39 Schedules 4, 5, and 6, provide: (1) the data used in Dr. Vander Weide’s studies is shown on his schedules and provided in his work papers; copies of all source documents are not readily available; (2) the sources of the data are described in Appendix 5; (3) the requested Excel data is provided in Dr. Vander Weide’s work papers; and (4) NA.

l. The requested data are provided in Dr. Vander Weide’s work papers.

m. Please see the attached Excel file.

n. (1) As stated in his testimony, Dr. Vander Weide obtained the information provided in Table 4 from KAWC’s filing, *In the Matter of the Motion of American Water Works Company, Inc. and Kentucky-American Water Company for Release of Conditions Ordered in Case No. 2006 – 00197*, October 9, 2014, at 7 – 9. Please see the Company’s October 9, 2014 filing in PSC Case No. 2014-00362.” (2) an Excel file is attached; and (3) NA.

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THE RELATIONSHIP BETWEEN RETURN AND MARKET VALUE OF COMMON STOCKS*

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This study examines the empirical relationship between the return and the total market value of NYSE common stocks. It is found that smaller firms have had higher risk adjusted returns, on average, than larger firms. This 'size effect' has been in existence for at least forty years and is evidence that the capital asset pricing model is misspecified. The size effect is not linear in the market value; the main effect occurs for very small firms while there is little difference in return between average sized and large firms. It is not known whether size *per se* is responsible for the effect or whether size is just a proxy for one or more true unknown factors correlated with size.

1. Introduction

The single-period capital asset pricing model (henceforth CAPM) postulates a simple linear relationship between the expected return and the market risk of a security. While the results of direct tests have been inconclusive, recent evidence suggests the existence of additional factors which are relevant for asset pricing. Litzenberger and Ramaswamy (1979) show a significant positive relationship between dividend yield and return of common stocks for the 1936–1977 period. Basu (1977) finds that price-earnings ratios and risk adjusted returns are related. He chooses to interpret his findings as evidence of market inefficiency but as Ball (1978) points out, market efficiency tests are often joint tests of the efficient market hypothesis and a particular equilibrium relationship. Thus, some of the anomalies that have been attributed to a lack of market efficiency might well be the result of a misspecification of the pricing model.

This study contributes another piece to the emerging puzzle. It examines the relationship between the total market value of the common stock of a firm and its return. The results show that, in the 1936–1975 period, the common stock of small firms had, on average, higher risk-adjusted returns

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*This study is based on part of my dissertation and was completed while I was at the University of Chicago. I am grateful to my committee, Myron Scholes (chairman), John Gould, Roger Ibbotson, Jonathan Ingersoll, and especially Eugene Fama and and Merton Miller, for their advice and comments. I wish to acknowledge the valuable comments of Bill Schwert on earlier drafts of this paper.

than the common stock of large firms. This result will henceforth be referred to as the 'size effect'. Since the results of the study are not based on a particular theoretical equilibrium model, it is not possible to determine conclusively whether market value *per se* matters or whether it is only a proxy for unknown true additional factors correlated with market value. The last section of this paper will address this question in greater detail.

The various methods currently available for the type of empirical research presented in this study are discussed in section 2. Since there is a considerable amount of confusion about their relative merit, more than one technique is used. Section 3 discusses the data. The empirical results are presented in section 4. A discussion of the relationship between the size effect and other factors, as well as some speculative comments on possible explanations of the results, constitute section 5.

2. Methodologies

The empirical tests are based on a generalized asset pricing model which allows the expected return of a common stock to be a function of risk β and an additional factor ϕ, the market value of the equity.[1] A simple linear relationship of the form

$$E(R_i)=\gamma_0+\gamma_1\beta_i+\gamma_2[(\phi_i-\phi_m)/\phi_m], \tag{1}$$

is assumed, where

$E(R_i)$ = expected return on security i,
γ_0 = expected return on a zero-beta portfolio,
γ_1 = expected market risk premium,
ϕ_i = market value of security i,
ϕ_m = average market value, and
γ_2 = constant measuring the contribution of ϕ_i to the expected return of a security.

If there is no relationship between ϕ_i and the expected return, i.e., $\gamma_2=0$, (1) reduces to the Black (1972) version of the CAPM.

Since expectations are not observable, the parameters in (1) must be estimated from historical data. Several methods are available for this purpose. They all involve the use of pooled cross-sectional and time series regressions to estimate γ_0, γ_1, and γ_2. They differ primarily in (a) the assumption concerning the residual variance of the stock returns (homoscedastic or heteroscedastic in the cross-sectional), and (b) the treatment of the errors-in-variables problem introduced by the use of estimated betas in (1). All methods use a constrained optimization procedure, described in Fama (1976, ch. 9), to generate minimum variance (m.v.) portfolios with mean returns γ_i, $i=0,\ldots,2$. This imposes certain constraints on the portfolio weights, since from (1)

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[1] In the empirical tests, Φ_i and Φ_m are defined as the market proportion of security i and average market proportion, respectively. The two specifications are, of course, equivalent.

$$E(R_p)\equiv\gamma_i=\gamma_0\sum_j w_j+\gamma_1\sum_j w_j\beta_j + \gamma_2\left[\left(\sum_j w_j\phi_j-\phi_m\sum_j w_j\right)\Big/\phi_m\right], \qquad i=0,\ldots,2. \tag{2}$$

where the w_j are the portfolio proportions of each asset j, $j=1,\ldots,N$. An examination of (2) shows that $\hat{\gamma}_0$ is the mean return of a standard m.v. portfolio $(\sum_j w_j=1)$ with zero beta and $\phi_p\equiv\sum_j w_j\phi_j=\phi_m$ [to make the second and third terms of the right-hand side of (2) vanish]. Similarly, $\hat{\gamma}_1$ is the mean return on a zero-investment m.v. portfolio with beta of one and $\phi_p=0$, and $\hat{\gamma}_2$ is the mean return on a m.v. zero-investment, zero-beta portfolio with $\phi_p=\phi_m$. As shown by Fama (1976, ch. 9), this constrained optimization can be performed by running a cross-sectional regression of the form

$$R_{it}=\gamma_{0t}+\gamma_{1t}\beta_{it}+\gamma_{2t}[(\phi_{it}-\phi_{mt})/\phi_{mt}]+\varepsilon_{it}, \qquad i=1,\ldots,N, \tag{3}$$

on a period-by-period basis, using estimated betas $\hat{\beta}_{it}$ and allowing for either homoscedastic or heteroscedastic error terms. Invoking the usual stationarity arguments the final estimates of the gammas are calculated as the averages of the T estimates.

One basic approach involves grouping individual securities into portfolios on the basis of market value and security beta, reestimating the relevant parameters (beta, residual variance) of the portfolios in a subsequent period, and finally performing either an ordinary least squares (OLS) regression [Fama and MacBeth (1973)] which assumes homoscedastic errors, or a generalized least squares (GLS) regression [Black and Scholes (1974)] which allows for heteroscedastic errors, on the portfolios in each time period.[2] Grouping reduces the errors-in-variables problem, but is not very efficient because it does not make use of all information. The errors-in-variables problem should not be a factor as long as the portfolios contain a reasonable number of securities.[3]

Litzenberger and Ramaswamy (1979) have suggested an alternative method which avoids grouping. They allow for heteroscedastic errors in the cross-section and use the estimates of the standard errors of the security betas as estimates of the measurement errors. As Theil (1971, p. 610) has pointed out, this method leads to unbiased maximum likelihood estimators for the gammas as long as the error in the standard error of beta is small and the standard assumptions of the simple errors-in-variables model are met. Thus, it is very important that the diagonal model is the correct specification of the return-generating process, since the residual variance assumes a critical position in this procedure. The Litzenberger–Ramaswamy method is superior from a theoretical viewpoint; however, preliminary work has shown that it leads to serious problems when applied to the model of this study and is not pursued any further.[4]

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[2] Black and Scholes (1974) do not take account of heteroscedasticity, even though their method was designed to do so.

[3] Black, Jensen and Scholes (1972, p. 116).

Instead of estimating equation (3) with data for all securities, it is also possible to construct arbitrage portfolios containing stocks of very large and very small firms, by combining long positions in small firms with short positions in large firms. A simple time series regression is run to determine the difference in risk-adjusted returns between small and large firms. This approach, long familiar in the efficient markets and option pricing literature, has the advantage that no assumptions about the exact functional relationships between market value and expected return need to be made, and it will therefore be used in this study.

3. Data

The sample includes all common stocks quoted on the NYSE for at least five years between 1926 and 1975. Monthly price and return data and the number of shares outstanding at the end of each month are available in the monthly returns file of the Center for Research in Security Prices (CRSP) of the University of Chicago. Three different market indices are used; this is in response to Roll's (1977) critique of empirical tests of the CAPM. Two of the three are pure common stock indices — the CRSP equally- and value-weighted indices. The third is more comprehensive: a value-weighted combination of the CRSP value-weighted index and return data on corporate and government bonds from Ibbotson and Sinquefield (1977) (henceforth 'market index').[5] The weights of the components of this index are derived from information on the total market value of corporate and government bonds in various issues of the *Survey of Current Business* (updated annually) and from the market value of common stocks in the CRSP monthly index file. The stock indices, made up of riskier assets, have both higher returns and higher risk than the bond indices and the 'market index'.[6] A time series of commercial paper returns is used as the risk-free rate.[7] While not actually constant through time, its variation is very small when compared to that of the other series, and it is not significantly correlated with any of the three indices used as market proxies.

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[4] If the diagonal model (or market model) is an incomplete specification of the return generating process, the estimate of the standard error of beta is likely to have an upward bias, since the residual variance estimate is too large. The error in the residual variance estimate appears to be related to the second factor. Therefore, the resulting gamma estimates are biased.

[5] No pretense is made that this index is complete; thus, the use of quotation marks. It ignores real estate, foreign assets, etc.; it should be considered a first step toward a comprehensive index. See Ibbotson and Fall (1979).

4. Empirical results

4.1. Results for methods based on grouped data

The portfolio selection procedure used in this study is identical to the one described at length in Black and Scholes (1974). The securities are assigned to one of twenty-five portfolios containing similar numbers of securities, first to one of five on the basis of the market value of the stock, then the securities in each of those five are in turn assigned to one of five portfolios on the basis of their beta. Five years of data are used for the estimation of the security beta; the next five years' data are used for the reestimation of the portfolio betas. Stock price and number of shares outstanding at the end of the five year periods are used for the calculation of the market proportions. The portfolios are updated every year. The cross-sectional regression (3) is then performed in each month and the means of the resulting time series of the gammas could be (and have been in the past) interpreted as the final estimators. However, having used estimated parameters, it is not certain that the series have the theoretical properties, in particular, the hypothesized beta. Black and Scholes (1974, p. 17) suggest that the time series of the gammas be regressed once more on the excess return of the market index. This correction involves running the time series regression (for $\hat{\gamma}_2$)

$$\hat{\gamma}_{2t} - R_{Ft} = \hat{\alpha}_2 + \hat{\beta}_2 (R_{mt} - R_{Ft}) + \hat{\varepsilon}_{2t}. \tag{4}$$

It has been shows earlier that the theoretical β_2 is zero. (4) removes the effects of a non-zero $\hat{\beta}_2$ on the return estimate $\hat{\gamma}_2$ and $\hat{\alpha}_2$ is used as the final estimator for $\hat{\gamma}_2 - R_F$. Similar corrections are performed for γ_0 and γ_1. The

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[6] Mean monthly returns and standard deviations for the 1926–1975 period are:

	Mean return	Standard deviation
'Market index'	0.0046	0.0178
CRSP value-weighted index	0.0085	0.0588
CRSP equally-weighted index	0.0120	0.0830
Government bond index	0.0027	0.0157
Corporate bond index	0.0032	0.0142

[7] I am grateful to Myron Scholes for making this series available. The mean monthly return for the 1926–1975 period is 0.0026 and the standard deviation is 0.0021.

derivations of the β_i, $i=0,\ldots,2$, in (4) from their theoretical values also allow us to check whether the grouping procedure is an effective means to eliminate the errors-in-beta problem.

The results are essentially identical for both OLS and GLS and for all three indices. Thus, only one set of results, those for the 'market index' with GLS, is presented in table 1. For each of the gammas, three numbers are reported: the mean of that time series of returns which is relevant for the test of the hypothesis of interest (i.e., whether or not $\hat{\gamma}_0$ and $\hat{\gamma}_1$ are different from the risk-free rate and the risk premium, respectively), the associated t-statistic, and finally, the estimated beta of the time series of the gamma from (4). Note that the means are corrected for the deviation from the theoretical beta as discussed above.

The table shows a significantly negative estimate for γ_2 for the overall time period. Thus, shares of firms with large market values have had smaller returns, on average, than similar small firms. The CAPM appears to be misspecified. The table also shows that γ_0 is different from the risk-free rate. As both Fama (1976, ch. 9) and Roll (1977) have pointed out, if a test does not use the true market portfolio, the Sharpe–Lintner model might be wrongly rejected. The estimates for γ_0 are of the same magnitude as those reported by Fama and MacBeth (1973) and others. The choice of a market index and the econometric method does not affect the results. Thus, at least within the context of this study, the choice of a proxy for the market portfolio does not seem to affect the results and allowing for heteroscedastic disturbances does not lead to significantly more efficient estimators.

Before looking at the results in more detail, some comments on econometric problems are in order. The results in table 1 are based on the 'market index' which is likely to be superior to pure stock indices from a theoretical viewpoint since it includes more assets [Roll (1977)]. This superiority has its price. The actual betas of the time series of the gammas are reported in table 1 in the columns labeled β_i. Recall that the theoretical values of β_0 and β_1 are zero and one, respectively. The standard zero-beta portfolio with return $\hat{\gamma}_0$ contains high beta stocks in short positions and low beta stocks in long positions, while the opposite is the case for the zero-investment portfolio with return $\hat{\gamma}_1$. The actual betas are all significantly different from the theoretical values. This suggests a regression effect, i.e., the past betas of high beta securities are overestimated and the betas of low beta securities are underestimated.[8] Past beta is not completely uncorrelated with the error of the current beta and the instrumental variable approach to the error-in-variables problem is not entirely successful.[9]

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[8] There is no such effect for β_2 because that portfolio has both zero beta and zero investment; i.e., net holdings of both high and low beta securities are, on average, zero.

[9] This result is first documented in Brenner (1976) who examines the original Fama–McBeth (1973) time series of $\hat{\gamma}_0$.

Table 1

Portfolio estimators for $\hat{\gamma}_0$, $\hat{\gamma}_1$ and $\hat{\gamma}_2$ based on the 'market index' with generalized least squares estimation.[a]

$$R_{it} = \hat{\gamma}_{0t} + \hat{\gamma}_{1t}\hat{\beta}_{it} + \hat{\gamma}_{2t}[(\phi_{it} - \phi_{mt})/\phi_{mt}]$$

Period	$\hat{\gamma}_0 - R_F$	$t(\hat{\gamma}_0 - R_F)$	$\hat{\beta}_0$	$\hat{\gamma}_1 - (R_M - R_F)$	$t(\hat{\gamma}_1 - (R_M - R_F))$	$\hat{\beta}_1$	$\hat{\gamma}_2$	$t(\hat{\gamma}_2)$	$\hat{\beta}_2$
1936–1975	0.00450	2.76	0.45	−0.00092	−1.00	0.75	−0.00052	−2.92	0.01
1936–1955	0.00377	1.66	0.43	−0.00060	−0.80	0.80	−0.00043	−2.12	0.01
1956–1975	0.00531	2.22	0.46	−0.00138	−0.82	0.73	−0.00062	−2.09	0.01
1936–1945	0.00121	0.30	0.63	−0.00098	−0.77	0.82	−0.00075	−2.32	−0.01
1946–1955	0.00650	2.89	0.03	−0.00021	−0.26	0.75	−0.00015	−0.65	0.06
1956–1965	0.00494	2.02	0.34	−0.00098	−0.56	0.96	−0.00039	−1.27	−0.01
1966–1975	0.00596	1.43	0.49	−0.00232	−0.80	0.69	−0.00080	−1.55	0.01

[a] $\hat{\gamma}_0 - R_F$ = mean difference between return on zero beta portfolio and risk-free rate. $\hat{\gamma}_1 - (R_M - R_F)$ = mean difference between actual risk premium ($\hat{\gamma}_1$) and risk premium stipulated by Sharpe–Lintner model ($R_M - R_F$). $\hat{\gamma}_2$ = size premium. $\hat{\beta}_i$ = actual estimated market risk of $\hat{\gamma}_i$ (theoretical values: $\beta_0 = 0$, $\beta_1 = 1$, $\beta_2 = 0$); all β_0, β_1 are significantly different from the theoretical values. $t(\cdot)$ = t-statistic.

The deviations from the theoretical betas are largest for the 'market index', smaller for the CRSP value-weighted index, and smallest for the CRSP equally-weighted index. This is due to two factors: first, even if the true covariance structure is stationary, betas with respect to a value-weighted index change whenever the weights change, since the weighted average of the betas is constrained to be equal to one. Second, the betas and their standard errors with respect to the 'market index' are much larger than for the stock indices (a typical stock beta is between two and three), which leads to larger deviations — a kind of 'leverage' effect. Thus, the results in table 1 show that the final correction for the deviation of $\hat{\beta}_0$ and $\hat{\beta}_1$ from their theoretical values is of crucial importance for maket proxies with changing weights.

Estimated portfolio betas and portfolio market proportions are (negatively) correlated. It is therefore possible that the errors in beta induce an error in the coefficient of the market proportion. According to Levi (1973), the probability limit of $\hat{\gamma}_1$ in the standard errors-in-the-variables model is

$$\operatorname{plim} \hat{\gamma}_1 = \gamma_1/(1 + (\sigma_u^2 \cdot \sigma_2^2)/D) < \gamma_1,$$

with

$$D = (\sigma_1^2 + \sigma_u^2) \cdot \sigma_2^2 - \sigma_{12}^2 > 0,$$

where σ_1^2, σ_2^2 are the variances of the true factors β and ϕ, respectively, σ_u^2 is the variance of the error in beta and σ_{12} is the covariance of β and ϕ. Thus, the bias in $\hat{\gamma}_1$ is unambiguously towards zero for positive γ_1. The probability limit of $\hat{\gamma}_2 - \gamma_2$ is [Levi (1973)]

$$\operatorname{plim} (\hat{\gamma}_2 - \gamma_2) = (\sigma_u^2 \cdot \sigma_{12} \cdot \gamma_1)/D.$$

We find that the bias in $\hat{\gamma}_2$ depends on the covariance between β and ϕ and the sign of γ_1. If σ_{12} has the same sign as the covariance between $\hat{\beta}$ and ϕ, i.e., $\sigma_{12} < 0$, and if $\gamma_1 > 0$, then $\operatorname{plim}(\hat{\gamma}_2 - \gamma_2) < 0$, i.e., $\operatorname{plim} \hat{\gamma}_2 < \gamma_2$. If the grouping procedure is not successful in removing the error in beta, then it is likely that the reported $\hat{\gamma}_2$ overstates the true magnitude of the size effect. If this was a serious problem in this study, the results for the different market indices should reflect the problem. In particular, using the equally-weighted stock index should then lead to the smallest size effect since, as was pointed out earlier, the error in beta problem is apparently less serious for that kind of index. In fact, we find that there is little difference between the estimates.[10]

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[10] For the overall time period, $\hat{\gamma}_2$ with the equally-weighted CRSP index is -0.00044, with the value weighted CRSP index -0.00044 as well as opposed to the -0.00052 for the 'market index' reported in table 1. The estimated betas of $\hat{\gamma}_0$ and $\hat{\gamma}_1$ which reflect the degree of the error in beta problems are 0.07 and 0.91, respectively, for the equally-weighted CRSP index and 0.13 and 0.87 for the value-weighted CRSP index.

Thus, it does not appear that the size effect is just a proxy for the unobservable true beta even though the market proportion and the beta of securities are negatively correlated.

The correlation coefficient between the mean market values of the twenty-five portfolios and their betas is significantly negative, which might have introduced a multicollinearity problem. One of its possible consequences is coefficients that are very sensitive to addition or deletion of data. This effect does not appear to occur in this case: the results do not change significantly when five portfolios are dropped from the sample. Revising the grouping procedure — ranking on the basis of beta first, then ranking on the basis of market proportion — also does not lead to substantially different results.

4.2. A closer look at the results

An additional factor relevant for asset pricing — the market value of the equity of a firm — has been found. The results are based on a linear model. Linearity was assumed only for convenience and there is no theoretical reason (since there is no model) why the relationship should be linear. If it is nonlinear, the particular form of the relationship might give us a starting point for the discussion of possible causes of the size effect in the next section. An analysis of the residuals of the twenty-five portfolios is the easiest way to look at the linearity question. For each month t, the estimated residual return

$$\hat{\varepsilon}_{it} = R_{it} - \hat{\gamma}_{0t} - \hat{\gamma}_{1t}\hat{\beta}_{it} - \hat{\gamma}_{2t}[(\phi_{it} - \phi_{mt})/\phi_{mt}], \qquad i = 1, \ldots, 25, \tag{5}$$

is calculated for all portfolios. The mean residuals over the forty-five year sample period are plotted as a function of the mean market proportion in fig. 1. Since the distribution of the market proportions is very skewed, a logarithmic scale is used. The solid line connects the mean residual returns of each size group. The numbers identify the individual portfolios within each group according to beta, '1' being the one with the largest beta, '5' being the one with the smallest beta.

The figure shows clearly that the linear model is misspecified.[11] The residuals are not randomly distributed around zero. The residuals of the portfolios containing the smallest firms are all positive; the remaining ones are close to zero. As a consequence, it is impossible to use $\hat{\gamma}_2$ as a simple size premium in the cross-section. The plot also shows, however, that the misspecification is not responsible for the significance of $\hat{\gamma}_2$ since the linear model underestimates the true size effect present for very small firms. To illustrate this point, the five portfolios containing the smaller firms are deleted from the sample and the parameters reestimated. The results, summarized in table 2, show that the $\hat{\gamma}_2$ remain essentially the same. The relationship is still not linear; the new $\hat{\gamma}_2$ still cannot be used as a size premium.

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[11] The nonlinearity cannot be eliminated by defining ϕ_i as the log of the market proportion.

Fig. 1 suggests that the main effect occurs for very small firms. Further support for this conclusion can be obtained from a simple test. We can regress the returns of the twenty-five portfolios in each result on beta alone and examine the residuals. The regression is misspecified and the residuals contain information about the size effect. Fig. 2 shows the plot of those residuals in the same format as fig. 1. The smallest firms have, on average, very large unexplained mean returns. There is no significant difference between the residuals of the remaining portfolios.

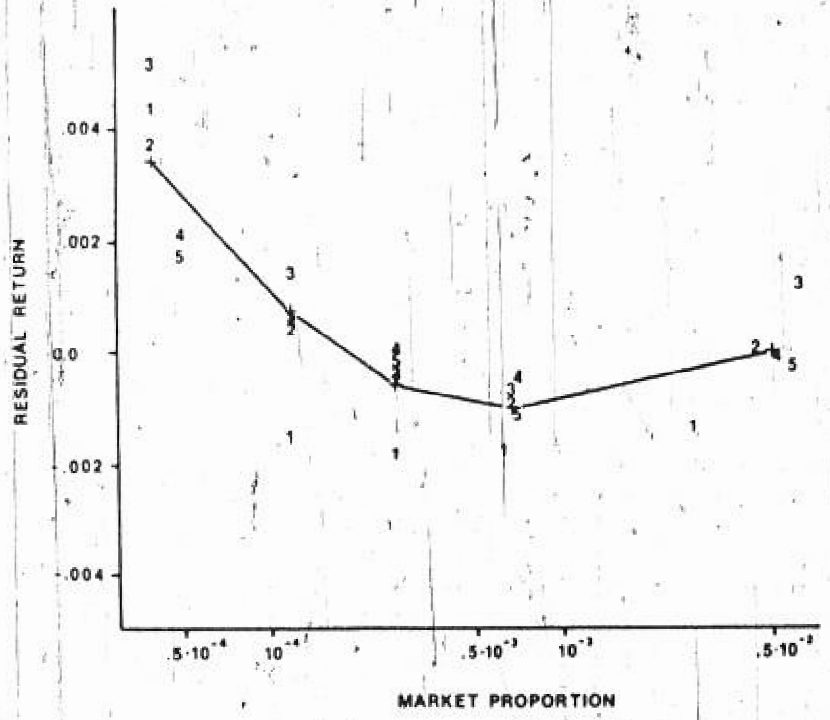

Fig. 1. Mean residual returns of portfolios (1936-1975) with equally-weighted CRSP index as market proxy. The residual is calculated with the three-factor model [eq. (3)]. The numbers 1,...,5 represent the mean residual return for the five portfolios within each size group (1: portfolio with largest beta,...,5: portfolio with smallest beta). + represents the mean of the mean residuals of the five portfolios with similar market values.

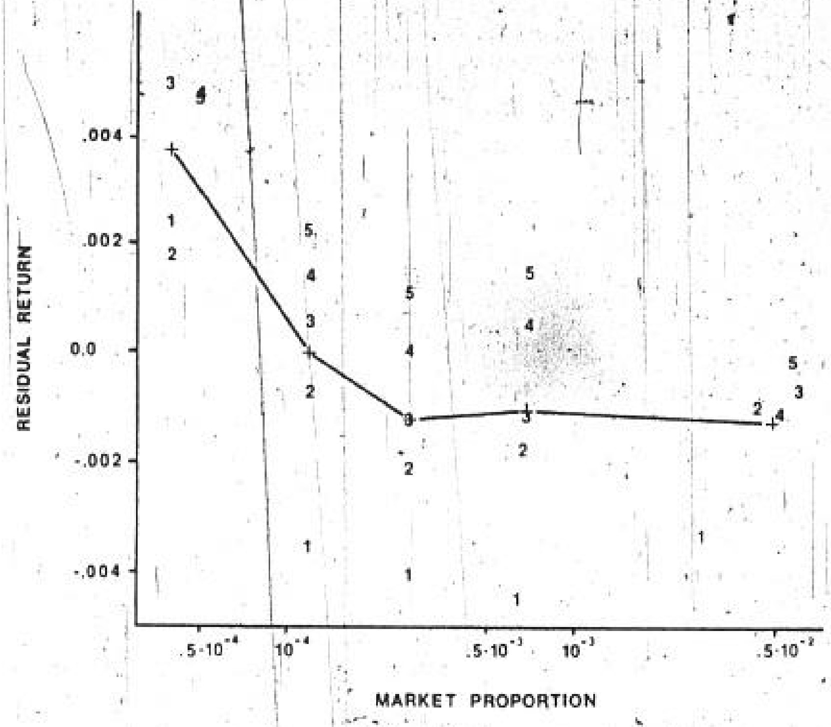

Fig. 2. Mean residual returns of portfolios (1936–1975) with equally-weighted CRSP index as market proxy. The residual is calculated with the two-factor model ($\hat{\varepsilon}_{it} = R_{it} - \hat{\gamma}_{0t} - \hat{\gamma}_{1t}\hat{\beta}_{it}$). The symbols are as defined for fig. 1.

4.3. 'Arbitrage' portfolio returns

One important empirical question still remains: How important is the size effect from a practical point of view? Fig. 2 suggests that the difference in returns between the smallest firms and the remaining ones is, on average, about 0.4 percent per month. A more dramatic result can be obtained when the securities are chosen solely on the basis of their market value.

As an illustration, consider putting equal dollar amounts into portfolios containing the smallest, largest and median-sized firms at the beginning of a year. These portfolios are to be equally weighted and contain, say, ten, twenty or fifty securities. They are to be held for five years and are rebalanced every month. They are levered or unlevered to have the same beta. We are then interested in the differences in their returns,

$$R_{1t} = R_{st} - R_{lt}, \qquad R_{2t} = R_{st} - R_{at}, \qquad R_{3t} = R_{at} - R_{lt}, \tag{6}$$

Table 2
Portfolio estimators for γ_2 for all 25 portfolios and for 20 portfolios (portfolios containing smallest firms deleted) based on CRSP equally weighted index with generalized least-squares estimation.[a]

	Size premium $\hat{\gamma}_2$ with	
Period	25 portfolios	20 portfolios
1936–1975	−0.00044 (−2.42)	−0.00043 (−2.54)
1936–1955	−0.00037 (−1.72)	−0.00041 (−1.88)
1956–1975	−0.00056 (−1.91)	−0.00050 (−1.91)
1936–1945	−0.00085 (−2.81)	−0.00083 (−2.48)
1946–1955	0.00003 (0.12)	−0.00003 (−0.13)
1956–1965	−0.00023) (−0.81)	−0.00017 (−0.65)
1966–1975	−0.00091 (−1.78)	−0.00085 (−1.84)

[a] t-statistic in parentheses.

where R_{st}, R_{mt} and R_{lt} are the returns on the portfolios containing the smallest, median-sized and largest firms at portfolio formation time (and $R_{1t} = R_{2t} + R_{3t}$). The procedure involves (a) the calculation of the three differences in raw returns in each month and (b) running time series regressions of the differences on the excess returns of the market proxy. The intercept terms of these regressions are then interpreted as the $\bar{R}_i$, $i = 1, \ldots, 3$. Thus, the differences can be interpreted as 'arbitrage' returns, since, e.g., R_{1t} is the return obtained from holding the smallest firms long and the largest firms short, representing zero net investment in a zero-beta portfolio.[12] Simple equally weighted portfolios are used rather than more sophisticated minimum variance portfolios to demonstrate that the size effect is not due to some quirk in the covariance matrix.

Table 3 shows that the results of the earlier tests are fully confirmed. $\bar{R}_2$, the difference in returns between very small firms and median-size firms, is typically considerably larger than $\bar{R}_3$, the difference in returns between median-sized and very large firms. The average excess return from holding very small firms long and very large firms short is, on average, 1.52 percent

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[12] No *ex post* sample bias is introduced, since monthly rebalancing includes stocks delisted during the five years. Thus, the portfolio size is generally accurate only for the first month of each period.

Table 3
Mean monthly returns on 'arbitrage' portfolios.[a]
$R_j - R_1 = \hat{\alpha}_i + \hat{\beta}_i(R_m - R_f)$

$\hat{\alpha}_1^a$ $\hat{\alpha}_2^a$ $\hat{\alpha}_3^a$

Table 3

Mean monthly returns on 'arbitrage' portfolios.[a]

$$R_j - R_k = \hat{\alpha}_i + \hat{\beta}_i (R_m - R_F)$$

	$\hat{\alpha}_1$[b]			$\hat{\alpha}_2$[c]			$\hat{\alpha}_3$[d]		
	$n=10$	$n=20$	$n=50$	$n=10$	$n=20$	$n=50$	$n=10$	$n=20$	$n=50$
Overall period									
1931–1975	0.0152 (2.99)	0.0148 (3.53)	0.0101 (3.07)	0.0130 (2.90)	0.0124 (3.56)	0.0089 (3.64)	0.0021 (1.06)	0.0024 (1.41)	0.0012 (0.85)
Five-year subperiods									
1931–1935	0.0559 (2.25)	0.0597 (2.81)	0.0427 (2.35)	0.0462 (1.92)	0.0462 (2.55)	0.0326 (2.46)	0.0127 (1.09)	0.0134 (1.49)	0.0101 (1.42)
1936–1940	0.0201 (0.82)	0.0182 (0.97)	0.0089 (0.67)	0.0118 (0.55)	0.0145 (0.90)	0.0064 (0.65)	0.0084 (1.20)	0.0037 (0.62)	0.0025 (0.49)
1941–1945	0.0430 (2.29)	0.0408 (2.46)	0.0269 (2.17)	0.0381 (2.29)	0.0367 (2.54)	0.0228 (2.02)	0.0049 (1.25)	0.0038 (1.09)	0.0041 (1.68)
1946–1950	−0.0060 (−1.17)	−0.0046 (−0.97)	−0.0036 (−0.97)	−0.0058 (−1.03)	−0.0059 (−1.29)	−0.0029 (−0.83)	−0.0002 (−0.07)	−0.0104 (−0.50)	−0.0007 (−0.38)
1951–1955	−0.0067 (−0.89)	−0.0011 (−0.21)	0.0013 (0.32)	−0.0004 (−0.07)	0.0026 (0.72)	0.0010 (0.39)	−0.0062 (−1.29)	−0.0037 (−0.99)	0.0003 (0.11)
1956–1960	0.0039 (0.67)	0.0008 (0.15)	0.0037 (0.89)	0.0007 (0.14)	−0.0027 (−0.64)	0.0011 (0.45)	0.0031 (0.88)	0.0035 (1.16)	0.0026 (0.97)
1961–1965	0.0131 (1.38)	0.0060 (0.67)	0.0024 (0.31)	0.0096 (1.11)	0.0046 (0.72)	0.0036 (0.77)	0.0035 (0.59)	0.0014 (0.24)	−0.0012 (−0.24)
1966–1970	0.0121 (1.64)	0.0117 (2.26)	0.0077 (1.91)	0.0129 (1.93)	0.0110 (2.71)	0.0071 (2.43)	0.0008 (0.23)	0.0007 (0.22)	0.0006 (0.27)
1971–1975	0.0063 (0.60)	0.0108 (1.23)	0.0098 (1.45)	0.0033 (0.39)	0.0077 (1.18)	0.0083 (1.79)	0.0030 (0.64)	0.0031 (0.72)	0.0015 (0.43)

[a] Equally-weighted portfolios with n securities, adjusted for differences in market risk with respect to CRSP value-weighted index, t-statistics in parentheses.

[b] Small firms held long, large firms held short.

[c] Small firms held long, median-size firms held short.

[d] Median-size firms held long, large firms held short.

per month or 19.8 percent on an annualized basis. This strategy, which suggests very large 'profit opportunities', leaves the investor with a poorly diversified portfolio. A portfolio of small firms has typically much larger residual risk with respect to a value-weighted index than a portfolio of very large firms with the same number of securities [Banz (1978, ch. 3)]. Since the fifty largest firms make up more than 25 percent of the total market value of NYSE stocks, it is not surprising that a larger part of the variation of the return of a portfolio of those large firms can be explained by its relation with the value-weighted market index. Table 3 also shows that the strategy would not have been successful in every five year subperiod. Nevertheless, the magnitude of the size effect during the past forty-five years is such that it is of more than just academic interest.

5. Conclusions

The evidence presented in this study suggests that the CAPM is misspecified. On average, small NYSE firms have had significantly larger risk adjusted returns than large NYSE firms over a forty year period. This size effect is not linear in the market proportion (or the log of the market proportion) but is most pronounced for the smallest firms in the sample. The effect is also not very stable through time. An analysis of the ten year subperiods show substantial differences in the magnitude of the coefficient of the size factor (table 1).

There is no theoretical foundation for such an effect. We do not even know whether the factor is size itself or whether size is just a proxy for one or more true but unknown factors correlated with size. It is possible, however, to offer some conjectures and even discuss some factors for which size is suspected to proxy. Recent work by Reinganum (1980) has eliminated one obvious candidate: the price-earnings (P/E) ratio.[13] He finds that the P/E-effect, as reported by Basu (1977), disappears for both NYSE and AMEX stocks when he controls for size but that there is a significant size effect even when he controls for the P/E-ratio, i.e., the P/E-ratio effect is a proxy for the size effect and not vice versa. Stattman (1980), who found a significant negative relationship between the ratio of book value and market value of equity and its return, also reports that this relationship is just a proxy for the size effect. Naturally, a large number of possible factors remain to be tested.[14] But the Reinganum results point out a potential problem with some of the existing negative evidence of the efficient market hypothesis. Basu believed to have identified a market inefficiency but his P/E-effect is just a proxy for the size effect. Given its longevity, it is not likely that it is due to a market inefficiency but it is rather evidence of a pricing model misspecification. To the extent that tests of market efficiency use data of firms of different sizes and are based on the CAPM, their results might be at least contaminated by the size effect.

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[13] The average correlation coefficient between P/E-ratio and market value is only 0.16 for individual stocks for thirty-eight quarters ending in 1978. But for the portfolios formed on the basis of P/E-ratio, it rises to 0.82. Recall that Basu (1977) used ten portfolios in his study.

[14] E.g., debt-equity ratios, skewness of the return distribution [Kraus and Litzenberger (1976)].

One possible explanation involving the size of the firm directly is based on a model by Klein and Bawa (1977). They find that if insufficient information is available about a subset of securities, investors will not hold these securities because of estimation risk, i.e., uncertainty about the true parameters of the return distribution. If investors differ in the amount of information available, they will limit their diversification to different subsets of all securities in the market.[15] It is likely that the amount of information generated is related to the size of the firm. Therefore, many investors would not desire to hold the common stock of very small firms. I have shown elsewhere [Banz (1978, ch. 2)] that securities sought by only a subset of the investors have higher risk-adjusted returns than those considered by all investors. Thus, lack of information about small firms leads to limited diversification and therefore to higher returns for the 'undesirable' stocks of small firms.[16] While this informal model is consistent with the empirical results, it is, nevertheless, just conjecture.

To summarize, the size effect exists but it is not at all clear why it exists. Until we find an answer, it should be interpreted with caution. It might be tempting to use the size effect, e.g., as the basis for a theory of mergers — large firms are able to pay a premium for the stock of small firms since they will be able to discount the same cash flows at a smaller discount rate. Naturally, this might turn out to be complete nonsense if size were to be shown to be just a proxy.

The preceding discussion suggests that the results of this study leave many questions unanswered. Further research should consider the relationship between size and other factors such as the dividend yield effect, and the tests should be expanded to include OTC stocks as well.

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[15] Klein and Bawa (1977, p. 102).

[16] A similar result can be obtained with the introduction of fixed holding costs which lead to limited diversification as well. See Brennan (1975), Banz (1978, ch. 2) and Mayshar (1979).

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The Capital Asset Pricing Model: Some Empirical Tests*

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AND

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I. Introduction and Summary

Considerable attention has recently been given to general equilibrium models of the pricing of capital assets. Of these, perhaps the best known is the mean-variance formulation originally developed by Sharpe [1964] and Treynor [1961], and extended and clarified by Lintner [1965a, b], Mossin [1966], Fama [1968a, b], and Long [1972]. In addition Treynor [1965], Sharpe [1966], and Jensen [1968, 1969] have developed portfolio evaluation models which are either based on this asset pricing model or bear a close relation to it. In the development of the asset pricing model it is assumed that (1) all investors are single period risk-averse utility of terminal wealth maximizers and can choose among portfolios solely on the basis of mean and variance, (2) there are no taxes or transactions costs, (3) all investors have homogeneous views regarding the parameters of the joint probability distribution of all security returns, and (4) all investors can borrow and lend at a given riskless rate of interest. The main result of the model is a statement of the relation between the expected risk premiums on individual assets and their "systematic risk." The relationship is

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$$E(\tilde{R}_j) = E(\tilde{R}_M)\beta_j \tag{1}$$

where the tildes denote random variables and

$$E(\tilde{R}_j) = \frac{E(\tilde{P}_t) - P_{t-1} + E(\tilde{D}_t)}{P_{t-1}} - r_{Ft} = \text{expected excess returns on the } j\text{th asset}$$

$\tilde{D}_t$ = dividends paid on the jth security at time t

r_{Ft} = the riskless rate of interest

$E(\tilde{R}_M)$ = expected excess returns on a "market portfolio" consisting of an investment in every asset outstanding in proportion to its value

$$\beta_j = \frac{\operatorname{cov}(\tilde{R}_j, \tilde{R}_M)}{\sigma^2(\tilde{R}_M)} = \text{the "systematic" risk of the } j\text{th asset.}$$

Relation 1 says that the expected excess return on any asset is directly proportional to its β. If we define α_j as

$$\alpha_j = E(\tilde{R}_j) - E(\tilde{R}_M)\beta_j$$

then (1) implies that the α on every asset is zero.

If empirically true, the relation given by (1) has wide-ranging implications for problems in capital budgeting, cost benefit analysis, portfolio selection, and for other economic problems requiring knowledge of the relation between risk and return. Evidence presented by Jensen [1968, 1969] on the relationship between the expected return and systematic risk of a large sample of mutual funds suggests that (1) might provide an adequate description of the relation between risk and return for securities. On the other hand, evidence presented by Douglas [1969], Lintner [1965], and most recently Miller and Scholes [1972] seems to indicate the model does not provide a complete description of the structure of security returns. In particular, the work done by Miller and Scholes suggests that the α's on individual assets depend in a systematic way on their β's: that high-beta assets tend to have negative α's, and that low-beta stocks tend to have positive α's.

Our main purpose is to present some additional tests of this asset pricing model which avoid some of the problems of earlier studies and which, we believe, provide additional insights into the nature of the structure of security returns. All previous direct tests of the model have been conducted using cross-sectional methods; primarily regression of $\bar{R}_j$, the mean excess return over a time interval for a set of securities on estimates of the systematic risk, $\hat{\beta}_j$, of each of the securities. The equation

$$\bar{R}_j = \gamma_0 + \gamma_1\hat{\beta}_j + \tilde{u}_j$$

was estimated, and contrary to the theory, γ_0 seemed to be significantly different from zero and γ_1 significantly different from $\bar{R}_M$, the slope predicted by the model. We shall show in Section III that, because of the structure of the process which appears to be generating the data, these cross-sectional tests of significance can be misleading and therefore do not provide direct tests of the validity of (1). In Section II we provide a more powerful time series test of the validity of the model, which is free of the difficulties associated with the cross-sectional tests. These results indicate that the usual form of the asset pricing model as given by (1) does not provide an accurate description of the structure of security returns. The tests indicate that the expected excess returns on high-beta assets are lower than (1) suggests and that the expected excess returns on low-beta assets are higher than (1) suggests. In other words, that high-beta stocks have negative α's and low-beta stocks have positive α's.

The data indicate that the expected return on a security can be represented by a two-factor model such as

$$E(\tilde{r}_j) = E(\tilde{r}_Z)(1-\beta_j) + E(\tilde{r}_M)\beta_j \tag{2}$$

where the r's indicate total returns and $E(\tilde{r}_Z)$ is the expected return on a second factor, which we shall call the "beta factor," since its coefficient is a function of the asset's β. After we had observed this phenomenon, Black [1970] was able to show that relaxing the assumption of the existence of riskless borrowing and lending opportunities provides an asset pricing model which implies that, in equilibrium, the expected return on an asset will be given by (2). His results furnish an explicit definition of the beta factor, $\tilde{r}_Z$, as the return on a portfolio that has a zero covariance with the return on the market portfolio $\tilde{r}_M$. Although this model is entirely consistent with our empirical results (and provides a convenient interpretation of them), there are perhaps other plausible hypotheses consistent with the data (we shall briefly discuss several in Section V). We hasten to add that we have not attempted here to supply any direct tests of these alternative hypotheses.

The evidence presented in Section II indicates the expected excess return on an asset is not strictly proportional to its β, and we believe that this evidence, coupled with that given in Section IV, is sufficiently strong to warrant rejection of the traditional form of the model given by (1). We then show in Section III how the cross-sectional tests are subject to measurement error bias, provide a solution to this problem through grouping procedures, and show how cross-sectional methods are relevant to testing the expanded two-factor form of the model. Here we find that the evidence indicates the existance of a linear relation between risk and return and is therefore consistent with a form of the two-factor model which specifies the realized returns on each asset to be a linear function of the returns on the two factors $\tilde{r}_Z$ and $\tilde{r}_M$,

$$\tilde{r}_j = \tilde{r}_Z(1-\beta_j) + \tilde{r}_M\beta_j + \tilde{w}_j \tag{2}$$

The fact that the α's of high-beta securities are negative and that the α's of low-beta securities are positive implies that the mean of the beta factor is greater than r_F. The traditional form of the capital asset pricing model as expressed by (1), could hold exactly, even if asset returns were generated by (2′), if the mean of the beta factor were equal to the risk-free rate. We show in Section IV that the mean of the beta factor has had a positive trend over the period 1931–65 and was on the order of 1.0 to 1.3% per month in the two sample intervals we examined in the period 1948–65. This seems to have been significantly different from the average risk-free rate and indeed is roughly the same size as the average market return of 1.3 and 1.2% per month over the two sample intervals in this period. This evidence seems to be sufficiently strong enough to warrant rejection of the traditional form of the model given by (1). In addition, the standard deviation of the beta factor over these two sample intervals was 2.0 and 2.2% per month, as compared with the standard deviation of the market factor of 3.6 and 3.8% per month. Thus the beta factor seems to be an important determinant of security returns.

II. *Time Series Tests of the Model*

A. Specification of the Model. Although the model of (1) which we wish to test is stated in terms of expected returns, it is possible to use realized returns to test the theory. Let us represent the returns on any security by the "market model" originally proposed by Markowitz [1959] and extended by Sharpe [1963] and Fama [1968a]

$$\tilde{R}_j = E(\tilde{R}_j) + \beta_j\tilde{R}'_M + \tilde{e}_j \tag{3}$$

where $\tilde{R}'_M = \tilde{R}_M - E(\tilde{R}_M) =$ the "unexpected" excess market return, and $\tilde{R}'_M$ and $\tilde{e}_j$ are normally distributed random variables that satisfy:

$$E(\tilde{R}'_M) = 0 \tag{4a}$$

$$E(\tilde{e}_j) = 0 \tag{4b}$$

$$E(\tilde{e}_j\tilde{R}'_M) = 0 \tag{4c}$$

The specifications of the market model, extensively tested by Fama et al. [1969] and Blume [1968], are well satisfied by the data for a large number of securities on the New York Stock Exchange. The only assumption violated to any extent is the normality assumption[1]—the estimated residuals seem to conform to the infinite variance members of the stable class of distributions rather than the normal. There are those who would explain these discrepancies from normality by certain nonstationarities in the distributions (cf. Press [1967]), which still yield finite variances. However, Wise [1963] has shown that the least-squares estimate of β_j in (3) is unbiased (although not efficient) even if the variance does not exist, and simulations by Blattberg and Sargent [1968] and Fama and Babiak [1968] also indicate that the least-squares procedures are not totally inappropriate in the presence of infinite variance stable distributions. For simplicity, therefore, we shall ignore the nonnormality issues and continue to assume normally distributed random variables where relevant.[2] However, because of these problems caution should be exercised in making literal interpretations of any significance tests.

Substituting from (1) for $E(R_j)$ in (3) we obtain

$$\tilde{R}_j = \tilde{R}_M\beta_j + \tilde{e}_j \tag{5}$$

where $\tilde{R}_M$ is the ex post excess return on the market portfolio over the holding period of interest. If assets are priced in the market such that (1) holds over each short time interval (say a month), then we can test the traditional form of the model by adding an intercept α_j to (5) and subscripting each of the variables by t to obtain

$$\tilde{R}_{jt} = \alpha_j + \beta_j \tilde{R}_{Mt} + \tilde{e}_{jt} \tag{6}$$

which, given the assumptions of the market model, is a regression equation. If the asset pricing and the market models given by (1), (3), and (4) are valid, then the intercept α_j in (6) will be zero. Thus a direct test of the model can be obtained by estimating (6) for a security over some time period and testing to see if α_j is significantly different from zero.[3,4]

B. An Aggregation Problem. The test just proposed is simple but inefficient, since it makes use of information on only a single security whereas data is available on a large number of securities. We would like to design a test that allows us to aggregate the data on a large number of securities in an efficient manner. If the estimates of the α_j's were independent with normally distributed residuals, we could proceed along the lines outlined by Jensen [1968] and compare the frequency distributions of the "t" values for the intercepts with the theoretical distribution. However, the fact that the e_{jt} are not cross-sectionally independent, (that is, $E(\tilde{e}_{jt}\tilde{e}_{it}) \neq 0$ for $i \neq j$, cf. King [1966]); makes this procedure much more difficult.

One procedure for solving this problem which makes appropriate allowance for the effects of the nonindependence of the residuals on the standard error of estimate of the average coefficient, $\bar{\alpha}$, is to run the tests on grouped data. That is, we form portfolios (or groups) of the individual securities and estimate (6) defining $\tilde{R}_{Kt}$ to be the average return on all securities in the Kth portfolio for time t. Given this definition of R_{Kt}, $\hat{\beta}_K$ will be the average risk of the securities in the portfolio and $\hat{\alpha}_K$ will be the average intercept. Moreover, since the residual variance from this regression will incorporate the effects of any cross-sectional interdependencies in the $\tilde{e}_{jt}$ among the securities in each portfolio, the standard error of the intercept $\hat{\alpha}_K$ will appropriately incorporate the nonindependence of $\tilde{e}_{jt}$.

In addition, we wish to group our securities such that we obtain the maximum possible dispersion of the risk coefficients, β_K. If we were to construct our portfolios by using the ranked values of the $\hat{\beta}_j$, we would introduce a selection bias into the procedure. This would occur because those securities entering the first or high-beta portfolio would tend to have positive measurement errors in their $\hat{\beta}_j$, and this would introduce positive bias in $\hat{\beta}_K$, the estimated portfolio risk coefficient. This positive bias in $\hat{\beta}_K$ will, of course, introduce a negative bias in our estimate of the intercept, $\hat{\alpha}_K$, for that portfolio. On the other hand, the opposite would occur for the lowest beta portfolio; its $\hat{\beta}_K$ would be negatively biased, and therefore our estimate of the intercept for this low-risk portfolio would be positively biased. Thus even if the traditional model were true, this selection bias would tend to cause the low-risk portfolios to exhibit positive intercepts and high-risk portfolios to exhibit negative intercepts. To avoid this bias, we need to use an instrumental variable that is highly correlated with $\hat{\beta}_j$, but that can be observed independently of $\hat{\beta}_j$. The instrumental variable we have chosen is simply an independent estimate of the β of the security obtained from past data. Thus when we estimate the group risk parameter on sample data not used in the ranking procedures, the measurement errors in these estimates will be independent of the errors in the coefficients used in the ranking and we therefore obtain unbiased estimates of $\hat{\beta}_K$ and $\hat{\alpha}_K$.

C. The Data. The data used in the tests to be described were taken from the University of Chicago Center for Research in Security Prices Monthly Price Relative File, which contains monthly price, dividend, and adjusted price and dividend information for all securities listed on the New York Stock Exchange in the period January, 1926–March, 1966. The monthly returns on the market portfolio R_{Mt} were defined as the returns that would have been earned on a portfolio consisting of an equal investment in every security listed on the NYSE at the beginning of each month. The risk-free rate was defined as the 30-day rate on U.S. Treasury Bills for the period 1948–66. For the period 1926–47 the dealer commercial paper rate[5] was used because Treasury Bill rates were not available.

D. The Grouping Procedure

1. *The ranking procedure.* Ideally we would like to assign the individual securities to the various groups on the basis of the ranked β_j (the true coefficients), but of course these are unobservable. In addition we cannot assign them on the basis of the $\hat{\beta}_j$, since this would introduce the selection bias prob-

lems discussed previously. Therefore, we must use a ranking procedure that is independent of the measurement errors in the $\hat{\beta}_j$. One way to do this is to use part of the data—in our case five years of previous monthly data—to obtain estimates $\hat{\beta}_{j0}$, of the risk measures for each security. The ranked values of the $\hat{\beta}_{j0}$ are used to assign membership to the groups. We then use data from a subsequent time period to estimate the group risk coefficients $\hat{\beta}_K$, which then contain measurement errors for the individual securities, which are independent of the errors in $\hat{\beta}_{j0}$ and hence independent of the original ranking and independent among the securities in each group.

2. *The stationarity assumptions.* The group assignment procedure just described will be satisfactory as long as the coefficients β_j are stationary through time. Evidence presented by Blume [1968] indicates this assumption is not totally inappropriate, but we have used a somewhat more complicated procedure for grouping the firms which allows for any nonstationarity in the coefficients through time.

We began by estimating the coefficient β_j, (call this estimate $\hat{\beta}_{j0}$) in (6) for the five-year period January, 1926–December, 1930 for all securities listed on the NYSE at the beginning of January 1931 for which at least 24 monthly returns were available. These securities were then ranked from high to low on the basis of the estimates $\hat{\beta}_{j0}$, and were assigned to ten portfolios[6]—the 10% with the largest $\hat{\beta}_{j0}$ to the first portfolio, and so on. The return in each of the next 12 months for each of the ten portfolios was calculated. Then the entire process was repeated for all securities listed as of January, 1932 (for which at least 24 months of previous monthly returns were available) using the immediately preceding five years of data (if available) to estimate new coefficients to be used for ranking and assignment to the ten portfolios. The monthly portfolio returns were again calculated for the next year. This process was then repeated for January, 1933, January, 1934, and so on, through January, 1965.

In this way we obtained 35 years of monthly returns on ten portfolios from the 1,952 securities in the data file. Since at each stage we used all listed securities for which at least 24 months of data were available in the immediately preceding five-year period, the total number of securities used in the analysis varied through time ranging from 582 to 1,094, and thus the number of securities contained in each portfolio changed from year to year.[7] The total number of securities from which the portfolios were formed at the beginning of each year is given in Table 1. Each of the portfolios may be thought of as a mutual fund portfolio, which has an identity of its own, even though the stocks it contains change over time.

TABLE 1
Total Number of Securities Entering All Portfolios, by Year

Year	*Number of Securities*	*Year*	*Number of Securities*
1931	582	1949	893
1932	673	1950	928
1933	688	1951	943
1934	683	1952	966
1935	676	1953	994
1936	674	1954	1000
1937	666	1955	1006
1938	690	1956	994
1939	718	1957	994
1940	743	1958	1000
1941	741	1959	995
1942	757	1960	1021
1943	772	1961	1014
1944	778	1962	1024
1945	773	1963	1056
1946	791	1964	1081
1947	812	1965	1094
1948	842		

E. The Empirical Results

1. *The entire period.* Given the 35 years of monthly returns on each of the ten portfolios calculated as explained previously, we then calculated the least-squares estimates of the parameters α_K and β_K in (6) for each of the ten portfolios ($K = 1, \ldots, 10$) using all 35 years of monthly data (420 observations). The results are summarized in Table 2. Portfolio number 1 contains the highest-risk securities and portfolio number 10 contains the lowest-risk securities. The estimated risk coefficients range from 1.561 for portfolio 1 to 0.499 for portfolio 10. The critical intercepts, the $\hat{\alpha}_K$, are given in the second line of Table 2 and the Student "t" values are given directly below them. The correlation between the portfolio returns and the market returns, $r(\tilde{R}_K, \tilde{R}_M)$, and the autocorrelation of the residuals, $r(\tilde{e}_t, \tilde{e}_{t-1})$, are also given in Table 2. The autocorrelation appears to be quite small and the correlation between the portfolio and market returns are, as expected, quite

TABLE 2

Summary of Statistics for Time Series Tests, Entire Period (January, 1931–December, 1965)
(Sample Size for Each Regression = 420)

	Portfolio Number										
Item*	1	2	3	4	5	6	7	8	9	10	$\bar{R}_M$
$\hat{\beta}$	1.5614	1.3838	1.2483	1.1625	1.0572	0.9229	0.8531	0.7534	0.6291	0.4992	1.0000
$\hat{\alpha} \cdot 10^2$	−0.0829	−0.1938	−0.0649	−0.0167	−0.0543	0.0593	0.0462	0.0812	0.1968	0.2012	
$t(\hat{\alpha})$	−0.4274	−1.9935	−0.7597	−0.2468	−0.8869	0.7878	0.7050	1.1837	2.3126	1.8684	
$r(\bar{R}, \bar{R}_M)$	0.9625	0.9875	0.9882	0.9914	0.9915	0.9833	0.9851	0.9793	0.9560	0.8981	
$r(\tilde{e}_t, \tilde{e}_{t-1})$	0.0549	−0.0638	0.0366	0.0073	−0.0708	−0.1248	0.1294	0.1041	0.0444	0.0992	
$\sigma(\tilde{e})$	0.0393	0.0197	0.0173	0.0137	0.0124	0.0152	0.0133	0.0139	0.0172	0.0218	
$\bar{R}$	0.0213	0.0177	0.0171	0.0163	0.0145	0.0137	0.0126	0.0115	0.0109	0.0091	0.0142
σ	0.1445	0.1248	0.1126	0.1045	0.0950	0.0836	0.0772	0.0685	0.0586	0.0495	0.0891

* $\bar{R}$ = average monthly excess returns, σ = standard deviation of the monthly excess returns, r = correlation coefficient.

high. The standard deviation of the residuals $\sigma(\tilde{e}_K)$, the average monthly excess return $\bar{R}_K$, and the standard deviation of the monthly excess return, σ, are also given for each of the portfolios.

Note first that the intercepts $\hat{\alpha}$ are consistently negative for the high-risk portfolios ($\hat{\beta} > 1$) and consistently positive for the low-risk portfolios ($\hat{\beta} < 1$). Thus the high-risk securities earned less on average over this 35-year period than the amount predicted by the traditional form of the asset pricing model. At the same time, the low-risk securities earned more than the amount predicted by the model.

The significance tests given by the "t" values in Table 2 are somewhat inconclusive, since only 3 of the 10 coefficients have "t" values greater than 1.85 and, as we pointed out earlier, we should use some caution in interpreting these "t" values since the normality assumptions can be questioned. We shall see, however, that due to the existence of some nonstationarity in the relations and to the lack of more complete aggregation, these results vastly understate the significance of the departures from the traditional model.

2. *The subperiods.* In order to test the stationarity of the empirical relations, we divided the 35-year interval into four equal subperiods each containing 105 months. Table 3 presents a summary of the regression statistics of (6) calculated using the data for each of these periods for each of the ten portfolios. Note that the data for $\hat{\beta}$ in Table 3 indicate that, except for portfolios 1 and 10, the risk coefficients $\hat{\beta}_K$ were fairly stationary.

Note, however, in the sections for α and $t(\hat{\alpha})$ that the critical intercepts $\hat{\alpha}_K$, were most definitely nonstationary throughout this period. The positive α's for the high-risk portfolios in the first subperiod (January, 1931–September, 1939) indicate that these securities earned more than the amount predicted by the model, and the negative α's for the low-risk portfolios indicate they earned less than what the model predicted. In the three succeeding subperiods (October, 1939–June, 1948; July, 1948–March, 1957, and April, 1957–December, 1965) this pattern was reversed and the departures from the model seemed to become progressively larger; so much larger that six of the ten coefficients in the last subperiod seem significant. (Note that all six coefficients are those with β's most different from unity – a point we shall return to. Thus it seems unlikely that these changes were the result of chance; they most probably reflect changes in the α_K's).

TABLE 3
Summary of Coefficients for the Subperiods

Item*	Sub-period†	Portfolio Number 1	2	3	4	5	6	7	8	9	10	M_M
$\hat{\beta}$	1	1.5416	1.3993	1.2620	1.1813	1.0750	0.9197	0.8569	0.7510	0.6222	0.4843	1.0000
	2	1.7157	1.3196	1.1938	1.0861	0.9697	0.9254	0.8114	0.7675	0.6647	0.5626	1.0000
	3	1.5427	1.3598	1.1822	1.1216	1.0474	0.9851	0.9180	0.7714	0.6547	0.4868	1.0000
	4	1.4423	1.2764	1.1818	1.0655	0.9957	0.9248	0.8601	0.7800	0.6614	0.6226	1.0000
$\hat{\alpha} \cdot 10^2$	1	0.7366	0.1902	0.3978	0.1314	−0.0650	−0.0501	−0.2190	−0.3786	−0.2128	−0.0710	
	2	−0.2197	−0.1300	−0.1224	0.0653	−0.0805	0.0914	0.1306	0.0760	0.2685	0.1478	
	3	−0.4614	−0.3994	−0.1189	0.0052	0.0002	−0.0070	0.1266	0.2428	0.3032	0.2035	
	4	−0.4475	−0.2536	−0.2329	−0.0654	0.0840	0.1356	0.1218	0.3257	0.3338	0.3685	
$t(\hat{\alpha})$	1	1.3881	0.6121	1.4037	0.6484	−0.3687	−0.1882	−1.0341	−1.7601	−0.7882	−0.1978	
	2	−0.4256	−0.7605	−0.8719	0.5019	−0.6288	0.8988	1.1377	0.6178	1.7853	0.8377	
	3	−2.9030	−3.6760	−1.5160	0.0742	0.0029	−0.1010	1.8261	3.3768	3.3939	1.9879	
	4	−2.8761	−2.4603	−2.7886	−0.7722	1.1016	1.7937	1.6769	3.8772	3.0651	3.2439	
$\bar{R}$	1	0.0412	0.0326	0.0317	0.0272	0.0230	0.0197	0.0166	0.0127	0.0115	0.0099	0.0220
	2	0.0233	0.0183	0.0165	0.0168	0.0136	0.0147	0.0134	0.0122	0.0126	0.0098	0.0149
	3	0.0126	0.0112	0.0120	0.0126	0.0117	0.0109	0.0115	0.0110	0.0103	0.0075	0.0112
	4	0.0082	0.0082	0.0081	0.0087	0.0096	0.0095	0.0088	0.0101	0.0092	0.0092	0.0088
σ	1	0.2504	0.2243	0.2023	0.1886	0.1715	0.1484	0.1377	0.1211	0.1024	0.0850	0.1587
	2	0.1187	0.0841	0.0758	0.0690	0.0618	0.0586	0.0519	0.0494	0.0441	0.0392	0.0624
	3	0.0581	0.0505	0.0436	0.0413	0.0385	0.0364	0.0340	0.0289	0.0253	0.0203	0.0363
	4	0.0577	0.0503	0.0463	0.0420	0.0391	0.0365	0.0340	0.0312	0.0277	0.0265	0.0386

* $\bar{R}$ = average monthly excess returns, σ = standard deviation of monthly excess returns.
† Subperiod 1 = January, 1931–September, 1939; 2 = October, 1939–June 1948; 3 = July, 1948–March, 1957; 4 = April, 1957–December, 1965.

Note that the correlation coefficients between $\tilde{R}_{Kt}$ and $\tilde{R}_{Mt}$ given in Table 2 for each of the portfolios are all greater than 0.95 except for portfolio number 10. The lowest of the 40 coefficients in the subperiods (not shown) was 0.87, and all but two were greater than 0.90. A a result, the standard deviation of the residuals from each regression is quite small and hence so is the standard error of estimate of α, and this provides the main advantage of grouping in these tests.

III. Cross-sectional Tests of the Model

A. Tests of the Two-Factor Model. Although the time series tests discussed in Section II provide a test of the traditional form of the asset pricing model, they cannot be used to test the two-factor model directly. The cross-sectional tests, however, do furnish an opportunity to test the linearity of the relation between returns and risk implied by (2) or (2′) without making any explicit specification of the intercept. Recall that the traditional form of the model implies $\gamma_0 = 0$ and $\gamma_1 = \bar{R}_M$. The two factor model merely requires the linearity of (2) to hold for any specific cross section and allows the intercept to be nonzero. At this level of specification we shall not specify the size or even the sign of γ_0. We shall be able to make some statements on this point after a closer examination of the theory. However, we shall first examine the empirical evidence to motivate that discussion.

B. Measurement Errors and Bias in Cross-sectional Tests. We consider here the problems caused in cross-sectional tests of the model by measurement errors in the estimation of the security risk measures.[8] Let β_j represent the true (and unobservable) systematic risk of firm j and $\hat{\beta}_j = \beta_j + \tilde{\epsilon}_j$ be the measured value of the systematic risk of firm j where we assume that $\tilde{\epsilon}_j$, the measurement error, is normally distributed and for all j satisfies

$$E(\tilde{\epsilon}_j) = 0 \tag{7a}$$

$$E(\tilde{\epsilon}_j \beta_j) = 0 \tag{7b}$$

$$E(\tilde{\epsilon}_j \tilde{\epsilon}_i) = \begin{cases} 0 & i \neq j \\ \sigma^2(\tilde{\epsilon}) & i = j \end{cases} \tag{7c}$$

The traditional form of the asset pricing model and the assumptions of the market model imply that the mean excess return on a security

$$\bar{R}_j = \frac{\sum_{t=1}^{T} \tilde{R}_{jt}}{T} \tag{8}$$

observed over T periods can be written as

$$\bar{R}_j = E(\bar{R}_j|\bar{R}_M) + \bar{e}_j = \bar{R}_M\beta_j + \bar{e}_j \tag{9}$$

where $\bar{R}_M = \Sigma_{t=1}^{T} \tilde{R}_{Mt}/T$, $\bar{e}_j = \Sigma_{t=1}^{T} e_{jt}/T$. Now an obvious test of the traditional form of the asset pricing model is to fit

$$\bar{R}_j = \gamma_0 + \gamma_1\hat{\beta}_j + \bar{e}_j^{\circ} \tag{10}$$

to a cross section of firms (where $\hat{\beta}_j$ is the estimated risk coefficient for each firm and $\bar{e}_j^{\circ} = \bar{e}_j - \gamma_1\bar{\epsilon}_j$) and test to see if, as implied by the theory

$$\gamma_0 = 0 \qquad \text{and} \qquad \gamma_1 = \bar{R}_M$$

There are two major difficulties with this procedure; the first involves bias due to the measurement errors in $\hat{\beta}_j$, and the second involves the apparent inadequacy of (9) as a specification of the process generating the data. The two-factor asset pricing model given by (2′) implies that γ_0 and γ_1 are random coefficients—that is, in addition to the theoretical values above, they involve a variable that is random through time. If the two-factor model is the true model, the usual significance tests on γ_0 and γ_1 are misleading, since the data from a given cross section cannot provide any evidence on the standard deviation of $\tilde{r}_Z$ and hence results in a serious underestimate of the sampling error of $\hat{\gamma}_0$ and $\hat{\gamma}_1$. Ignoring this second difficulty for the moment, we shall first consider the measurement error problems and the cross-sectional empirical evidence. The random coefficients issue and appropriate significance tests in the context of the two-factor model are discussed in more detail in Section IV.

As long as the $\hat{\beta}_j$ contain the measurement errors $\tilde{\epsilon}_j$, the least-squares estimates $\hat{\gamma}_0$ and $\hat{\gamma}_1$ in (10) will be subject to the well-known errors in variables bias and will be inconsistent, (cf. Johnston [1963, Chap. VI]). That is, assuming that $\bar{e}_j$ and $\tilde{\epsilon}_j$ are independent and are independent of the β_j in the cross-sectional sample,

$$\operatorname{plim} \hat{\gamma}_1 = \frac{\gamma_1}{1 + \sigma^2(\tilde{\epsilon})/S^2(\beta_j)} \tag{11}$$

where $S^2(\beta_j)$ is the cross-sectional sample variance of the true risk parameters β_j. Even for large samples, then, as long as the variance of the errors in the risk measure $\sigma^2(\tilde{\epsilon})$ is positive, the estimated coefficient $\hat{\gamma}_1$ will be biased toward zero and $\hat{\gamma}_0$ will therefore be biased away from zero. Hence tests of the significance of the differences $\hat{\gamma}_0 - 0$ and $\hat{\gamma}_1 - \bar{R}_M$ will be misleading.

C. The Grouping Solution to the Measurement Error Problem. We show in the Appendix that by appropriate grouping of the data to be used in estimating (10) one can substantially reduce the bias introduced through the existence of measurement errors in the $\hat{\beta}_j$. In essence the procedure amounts to systematically ordering the firms into groups (in fact by the same procedure that formed the ten portfolios used in the time series tests in Section II) and then calculating the risk measures $\hat{\beta}$ for each portfolio using the time series of portfolio returns. This procedure can greatly reduce the sampling error in the estimated risk measures; indeed, for large samples and independent errors, the sampling error is virtually eliminated. We then estimate the cross-sectional parameters of (10) using the portfolio mean returns over the relevant holding period and the risk coefficients obtained from estimation of (6) from the time series of portfolio returns. If appropriate grouping procedures are employed, this procedure will yield consistent estimates of the parameters γ_0 and γ_1 and thus will yield virtually unbiased estimates for samples in which the number of securities entering each group is large. Thus, by applying the cross-sectional test to our ten portfolios rather than to the underlying individual securities, we can virtually eliminate the measurement error problem.[9]

D. The Cross-sectional Empirical Results. Given the 35 years of monthly returns on each of the ten portfolios calculated as explained in Section II, we then estimated $\hat{\beta}_K$ and $\bar{R}_K$ $(K = 1, 2, \ldots, 10)$ for each portfolio, using all 35 years of monthly data. These estimates (see Table 2) were then used in estimating the cross-sectional relation given by (10) for various holding periods.

Figure 1 is a plot of $\bar{R}_K$ versus $\hat{\beta}_K$ for the 35-year holding period January, 1931–December, 1965. The symbol × denotes the average monthly excess return and risk of each of the ten portfolios. The symbol ☐ denotes the average excess

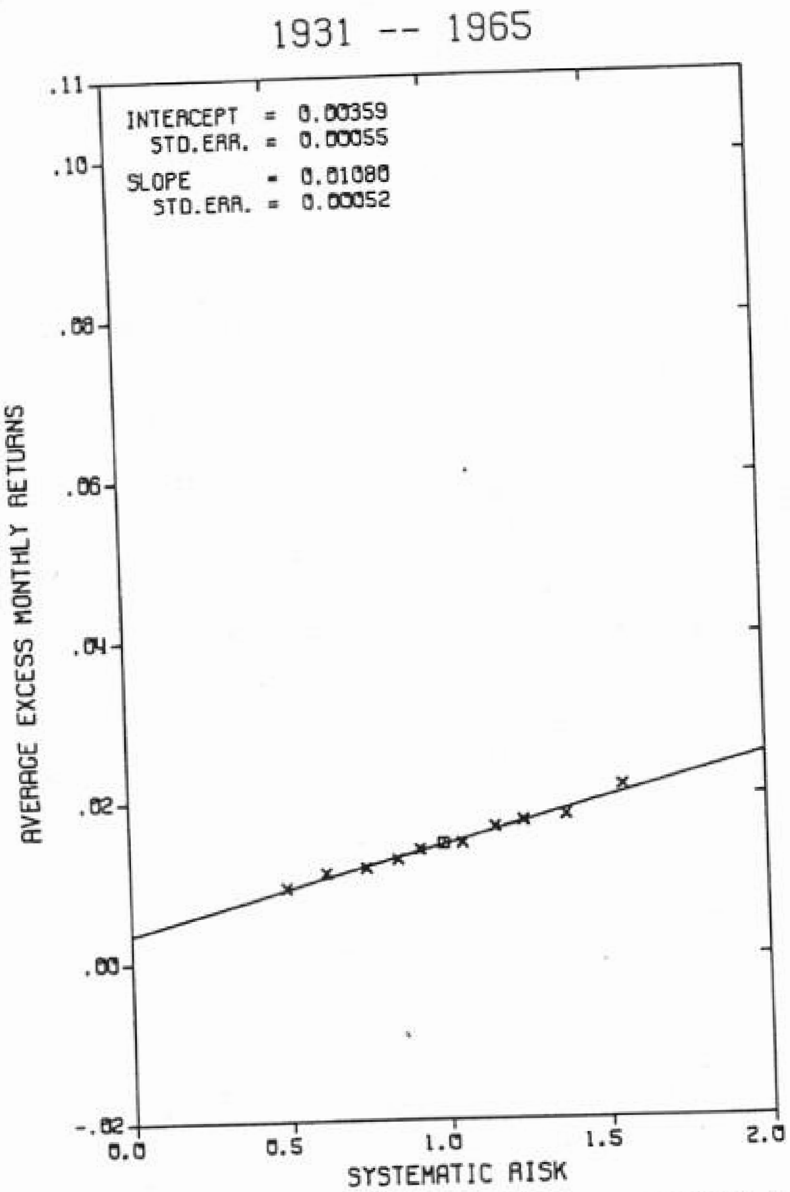

FIGURE 1 Average excess monthly returns versus systematic risk for the 35-year period 1931–65 for each of ten portfolios (denoted by ×) and the market portfolio (denoted by ☐).

return and risk of the market portfolio (which by the definition of β is equal to unity). The line represents the least-squares estimate of the relation between $\bar{R}_K$ and $\hat{\beta}_K$. The "intercept" and "slope" (with their respective standard errors given in parentheses) in the upper portion of the figure are the coefficients γ_0 and γ_1 of (10).

The traditional form of the asset pricing model implies that the intercept γ_0 in (10) should be equal to zero and the slope γ_1 should be equal to $\bar{R}_M$, the mean excess return on the market portfolio. Over this 35-year period, the average monthly excess return on the market portfolio $\bar{R}_M$, was 0.0142, and the theoretical values of the intercept and slope in Figure 1 are

$$\gamma_0 = 0 \qquad \text{and} \qquad \gamma_1 = 0.0142$$

The "t" values

$$t(\hat{\gamma}_0) = \frac{\hat{\gamma}_0}{s(\hat{\gamma}_0)} = \frac{0.00359}{0.00055} = 6.52$$

$$t(\hat{\gamma}_1) = \frac{\gamma_1 - \hat{\gamma}_1}{s(\hat{\gamma}_1)} = \frac{0.0142 - 0.0108}{0.00052} = 6.53$$

seem to indicate the observed relation is significantly different from the theoretical one. However, as we shall see, because (9) is a misspecification of the process generating the data, these tests vastly overstate the significance of the results.

We also divided the 35-year interval into four equal subperiods, and Figures 2 through 5 present the plots of the $\bar{R}_K$ versus the $\hat{\beta}_K$ for each of these intervals. In order to obtain better estimates of the risk coefficients for each of the subperiods, we used the coefficients previously estimated over the entire 35-year period.[10] The graphs indicate that the relation between return and risk is linear but that the slope is related in a nonstationary way to the theoretical slope for each period. Note that the traditional model implies that the theoretical relationship (not drawn) always passes through the two points given by the origin (0, 0) and the average market excess returns represented by ☐ in each figure. In the first subperiod (see Fig. 2) the empirical slope is steeper than the theoretical slope and then becomes successively flatter in each of the following three periods. In the last subperiod (see Fig. 5) the slope $\hat{\gamma}_1$ even has the "wrong" sign.

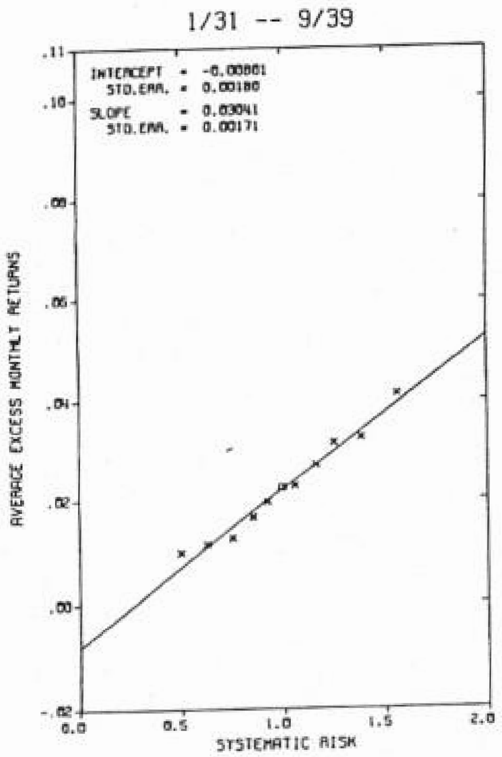

FIGURE 2 Average excess monthly returns versus systematic risk for the 105-month period January, 1931 – September, 1939. Symbols as in Figure 1.

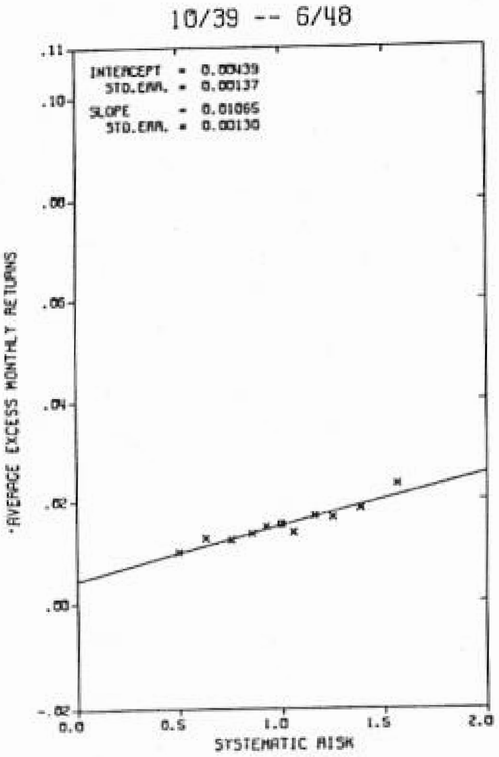

FIGURE 3 Average excess monthly returns versus systematic risk for the 105-month period October, 1939 – June, 1948. Symbols as in Figure 1.

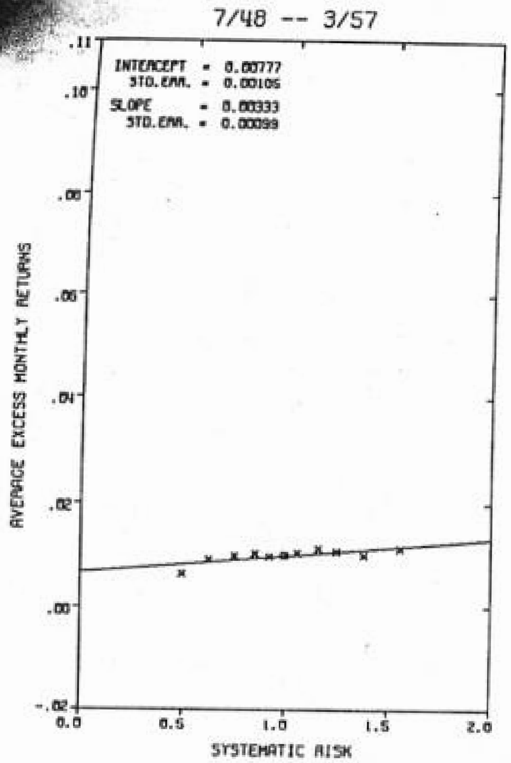

FIGURE 4 Average excess monthly returns versus systematic risk for the 105-month period July, 1948 – March, 1957. Symbols as in Figure 1.

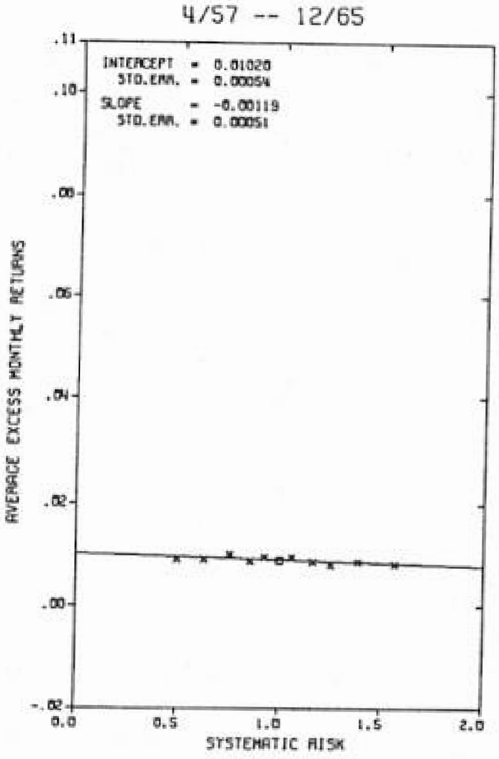

FIGURE 5 Average excess monthly returns versus systematic risk for the 105-month period April, 1957 – December, 1965. Symbols as in Figure 1.

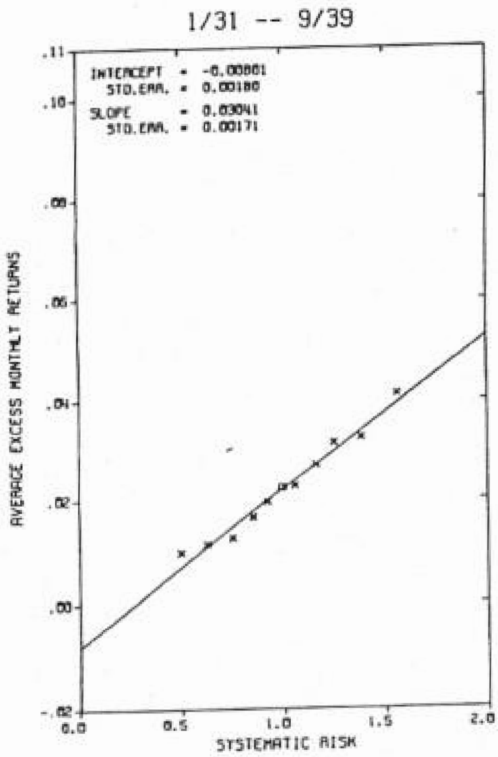

FIGURE 2 Average excess monthly returns versus systematic risk for the 105-month period January, 1931–September, 1939. Symbols as in Figure 1.

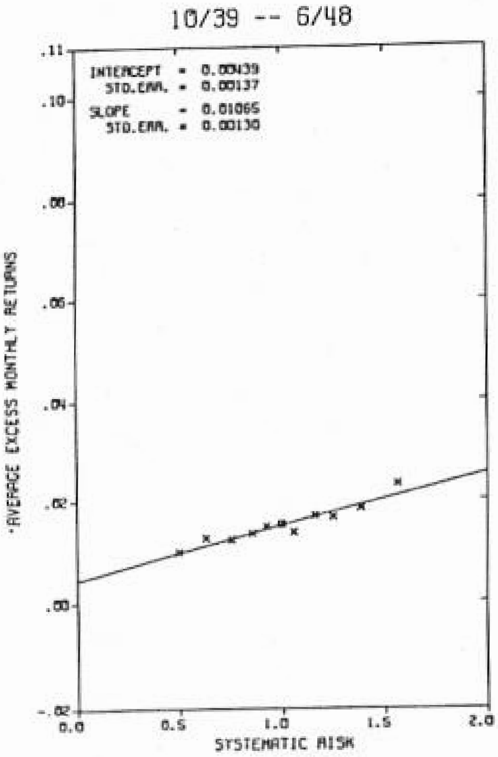

FIGURE 3 Average excess monthly returns versus systematic risk for the 105-month period October, 1939–June, 1948. Symbols as in Figure 1.

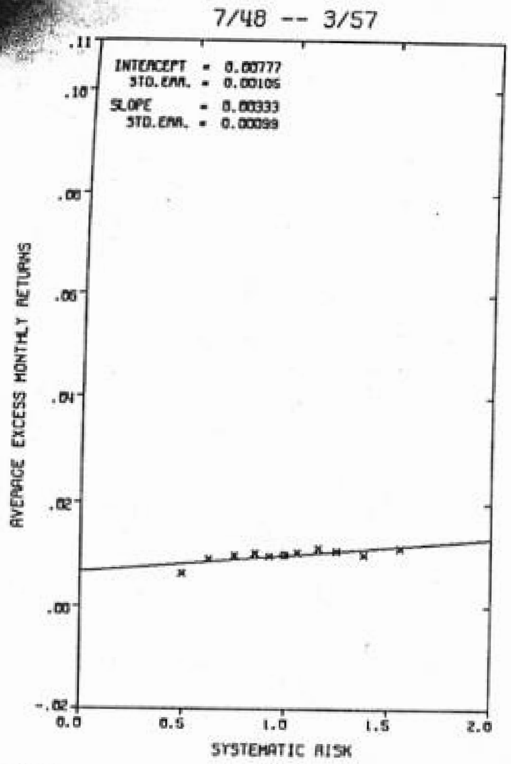

FIGURE 4 Average excess monthly returns versus systematic risk for the 105-month period July, 1948–March, 1957. Symbols as in Figure 1.

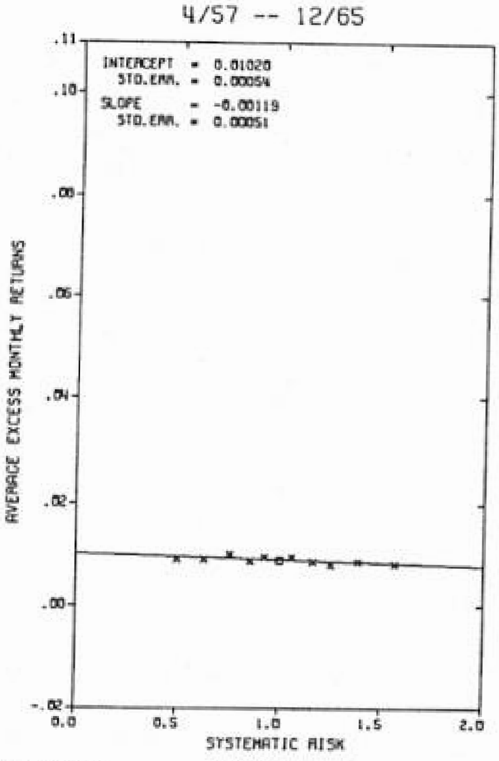

FIGURE 5 Average excess monthly returns versus systematic risk for the 105-month period April, 1957–December, 1965. Symbols as in Figure 1.

TABLE 4
Summary of Cross-sectional Regression Coefficients and Their t Values

	Time Period				
	Total Period	*Subperiods*			
	1/31–12/65	1/31–9/39	10/39–6/48	7/48–3/57	4/57–12/65
$\hat{\gamma}_0$	0.00359	−0.00801	0.00439	0.00777	0.01020
$\hat{\gamma}_1$	0.0108	0.0304	0.0107	0.0033	−0.0012
$\gamma_1 = \bar{R}_M$	0.0142	0.0220	0.0149	0.0112	0.0088
$t(\hat{\gamma}_0)$	6.52	−4.45	3.20	7.40	18.89
$t(\gamma_1 - \hat{\gamma}_1)$	6.53	−4.91	3.23	7.98	19.61

The coefficients $\hat{\gamma}_0$, $\hat{\gamma}_1$, γ_1 and the "t" values of $\hat{\gamma}_0$ and $\gamma_1 - \hat{\gamma}_1$ are summarized in Table 4 for the entire period and for each of the four subperiods. The smallest "t" value given there is 3.20, and all seem to be "significantly" different from their theoretical values. However, as we have already maintained, these "t" values are somewhat misleading because the estimated coefficients fluctuate far more in the subperiods than the estimated sampling errors indicate. This evidence suggests that the model given by (9) is misspecified. We shall now attempt to deal with this specification problem and to furnish an alternative formulation of the model.

IV. A Two-Factor Model

A. Form of the Model. As mentioned in the introduction, Black [1970] has shown under assumptions identical to that of the asset pricing model that, if riskless borrowing opportunities do not exist, the expected return on any asset j will be given by

$$E(\tilde{r}_j) = E(\tilde{r}_Z)(1-\beta_j) + E(\tilde{r}_M)\beta_j \qquad (12)$$

where $\tilde{r}_Z$ represents the return on a "zero beta" portfolio—a portfolio whose covariance with the returns on the market portfolio $\tilde{r}_M$ is zero.[11]

Close examination of the empirical evidence from both the cross-sectional and the time series tests indicates that the results are consistent with a model that expresses the return on a security as a linear function of the market factor r_M, (with a coefficient of β_j) and a second factor r_Z, (with a coefficient of

$1-\beta_j$). The function is

$$\tilde{r}_{jt} = \tilde{r}_{Zt}(1-\beta_j) + \tilde{r}_{Mt}\beta_j + \tilde{\omega}_{jt} \qquad (13)$$

Because the coefficient of the second factor is a function of the security's β, we call this factor the beta factor. For a given holding period T, the average value of $\tilde{r}_{Zt}$ will determine the relation between $\hat{\alpha}$ and $\hat{\beta}$ for different securities or portfolios. If the data are being generated by the process given by (13) and if we estimate the single variable time series regression given by (6), then the intercept $\hat{\alpha}$ in that regression will be

$$\hat{\alpha} = (\bar{r}_Z - \bar{r}_F)(1-\hat{\beta}_j) = \bar{R}_Z(1-\hat{\beta}_j) \qquad (14)$$

where $\bar{r}_Z = \Sigma_{t=1}^{T} \tilde{r}_{Zt}/T$ is the mean return on the beta factor over the period, $\bar{r}_F$ is the mean risk-free rate over the period, and $\bar{R}_Z$ is the difference between the two. Thus if $\bar{R}_Z$ is positive, high-beta securities will tend to have negative $\hat{\alpha}$'s, and low-beta securities will tend to have positive $\hat{\alpha}$'s. If $\bar{R}_Z$ is negative, high-beta securities will tend to have positive $\hat{\alpha}$'s, and low-beta securities will tend to have negative $\hat{\alpha}$'s.

In addition, if we estimate the cross-sectional regression given by (10), the expanded two-factor model implies that the true values of the parameters γ_0 and γ_1 will not be equal to zero and $\bar{R}_M$ but instead will be given by

$$\gamma_0 = \bar{R}_Z \qquad \text{and} \qquad \gamma_1 = \bar{R}_M - \bar{R}_Z$$

Hence if $\bar{R}_Z$ is positive, γ_0 will be positive and γ_1 will be less than $\bar{R}_M$. If $\bar{R}_Z$ is negative, γ_0 will be negative and γ_1 will be greater than $\bar{R}_M$.

Thus we can interpret Table 3 and Figures 2 through 5 as indicating that $\bar{R}_Z$ was negative in the first subperiod and became positive and successively larger in each of the following subperiods.

Examining (12), we see that the traditional form of the capital asset pricing model, as expressed in (1), is consistent with the present two-factor model if

$$E(\tilde{R}_Z) = 0 \qquad (15)$$

and (questions of statistical efficiency aside) any test for whether α_K for a portfolio is zero is equivalent to a test for whether $E(\tilde{R}_Z)$ is zero. The results in Table 3 suggest that $E(\tilde{R}_Z)$ is not stationary through time. For example, $\hat{\alpha}_K$ for the lowest risk portfolio (number 10) is negative in the first subperiod and positive in the last subperiod, with a "t" value of 8. Thus it is unlikely that the true values of α_K were the same in

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$\hat{\gamma}_1$	0.0108	0.0304	0.0107	0.0033	−0.0012
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Close examination of the empirical evidence from both the cross-sectional and the time series tests indicates that the results are consistent with a model that expresses the return on a security as a linear function of the market factor r_M, (with a coefficient of β_j) and a second factor r_Z, (with a coefficient of $1-\beta_j$). The function is

$$\tilde{r}_{jt} = \tilde{r}_{Zt}(1-\beta_j) + \tilde{r}_{Mt}\beta_j + \tilde{\omega}_{jt} \tag{13}$$

Because the coefficient of the second factor is a function of the security's β, we call this factor the beta factor. For a given holding period T, the average value of $\tilde{r}_{Zt}$ will determine the relation between $\hat{\alpha}$ and $\hat{\beta}$ for different securities or portfolios. If the data are being generated by the process given by (13) and if we estimate the single variable time series regression given by (6), then the intercept $\hat{\alpha}$ in that regression will be

$$\hat{\alpha} = (\bar{r}_Z - \bar{r}_F)(1-\hat{\beta}_j) = \bar{R}_Z(1-\hat{\beta}_j) \tag{14}$$

where $\bar{r}_Z = \Sigma_{t=1}^{T} \tilde{r}_{Zt}/T$ is the mean return on the beta factor over the period, $\bar{r}_F$ is the mean risk-free rate over the period, and $\bar{R}_Z$ is the difference between the two. Thus if $\bar{R}_Z$ is positive, high-beta securities will tend to have negative $\hat{\alpha}$'s, and low-beta securities will tend to have positive $\hat{\alpha}$'s. If $\bar{R}_Z$ is negative, high-beta securities will tend to have positive $\hat{\alpha}$'s, and low-beta securities will tend to have negative $\hat{\alpha}$'s.

In addition, if we estimate the cross-sectional regression given by (10), the expanded two-factor model implies that the true values of the parameters γ_0 and γ_1 will not be equal to zero and $\bar{R}_M$ but instead will be given by

$$\gamma_0 = \bar{R}_Z \qquad \text{and} \qquad \gamma_1 = \bar{R}_M - \bar{R}_Z$$

Hence if $\bar{R}_Z$ is positive, γ_0 will be positive and γ_1 will be less than $\bar{R}_M$. If $\bar{R}_Z$ is negative, γ_0 will be negative and γ_1 will be greater than $\bar{R}_M$.

Thus we can interpret Table 3 and Figures 2 through 5 as indicating that $\bar{R}_Z$ was negative in the first subperiod and became positive and successively larger in each of the following subperiods.

Examining (12), we see that the traditional form of the capital asset pricing model, as expressed in (1), is consistent with the present two-factor model if

$$E(\tilde{R}_Z) = 0 \tag{15}$$

and (questions of statistical efficiency aside) any test for whether α_K for a portfolio is zero is equivalent to a test for whether $E(\tilde{R}_Z)$ is zero. The results in Table 3 suggest that $E(\tilde{R}_Z)$ is not stationary through time. For example, $\hat{\alpha}_K$ for the lowest risk portfolio (number 10) is negative in the first subperiod and positive in the last subperiod, with a "t" value of 8. Thus it is unlikely that the true values of α_K were the same in the two subperiods (each of which contains 105 observations) and thus unlikely that the true values of $E(R_Z)$ were the same in the two subperiods, and we shall derive formal tests of this proposition below.

The existence of a factor $\tilde{R}_Z$ with a weight proportional to $1-\beta_j$ in most securities is also suggested by the unreasonably high "t" values[12] obtained in the cross-sectional regressions, as given in Table 4. Since γ_0 and γ_1 involve $\tilde{R}_Z$, which is a random variable from cross section to cross section, and since no single cross-sectional run can provide any information whatsoever on the variability of $\tilde{R}_Z$, this element is totally ignored in the usual calculation of the standard errors of γ_0 and γ_1. It is not surprising, therefore, that each individual cross-sectional result seems so highly significant but so totally different from any other cross-sectional relationship. Of course the presence of infinite-variance stable distributions will also contribute to this type of phenomenon.

In addition, in an attempt to determine whether the linearity observed in Figures 1 through 5 was in some way due to the averaging involved in the long periods presented there, we replicated those plots for our ten portfolios for 17 separate two-year periods from 1932 to 1965. These results, which also exhibit a remarkable linearity, are presented in Figures 6a and 6b. Since the evidence seems to indicate that the all-risky asset model describes the data better than the traditional model, and since the definition of our "riskless" interest rate was somewhat arbitrary in any case, these plots were derived from calculations on the raw return data with no reference whatsoever to the "risk-free" rate defined earlier (including the recalculation of the ten portfolios and the estimation of the β_j). Figures 7 through 11 contain a replication of Figures 1 through 5 calculated on the same basis. These results indicate that the basic findings summarized previously cannot be be attributed to misspecification of the riskless rate.

In summary, then, the empirical results suggest that the returns on different securities can be written as a linear function of two factors as given in (13), that the expected excess return on the beta factor $\tilde{R}_Z$ has in general been positive, and that the expected return on the beta factor has been higher in more recent subperiods than in earlier subperiods.

B. Explicit Estimation of the Beta Factor and a Crucial Test of the Model. Since the traditional form of the asset

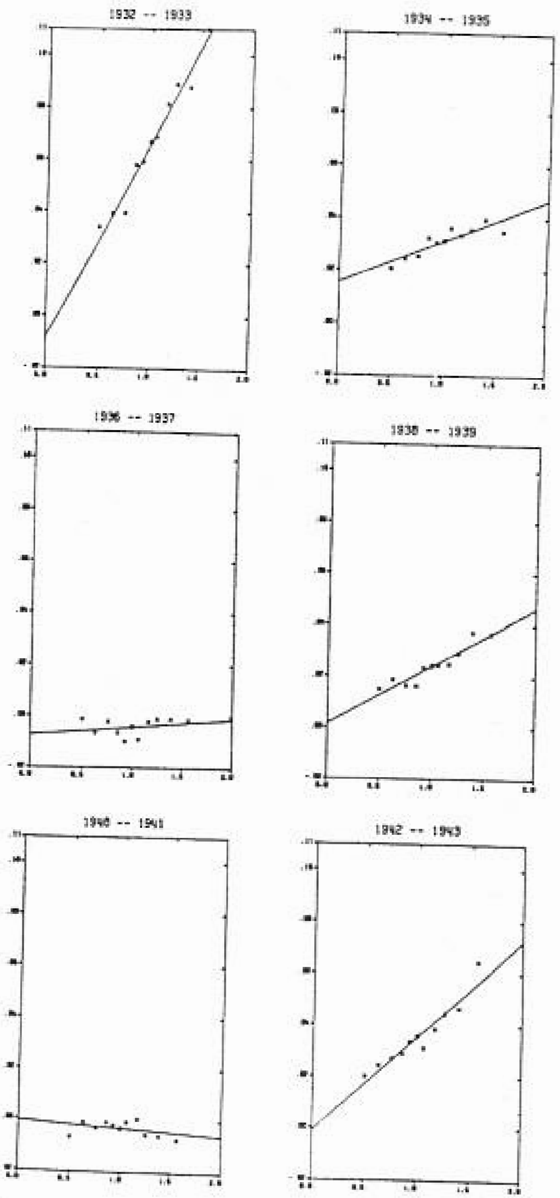

FIGURE 6 Average monthly returns versus systematic risk for 17 non-overlapping two-year periods from 1932 to 1965.

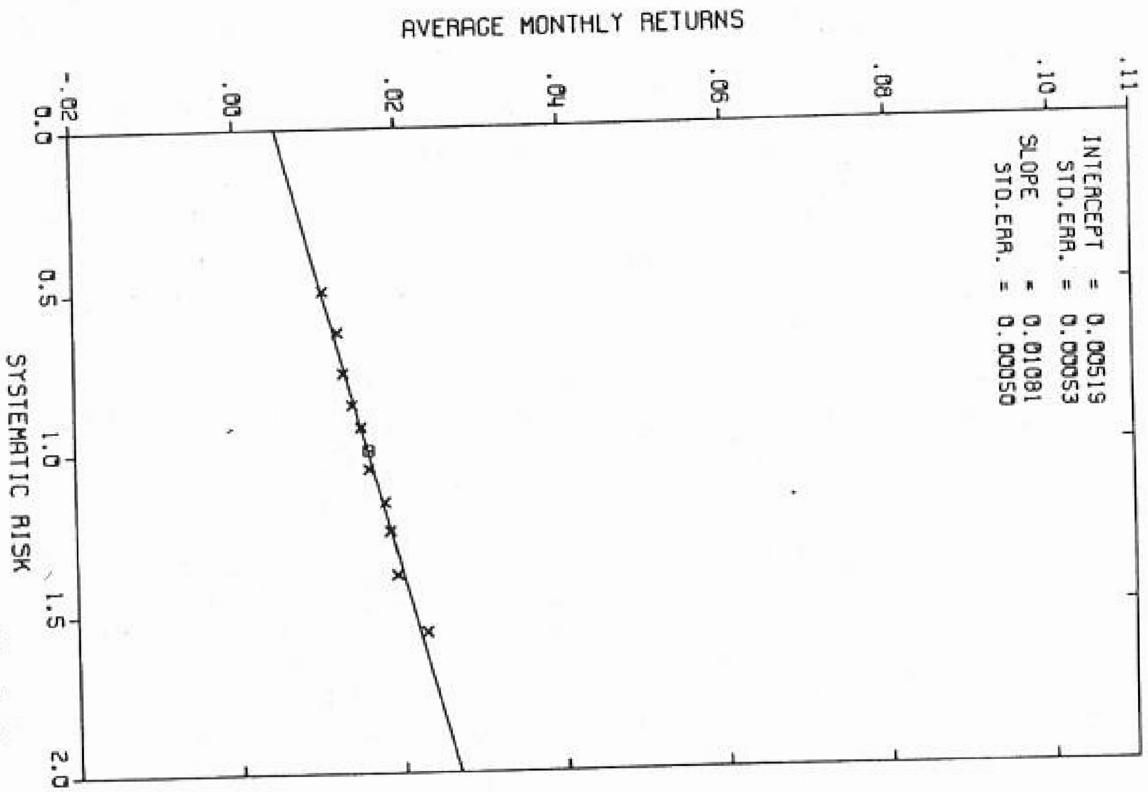

FIGURE 7 Average monthly returns versus systematic risk for the 35-year period 1931–65 for the ten portfolios and the market portfolio.

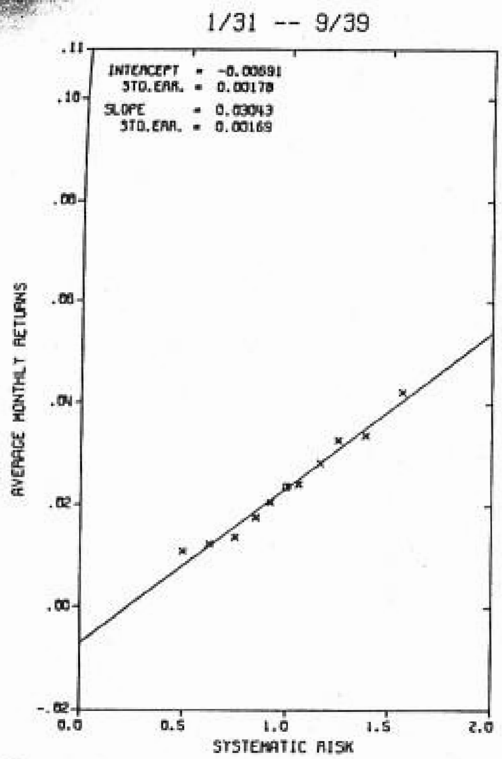

FIGURE 8 Average monthly returns versus systematic risk for the 105-month period January, 1931–September, 1939.

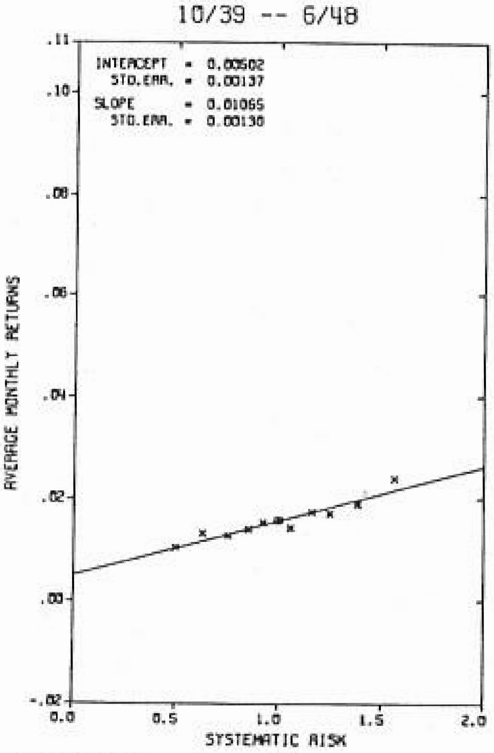

FIGURE 9 Average monthly returns versus systematic risk for the 105-month period October, 1939–June, 1948.

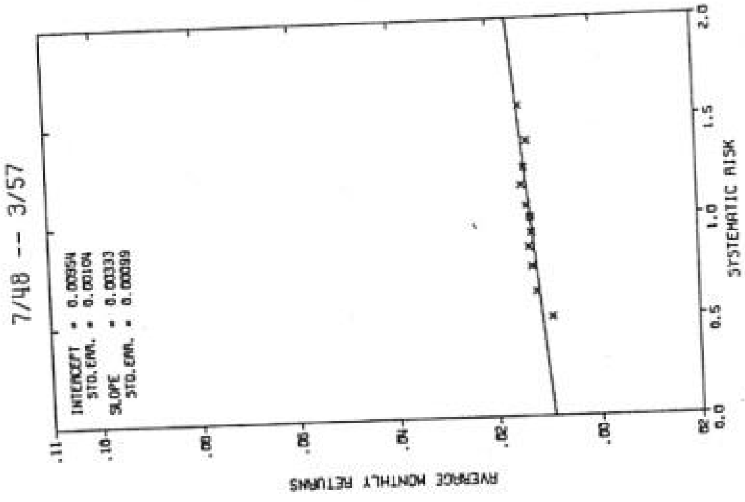

FIGURE 10 Average monthly returns versus systematic risk for the 105-month period July, 1948–March, 1957.

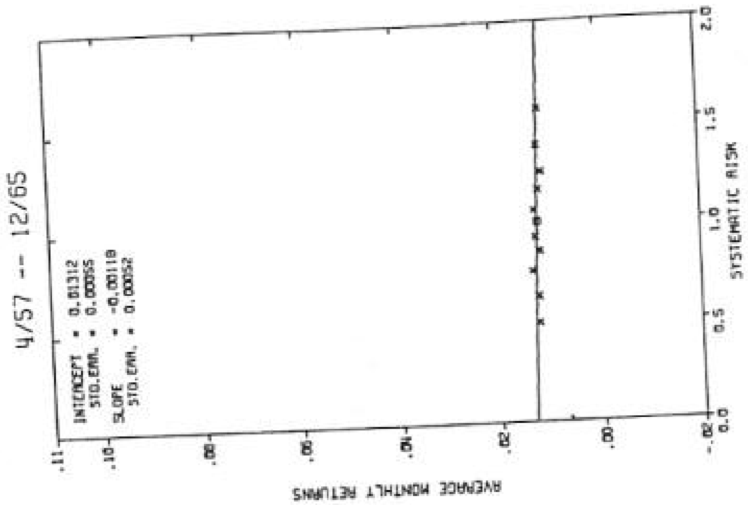

FIGURE 11 Average monthly returns versus systematic risk for the 105-month period April, 1957–December, 1965.

pricing model is consistent with the existence of the beta factor as long as the excess returns on the beta factor have a zero mean,[13] our purpose here is to provide a procedure for explicit estimation of the time series of the factor. Given such a time series, we can then make explicit estimates of the significance of its mean excess return rather than depending mainly on an examination of the $\hat{\alpha}_j$ for high- and low-beta securities. Solving (13) for $\tilde{r}_{Zt}$ plus the error term, we have an estimate $\hat{r}_{Zjt}$, of $\tilde{r}_{Zt}$

$$\hat{r}_{Zjt} = \frac{1}{(1-\beta_j)}[\tilde{r}_j - \beta_j \tilde{r}_{Mt}] = \tilde{r}_{Zt} + \tilde{u}_{jt} \qquad (16)$$

where $\tilde{u}_{jt} = \tilde{w}_{jt}/(1-\beta_j)$. We subscript $\hat{r}_{Zjt}$ by j to denote that this is an estimate of $\tilde{r}_{Zt}$ obtained from the jth asset or portfolio. Now, since we can obtain as many separate estimates of $\tilde{r}_{Zt}$ as we have securities or portfolios, we can formulate a combined estimate

$$r^{\circ}_{Zt} = \sum_j h_j \hat{r}_{Zjt} \qquad (17)$$

which is a linear combination of the $\hat{r}_{Zjt}$, to provide a much more efficient estimate of $\tilde{r}_{Zt}$. The problem is to find that linear combination of the $\hat{r}_{Zjt}$ which minimizes the error variance in the estimate of $\tilde{r}_{Zt}$. That is, we want to

$$\min_{h_j} E(r^{\circ}_{Zt} - \tilde{r}_{Zt})^2 = \min_{h_j} E\Big(\sum_j h_j \hat{r}_{Zjt} - \tilde{r}_{Zt}\Big)^2$$

subject to $\sum_j h_j = 1$, since we want an unbiased estimate. From the Lagrangian we obtain the first-order conditions

$$h_j \sigma^2(\tilde{u}_j) - \lambda = 0 \qquad j = 1, 2, \ldots, N \qquad (18)$$

where λ is the Lagrangian multiplier and N is the total number of securities or nonoverlapping portfolios. These conditions imply that

$$\frac{h_j}{h_i} = \frac{\sigma^2(\tilde{u}_i)}{\sigma^2(\tilde{u}_j)} \qquad \text{for} \quad \text{all } i \text{ and } j \qquad (19)$$

which implies that the optimal weights h_j are proportional to $1/\sigma^2(\tilde{u}_j)$. That is,

$$h_j = \frac{K}{\sigma^2(\tilde{u}_j)} \qquad j = 1, 2, \ldots, N \qquad (20)$$

where $K = 1/\Sigma_j [1/\sigma^2(\tilde{u}_j)]$ is a normalizing constant. But from the definition of $\tilde{u}_j$ we know that $\sigma^2(\tilde{u}_j) = \sigma^2(\tilde{w}_j)/(1-\beta_j)^2$, so

$$h_j = \frac{K(1-\beta_j)^2}{\sigma^2(\tilde{w}_j)} \tag{21}$$

Equation (21) makes sense, for we are then weighting the estimates in proportion to $(1-\beta_j)^2$ and inversely proportional to $\sigma^2(\tilde{w}_j)$. However, since we cannot observe $\sigma^2(\tilde{w}_j)$ directly,[14] we are forced, for lack of explicit estimates, to assume that the $\sigma^2(\tilde{w}_j)$ are all identical and to use as our weights

$$h_j = K'(1-\beta_j)^2 \tag{22}$$

where $K' = 1/\Sigma_j (1-\beta_j)^2$.

Equations (17) and (22) thus provide an unbiased and (approximately) efficient procedure for estimating $\bar{r}_{Zt}$ utilizing all available information. However, there is a problem of bias involved in actually applying this procedure to the security data. The coefficient β_j is of course unobservable, and in general if we use our estimates $\hat{\beta}_j$ in the weighting procedure we will introduce bias into our estimate of $\bar{r}_{Zt}$. To understand this, recall that $\hat{\beta}_j = \beta_j + \epsilon_j$, substitute this into (13) with the necessary additions and subtractions, and solve for the estimate

$$\hat{r}_{Zjt} = \frac{\tilde{r}_{jt} - \hat{\beta}_j \tilde{r}_{Mt}}{(1-\hat{\beta}_j)} = \frac{\tilde{r}_{Zt}(1-\beta_j) + \tilde{w}_j - \tilde{\epsilon}_j \tilde{r}_{Mt}}{(1-\hat{\beta}_j)}$$

Substituting this into (17), using (22), rearranging terms, and taking the probability limit, we have

$$\operatorname*{plim}_{N\to\infty} r^{\circ}_{Zt} = \frac{C_t[S^2(\beta) + (1-\bar{\beta})^2] + \sigma^2(\tilde{\epsilon}) r_{Mt}}{[S^2(\beta) + (1-\bar{\beta})^2] + \sigma^2(\tilde{\epsilon})} \tag{23}$$

where $S^2(\beta)$ is the cross-sectional variance of the β_j and $\bar{\beta}$ is the mean. However, the average standard deviation of the measurement error $\sigma(\tilde{\epsilon}_j)$ for our portfolios is only 0.0101 (implying an average variance on the order of 0.0001), and since $S^2(\beta)$ for our ten portfolios is 0.1144 and $\bar{\beta} = 1.007$, this bias will be negligible and we shall ignore it.

To begin, let us apply the foregoing procedures to the excess return data to obtain an estimate of $\tilde{R}_{Zt} = \tilde{r}_{Zt} - r_{Ft}$, the excess return on the beta factor. Substituting R_{jt} for r_{jt} and R_{Mt} for r_{Mt} in (16), the $\hat{R}_{Zjt}$ were estimated for each of our ten portfolios. These were then averaged to obtain the estimate

$$R^{\circ}_{Zt} = \sum_j h_j \hat{R}_{Zjt} = K' \sum_j (1-\beta_j)^2 \left[\frac{\tilde{R}_{jt} - \hat{\beta}_j R_{Mt}}{1-\hat{\beta}_j}\right]$$

for each month t. The average of the R°_{Zt} for the entire period and for each of the four subperiods are given in Table 5, along with their t values. Table 5 also presents the serial correlation coefficients $r(R^{\circ}_{Zt}, R^{\circ}_{Z,t-1})$.[15] Note that the mean value $\bar{R}^{\circ}_Z$ of the beta factor over the whole period has a "t" value of only 1.64. However, as hypothesized earlier, it was negative in the first subperiod and positive and successively larger in each of the following subperiods. Moreover, in the last two subperiods its "t" values were 4.03 and 4.49, respectively. These results seem to us to be strong evidence favoring rejection of the traditional form of the asset pricing model which says that $\bar{R}^{\circ}_Z$ should be insignificantly different from zero.

TABLE 5
Estimated Mean Values and Serial Correlation of the Excess Returns on the Beta Factor over the Entire Periods and the Four Subperiods*

Period	$\bar{R}^{\circ}_Z$	$\sigma(R^{\circ}_Z)$	$t(\bar{R}^{\circ}_Z)$	$r(R^{\circ}_{Zt}, R^{\circ}_{Z,t-1})$	$t(r)$
1/31–12/65	0.00338	0.0426	1.62	0.113	2.33
1/31–9/39	−0.00849	0.0641	−1.35	0.194	1.49
10/39–6/48	0.00420	0.0455	0.946	0.208	2.19
7/48–3/57	0.00782	0.0199	4.03	−0.181	−1.87
4/57–12/65	0.00997	0.0228	4.49	0.414	4.60

*The values of $t(\bar{R}^{\circ}_Z)$ were calculated under the assumption of normal distributions.

In order to be sure that the significance levels reported in Table 5 are not spurious and due only to the misapplication of normal distribution theory to a situation in which the variables may actually be distributed according to the infinite variance members of the stable class of distributions. We have performed the significance tests using the stable distribution theory outlined by Fama and Roll [1968]. Table 6 presents the standardized variates (i.e., the "t" values) for $\bar{R}^{\circ}_Z$ for each of the sample periods given in Table 5 along with the "t" values at the 5% level of significance (two-tail) under

TABLE 6

Normalized Variate [i.e., t Value $t(\bar{R}_Z^\circ, \alpha) = \bar{R}_Z^\circ/\sigma(\bar{R}_Z^\circ\ \alpha)$] of the Excess Return on the Beta Factor Under the Assumption of Infinite Variance Symmetric Stable Distributions

	α					
Period	1.5	1.6	1.7	1.8	1.9	2.0
1/31–12/65	1.33	1.71	2.14	2.61	3.11*	3.65*
1/31–9/39	−1.11	−1.44	−1.71	−2.00	−2.29	−2.58
10/39–6/48	0.82	1.00	1.18	1.38	1.58	1.79
7/48–3/57	2.60	3.16	3.75*	4.37*	5.00*	5.66*
4/57–12/65	3.05	3.70	4.40*	5.11*	5.86*	6.63*
t Value at the 5% level of significance (two-tail)†	4.49	3.90	3.48.	3.16	2.93	2.77

Note: α = characteristic exponent, $\sigma(\bar{R}_Z^\circ, \alpha)$ = dispersion parameter of the distribution.

†Cf. Fama and Roll [1968].

alternative assumptions regarding the value of α, the characteristic exponent of the distribution. The smaller is α, the higher are the extreme tails of the probability distribution; $\alpha = 2$ corresponds to the normal distribution and $\alpha = 1$ to the Cauchy distribution. Evidence presented by Fama [1965] seems to indicate that α is probably in the range 1.7 to 1.9 for common stocks. We have not attempted to obtain explicit estimates of α for our data, since currently known estimation procedures are quite imprecise and require extremely large samples (up to 2,000 observations). Therefore we have simply presented the "t" values calculated according to the procedures suggested by Fama and Roll [1968] for six values of α ranging from 1.5 to 2.0. The coefficients in Table 6 that are significant at the 5% level are noted with an asterisk. Clearly, if α is greater than 1.7, the results confirm the impression gained from the normal tests given in Table 5.

Note that the estimates in Tables 5 and 6 were obtained from the excess return data; therefore, although the figures are of interest for testing the traditional form of the model, they do not give the appropriate level of the mean value of $\bar{r}_Z$. The estimates $\bar{r}_Z^\circ$ and $\bar{r}_M$ obtained from the total return data used in Figures 6 through 11 appear in Table 7, along with $\sigma(\bar{r}_Z^\circ)$ and $\sigma(\bar{r}_M)$ and the estimated values of γ_0 and γ_1 for the cross-sectional regressions [given by (10)] for each of the var-

TABLE 7

Mean and Standard Deviation of Returns on the Zero Beta and Market Portfolios and the Cross-sectional Regression Coefficients [from (10)] for Various Sample Periods

Time Period	$\bar{r}_Z^\circ$	$\bar{r}_M$	$\bar{r}_M - \bar{r}_Z^\circ$	$\sigma(r_Z^\circ)$	$\sigma(r_M)$	$\hat{\gamma}_0{}^a$	$\hat{\gamma}_1{}^a$
1931–1965	0.004980	0.015800	0.010820	0.042584	0.089054	0.005190	0.010807
1/31–9/39	−0.007393	0.023067	0.030459	0.063927	0.158707	−0.006913	0.030429
10/39–6/48	0.004833	0.015487	0.010665	0.045520	0.062414	0.005021	0.010652
7/48–3/57	0.009591	0.012915	0.003324	0.019895	0.036204	0.009537	0.003327
4/57–12/65	0.012889	0.011723	−0.001167	0.022631	0.038470	0.013115	−0.001181
1931	−0.047243	−0.037573	0.009669	0.040827	0.152924	−0.045492	0.009557
1932–1933	−0.009180	0.065574	0.074754	0.059741	0.245281	−0.008286	0.074696
1934–1935	0.015549	0.031250	0.015701	0.048551	0.097739	0.015542	0.015702
1936–1937	−0.007749	−0.004538	0.005211	0.032589	0.084786	−0.007336	0.003194
1938–1939	0.001919	0.024436	0.022517	0.100490	0.147129	0.001514	0.022543
1940–1941	−0.001308	−0.003902	−0.002596	0.043481	0.072454	−0.000646	−0.002638
1942–1943	−0.009898	0.035782	0.036780	0.066552	0.066451	−0.001069	0.036784
1944–1945	0.004511	0.036117	0.031507	0.032522	0.043560	0.004451	0.031517
1946–1947	0.010153	−0.002357	−0.013010	0.033074	0.056139	0.010946	−0.013061
1948–1949	0.009721	0.008529	−0.001192	0.019590	0.051471	0.009709	−0.001191
1950–1951	0.007163	0.020253	0.013090	0.028656	0.039764	0.007215	0.013087
1952–1953	0.012258	0.003054	−0.009204	0.014559	0.026896	0.012050	−0.009191
1954–1955	0.007432	0.027266	0.019834	0.019232	0.030804	0.007392	0.019836
1956–1957	0.010463	−0.003097	−0.013559	0.017638	0.032340	0.010555	−0.013565
1958–1959	0.014582	0.025060	0.011478	0.019982	0.028261	0.014205	0.011502
1960–1961	0.026825	0.010867	−0.015958	0.023178	0.036505	0.026753	−0.015953
1962–1963	0.004300	0.002728	−0.001571	0.026231	0.052144	0.005054	−0.001620
1964–1965	0.005032	0.017771	0.012738	0.014433	0.026761	0.005519	0.012707

[a] Cf. eq. (10).

ious sample periods portrayed in Figures 6 through 11. (Recall that the two-factor model implies $\gamma_0 = \bar{r}_Z$ and $\gamma_1 = \bar{r}_M - \bar{r}_Z$.) One additional item of interest in judging the importance of the beta factor in the determination of security returns is its standard deviation relative to that of the market returns. As Table 7 reveals, $\sigma(\bar{r}_Z^\circ)$ is roughly 50% as large as $\sigma(\bar{r}_M)$. Comparison of $\bar{r}_Z^\circ$ and $\bar{r}_M$ in Table 7 for the four 105-month subperiods indicates that the mean returns on the beta factor were approximately equal to the average market returns in the last two periods covering the interval July, 1948–December, 1965. Apparently, then, the relative magnitudes of $\bar{r}_Z^\circ$ and $\bar{r}_M$ indicate that the beta factor is economically as well as statistically significant.

V. *Conclusion*

The traditional form of the capital asset pricing model states that the expected excess return on a security is equal to its level of systematic risk, β, times the expected excess return on the market portfolio. That is, in capital market equilibrium, prices of assets adjust such that

$$E(\tilde{R}_j) = \gamma_1 \beta_j \tag{24}$$

where $\gamma_1 = E(\tilde{R}_M)$, the expected excess return on the market portfolio.

An alternative hypothesis of the pricing of capital assets arises from the relaxation of one of the assumptions of the tranditional form of the capital asset pricing model. Relaxation of the assumption that riskless borrowing and lending opportunities are available leads to the formulation of the two-factor model. In equilibrium, the expected returns $E(\tilde{r}_j)$ on an asset will be given by

$$E(\tilde{r}_j) = E(\tilde{r}_Z) + [E(\tilde{r}_M) - E(\tilde{r}_Z)]\beta_j \tag{25}$$

where $E(\tilde{r}_Z)$ is the expected return on a portfolio that has a zero covariance (and thus $\beta_Z = 0$) with the return on the market portfolio $\tilde{r}_M$. In the context of this model, the return on 30-day Treasury Bills (which we have used as a proxy for a "riskless" rate) simply represents the return on a particular asset in the system. Thus, subtracting r_F from both sides of (25), we can rewrite (25) in terms of "excess" returns as

$$E(\tilde{R}_j) = \gamma_0 + \gamma_1 \beta_j \tag{26}$$

where $\gamma_0 = E(\tilde{R}_Z)$ and $\gamma_1 = E(\tilde{R}_M) - E(\tilde{R}_Z)$.

The traditional form of the asset pricing model implies that $\gamma_0 = 0$ and $\gamma_1 = E(\tilde{R}_M)$ and the two-factor model implies that $\gamma_0 = E(\tilde{R}_Z)$, which is not necessarily zero and that $\gamma_1 = E(\tilde{R}_M) - E(\tilde{R}_Z)$. In addition, several other models arise from relaxing some of the assumptions of the traditional asset pricing model which imply $\gamma_0 \neq 0$ and $\gamma_1 \neq E(R_M)$. These models involve explicit consideration of the problems of measuring R_M, the existence of nonmarketable assets, and the existence of differential taxes on capital gains and dividends, and we shall briefly outline them. Our main emphasis has been to test the strict traditional form of the asset pricing model; that is, is $\gamma_0 \neq 0$? We have made no attempt to provide direct tests of these other alternative hypotheses.

To test the traditional model, we used all securities listed on the New York Stock Exchange at any time in the interval between 1926 and 1966. The problem we faced was to obtain efficient estimates of the mean of the beta factor and its variance. It would be possible to test the alternative hypotheses by selecting one security at random and estimating its beta from the time series and ascertaining whether its mean return was significantly different from that predicted by the traditional form of the capital asset pricing model. However, this would be a very inefficient test procedure.

To gain efficiency, we grouped the securities into ten portfolios in such a way that the portfolios had a large spread in their β's. However, we knew that grouping the securities on the basis of their estimated β's would not give unbiased estimates of the portfolio "Beta," since the β's used to select the portfolios would contain measurement error. Such a procedure would introduce a selection bias into the tests. To eliminate this bias we used an instrumental variable, the previous period's estimated beta, to select a security's portfolio grouping for the next year. Using these procedures, we constructed ten portfolios whose estimated β's were unbiased estimates of the portfolio "Beta." We found that much of the sampling variability of the β's estimated for individual securities was eliminated by using the portfolio groupings. The β's of the portfolios constructed in this manner ranged from 0.49 to 1.5, and the estimates of the portfolio β's for the subperiods exhibited considerable stationarity.

The time series regressions of the portfolio excess returns on the market portfolio excess returns indicated that high-beta securities had significantly negative intercepts and low-beta securities had significantly positive intercepts, contrary to the predictions of the traditional form of the model. There was also considerable evidence that this effect became stronger through time, being strongest in the 1947–65 period. The cross-sectional plots of the mean excess returns on the portfolios against the estimated β's indicated that the relation between mean excess return and β was linear. However, the intercept and slope of the cross-sectional relation varied in different subperiods and were not consistent with the traditional form of the capital asset pricing model. In the two prewar 105-month subperiods examined, the slope was steeper in the first period than that predicted by the traditional form of the model, and it was flatter in the second period. In each of the two 105-month postwar periods it was considerably flatter than predicted. From the evidence of both the time series and cross-sectional runs, we were led to reject the hypothesis that γ_0 in (26) was equal to zero; we therefore concluded that the traditional form of the asset pricing model is not consistent with the data.

We also attempted to make explicit estimates of the time series of returns on the beta factor in order to obtain a more efficient estimate of its mean and variance and thereby enable ourselves to directly test whether or not the mean excess return on the beta factor was zero. We derived a minimum-variance, unbiased linear estimator of the returns on the β factor using our portfolio return data. We showed that, given the independence of the residuals the optimum estimator requires knowledge of the unobservable residual variances of each of the portfolios but that this problem could be avoided if they were equal. Under this assumption of equal residual variances, we estimated the time series of returns on the beta factor. However, if these assumptions (i.e., the independence of the residuals and equality of their variances) are not valid—and there is reason to believe they are not—more complicated procedures are necessary to obtain minimum-variance estimates. Such estimators, which use the complete covariance structure of the portfolio returns are available (although not derived here). However, we feel that a straightforward application of these procedures to the return data would result in the introduction of serious *ex post* bias in the estimates. Thus we have left a complete investigation of these problems, as well as more detailed tests of the two-factor model, to a future paper. In order to fully utilize the properties of the two-factor model in a number of applied problems (such as portfolio evaluation, see Jensen [1971] and various issues in valuation theory), it will be necessary to have minimum-variance unbiased estimates of the time series of returns on the beta factor, and we hope to provide such estimates in the not-too-distant future.

The evidence obtained from the time series of returns on the beta factor indicated that the beta factor had a nonzero mean and that the mean was nonstationary over time. It seems to us that we have established the presence and significance of the beta factor in explaining security returns but, as mentioned earlier, we have not provided any direct tests aimed at explaining the existence of the beta factor. We have, however, suggested an economic rationale for why capital market equilibrium is consistent with the finding of this second factor. Black [1970] has shown that if riskless borrowing opportunities are not available, the equilibrium expected returns on an asset will be a linear function of two factors, one the β factor, the other the market factor.

In addition, Black and Jensen [1970] have demonstrated that if assets are omitted from the estimated market return, a model similar in some ways to the two-factor model would result. (Roll's analysis [1969] is relevant to this issue as well.) That is, it yields a model similar in structure to (26) and implies that $\gamma_0 \neq 0$. However, it is clear from Figures 6a and 6b and Table 7 that the beta factor (the intercept in the figures and γ_0 in Table 7) is highly variable and any alternative hypothesis must be consistent with this phenomenon. In other words, it is not sufficient for an alternative model to simply imply a nonzero but constant intercept in (26).

Others have provided alternative models that are similar in structure to the Black–Jensen results. For example, Mayers [1972] has developed an equilibrium model incorporating the existence of nonmarketable assets and has shown that the basic linear relation of the traditional model is unaltered, but the constant term γ_0 will be nonzero and γ_1 will not equal $E(R_M)$. The implications of his model for the structure of asset returns are virtually identical to those of the omitted assets model. Brennan [1970] has derived the equilibrium structure of security returns when the effects of a differential tax on dividends and capital gains are considered. He also concludes that the basic linearity of the traditional model is unchanged, but a nonzero constant term must be included and γ_1 will not equal $E(R_M)$. Black and Scholes [1970], however, have tested for the existence of dividend effects and have found that the differential tax on dividends and capital gains does not affect the structure of security returns and hence cannot explain the results reported here.

There are undoubtedly other economic hypotheses that are consistent with the findings of the existence of a second factor and consistent also with capital market equilibrium. Each hypothesis must be tested directly to determine whether it can account for the presence of the β factor. The Black–Scholes investigation of dividend effects is an example of such a test.

Appendix: The Grouping Solution to the Measurement Error Problem

Consider first the estimate $\hat{\beta}_j$ of the risk parameter in more detail. We will want to test (10) over some holding period, but we must first obtain the estimates of the risk parameter $\hat{\beta}_j$, from the time series equation given by (6). For simplicity, we shall assume that the $\tilde{e}_{jt}$ are independently distributed and have constant variance for all j and t. The least-squares estimate of β_j in (6), $\hat{\beta}_j$, is thus unbiased but subject to a sampling error $\tilde{\epsilon}_j$ as in (7), and the variance of the sampling error of the estimate $\hat{\beta}_j$ is

$$\operatorname{var}(\hat{\beta}_j|\beta_j) = \sigma^2(\tilde{\epsilon}_j) = \frac{\sigma^2(\tilde{e}_j)}{\phi} = \frac{\sigma^2(\tilde{e})}{\phi} \tag{A.1}$$

since $\sigma^2(\tilde{e}_j)$ was assumed equal for all j, and where

$$\phi = \sum_{t=1}^{T} (R_{Mt} - R_M)^2 \tag{A.2}$$

is the sample sum of squared deviations of the independent variable over the T observations used in the time series estimating equation. Hence using (11) we see that

$$\operatorname{plim} \hat{\gamma} = \frac{\gamma_1}{1 + \sigma^2(\tilde{e})/\phi S^2(\beta_j)} \tag{A.3}$$

Let us assume that we can order the firms on the basis of β_j or on the basis of some instrumental variable highly correlated with β_j but independent of $\tilde{\epsilon}_j$. Given the N ordered firms, we group them into M equal-size contiguous subgroups, represented by $K = 1, 2, \ldots, M$ and calculate the average return

for each group for each month t according to

$$\tilde{R}_{Kt} = \frac{1}{L} \sum_{j=1}^{L} \tilde{R}_{Kjt} \qquad K = 1, 2, \ldots, M \tag{A.4}$$

$$L = \frac{N}{M} \quad \text{(assumed to be integer)} \tag{A.5}$$

where $\tilde{R}_{Kjt}$ is the return for month t for security j in group K. We then estimate the systematic risk of the group by applying least squares to

$$\tilde{R}_{Kt} = \alpha_K + \beta_K \tilde{R}_{Mt} + \tilde{e}_{Kt} \qquad \begin{cases} K = 1, 2, \ldots, M \\ t = 1, 2, \ldots, T \end{cases} \tag{A.6}$$

where

$$\tilde{e}_{Kt} = \frac{1}{L} \sum_{j=1}^{L} \tilde{e}_{Kjt} \tag{A.7}$$

and

$$\sigma^2(\tilde{e}_{Kt}) = \frac{\sigma^2(\tilde{e})}{L} \tag{A.8}$$

Equation (A.8) holds, since, by assumption, the $\tilde{e}_{Kjt}$ are independently distributed with equal variance. The least-squares estimate of β_K in (A.6) is $\hat{\beta}_K = \beta_K + \tilde{\epsilon}_K$ and its variance is

$$\operatorname{var}(\hat{\beta}_K|\beta_K) = \sigma^2(\tilde{\epsilon}_K) = \frac{\sigma^2(\tilde{e})}{\phi L} \tag{A.9}$$

Now if we estimate the cross-sectional relation (10) using our M observations on $\bar{R}_K = \Sigma_{t=1}^{T} R_{Kt}/T$ and $\hat{\beta}_K$ for some holding period, we have

$$\bar{R}_K = \gamma_0 + \gamma_1 \hat{\beta}_K + \bar{e}_K^{\circ} \tag{A.10}$$

where

$$\bar{e}_K^{\circ} = \sum_{t=1}^{T} \frac{\tilde{e}_{Kt}^{\circ}}{T} = \bar{e}_K - \gamma_1 \tilde{\epsilon}_K \tag{A.11}$$

Now the large sample estimate of γ_1 in (A.10)

$$\operatorname{plim} \hat{\gamma}_1 = \frac{\gamma_1}{1 + \dfrac{\operatorname{plim} \sigma^2(\tilde{\epsilon}_K)}{\operatorname{plim} S^2(\beta_K)}} = \frac{\gamma_1}{1 + \dfrac{\operatorname{plim} \dfrac{1}{L} \sigma^2(\tilde{e})}{\phi S^2(\beta_K)}} = \gamma_1 \tag{A.12}$$

since $\operatorname{plim} \sigma^2(\tilde{e})/L = 0$ as long as $L \to \infty$ as $N \to \infty$, and this is true as long as we hold the number of groups constant. Thus these grouping procedures will result in unbiased estimates of the parameters of (10) for large samples. Note that $S^2(\beta_K)$, the cross-sectional sample variance of the true group risk coefficients, is constant with increasing L so long as securities are assigned to groups on the basis of the ranked $\hat{\beta}_j$. Note also, however, that if we randomly assigned securities to the M groups we would have plim $S^2(\beta_K) =$ plim $S^2(\beta_j)/L$ and (A.12) would thus be identical to (A.3). Therefore, random grouping would be of no help in eliminating the bias. As can be seen, the grouping procedures we have already described in the time series tests accomplish these results. While we expect these procedures to substantially reduce the bias[16] they cannot completely eliminate it in our case because the $\bar{e}_j$ and therefore the $\bar{\epsilon}_j$ are not independent across firms. However, as discussed in Section III, we expect the remaining bias to be trivially small.

Notes

1. Note that (4c) can be valid even though R_M is a weighted average of the R_j and therefore R'_M contains e_j. This may be clarified as follows: taking the weighted sum of (3) using the weights, X_j, of each security in the market portfolio we know by the definition of R_M that $\Sigma_j X_j R_j = R_M$, $\Sigma_j X_j \beta_j = 1$, and $\Sigma_j X_j e_j = 0$. Thus by the last equality we know $X_j e_j = -\Sigma_{i\neq j} X_i e_i$, and by substitution $E(e_j X_j e_j) = E[e_j(-\Sigma_{i\neq j} X_i e_i)] = X_j \sigma^2(e_j)$, and this implies condition (4c) since $E(e_j R'_m) = X_j \sigma^2(e_j) + E[e_j \Sigma_{i\neq j} X_i e_i] = 0$.
2. We could develop the model and tests under the assumption of infinite variance stable distributions, but this would unnecessarily complicate some of the analysis. We shall take explicit account of these distributional problems in some of the crucial tests of significance in Section IV.
3. Recall that the R_{jt} and R_{Mt} are defined as excess returns. The model can be formulated with r_{Ft} omitted from (6) and therefore assumed constant (then $\alpha_j = r_F(1-\beta_j)$) or included as a variable (as we have done), which strictly requires them to be known for all t. But experiments with estimates obtained with the inclusion of r_{Ft} as a variable in (6) yield results virtually identical to those obtained with the assumption of constant r_F [and hence the exclusion of r_{Ft} as a variable in (6)], so we shall ignore this problem here. See also Roll [1969] and Miller and Scholes [1972] for a thorough discussion of the bias introduced through misspecification of the riskless rate. Miller and Scholes conclude as we do that these problems are not serious.
4. Unbiased measurement errors in $\hat{\beta}_j$ cause severe difficulties with the cross-sectional tests of the model, and it is important to note that the time series form of the tests given by (6) are free of this source of bias. Unbiased measurement errors in $\hat{\beta}_j$, which is estimated simultaneously with α_j in the time series formulation, cause errors in the estimate of α_j but no systematic bias. Measurement errors in R_{Mt} may cause difficulties in

both the cross-sectional and time series forms of the tests, but we shall ignore this issue here. For an analysis of the problems associated with measurement errors in R_{Mt}, see Black and Jensen [1970], Miller and Scholes [1972], and Roll [1969].
5. Treasury Bill rates were obtained from the Salomon Brothers & Hutzler quote sheets at the end of the previous month for the following month. Dealer commercial paper rates were obtained from Banking and Monetary Statistics, Board of Governors of the Federal Reserve System, Washington, D.C.
6. The choice of the number of portfolios is somewhat arbitrary. As we shall see below, we wanted enough portfolios to provide a continuum of observations across the risk spectrum to enable us to estimate the suspected relation between α_K and β_K.
7. Note that in order for the risk parameters of the groups β_K, to be stationary through time, our procedures require that firms leave and enter the sample symmetrically across the entire risk spectrum.
8. See also Miller and Scholes [1972], who provide a careful analysis (using procedures that are complementary to but much different from those suggested here) of many of these problems with cross-sectional tests and their implications for the interpretation of previous empirical work.
9. Intuitively one can see that the measurement error problem is virtually eliminated by these procedures because the errors in $\hat{\beta}_K$ become extremely small. Since the correlations $r(\tilde{R}_K, \tilde{R}_M)$ are so high in Table 2, the standard errors of estimate of the coefficients β_K are all less than 0.022, and nine of them are less than 0.012. The average standard error of estimate for the ten $\hat{\beta}_K$ coefficients given in Table 2 for the entire period was 0.0101 and the cross-sectional variance of the $\hat{\beta}_K$, $S^2(\hat{\beta}_K)$ was 0.1144. Hence, assuming $S^2(\hat{\beta}_K) = S^2(\beta_K)$, squaring 0.0101, and using (11), we see that our estimateof γ_1 will be greater than 99.9% of its true value.
10. The analysis was also performed where the coefficients were reestimated for each subperiod, and the results were very similar because the $\hat{\beta}_K$ were quite stable over time. We report these results since this estimation procedure seemed to result in a slightly larger spread of the $\hat{\beta}_K$ and since the increased sample sizes tends to further reduce the bias caused by the variance of the measurement error in $\hat{\beta}_K$.
11. In fact, there is an infinite number of such zero β portfolios. Of all such portfolios. however, r_Z is the return on the one with minimum variance. (We are indebted to John Long for the proof of this point.)
12. We say unreasonably high because the coefficients change from period to period by amounts ranging up to almost seven times their estimated standard errors.
13. Although the traditional form of the model is consistent with the existence of the β factor if its excess return had a zero mean, clearly it would not provide as complete an explanation of the structure of asset returns as a model that explicitly incorporated such a factor. In particular, under these circumstances the traditional form would provide an adequate description of security returns over fairly lengthy periods of time, say three years or more, but it would probably not furnish an adequate description of security returns over much shorter intervals.
14. We only observe the residual variance from the single variable regression, and, as we can see from (13), this will be equal to $(1-\beta_j)^2\sigma^2(\tilde{r}_Z) + \sigma^2(\tilde{w}_j)$. However, there are more general procedures for estimating $\tilde{r}_{Zt}$ in

the situation of nonidentical $\sigma^2(\tilde{w}_j)$ and $\text{cov}(\tilde{w}_j, \tilde{w}_i) = 0$ for $j \neq i$. But we leave an investigation of the properties of these estimates and some additional tests of the two-factor model for a future paper. If the assumption of identical $\sigma^2(\tilde{w}_j)$ made here is inappropriate, we still obtain an unbiased estimate of the $\bar{R}_z$. However, the estimated variance of $\bar{R}_z$, which is of some interest, will be greater than the true variance.

15. The serial correlation for the entire period appears significant. Indeed, the serial correlation in the last period, 0.414, seems very large and even highly significant, with a t value of 4.6. However, the coefficients in the earlier periods seem to border on significance but show an inordinately large amount of variability, thus indicating substantial nonstationarity.

16. As mentioned earlier, the choice of the number of groups is somewhat arbitrary and, for any given sample size, involves a tradeoff between the bias and the degree of sampling error in the estimates of the parameters in (10). In an unpublished study of the properties of the grouping procedures by simulation techniques, Jensen and Mendu Rao have found that, when $\sigma^2(\bar{\epsilon}_j) = S^2(\beta_j)$, the use of ten groups with a total sample size of $N = 400$, yields estimates of the coefficient γ_1 in (10) which, on the average, are biased downward by less than 0.9% of their true value and have a standard error of estimate about 50% higher than that obtained with ungrouped data. The ungrouped sample estimates were, of course, 50% of their true values on the average [as implied by (11) for these assumed variances].

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Risk, Return, and Equilibrium: Empirical Tests

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This paper tests the relationship between average return and risk for New York Stock Exchange common stocks. The theoretical basis of the tests is the "two-parameter" portfolio model and models of market equilibrium derived from the two-parameter portfolio model. We cannot reject the hypothesis of these models that the pricing of common stocks reflects the attempts of risk-averse investors to hold portfolios that are "efficient" in terms of expected value and dispersion of return. Moreover, the observed "fair game" properties of the coefficients and residuals of the risk-return regressions are consistent with an "efficient capital market"—that is, a market where prices of securities fully reflect available information.

I. Theoretical Background

In the two-parameter portfolio model of Tobin (1958), Markowitz (1959), and Fama (1965*b*), the capital market is assumed to be perfect in the sense that investors are price takers and there are neither transactions costs nor information costs. Distributions of one-period percentage returns on all assets and portfolios are assumed to be normal or to conform to some other two-parameter member of the symmetric stable class. Investors are assumed to be risk averse and to behave as if they choose among portfolios on the basis of maximum expected utility. A perfect capital market, investor risk aversion, and two-parameter return distributions imply the important "efficient set theorem": The optimal portfolio for any investor must be efficient in the sense that no other portfolio with the same or higher expected return has lower dispersion of return.[1]

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[1] Although the choice of dispersion parameter is arbitrary, the standard deviation

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In the portfolio model the investor looks at individual assets only in terms of their contributions to the expected value and dispersion, or risk, of his portfolio return. With normal return distributions the risk of portfolio p is measured by the standard deviation, $\sigma(\tilde{R}_p)$, of its return, $\tilde{R}_p$,[2] and the risk of an asset for an investor who holds p is the contribution of the asset to $\sigma(\tilde{R}_p)$. If x_{ip} is the proportion of portfolio funds invested in asset i, $\sigma_{ij} = \text{cov}(\tilde{R}_i, \tilde{R}_j)$ is the covariance between the returns on assets i and j, and N is the number of assets, then

$$\sigma(\tilde{R}_p) = \sum_{i=1}^{N} x_{ip} \left[\frac{\sum_{j=1}^{N} x_{jp}\sigma_{ij}}{\sigma(\tilde{R}_p)} \right] = \sum_{i=1}^{N} x_{ip} \frac{\text{cov}(\tilde{R}_i, \tilde{R}_p)}{\sigma(\tilde{R}_p)}.$$

Thus, the contribution of asset i to $\sigma(\tilde{R}_p)$—that is, the risk of asset i in the portfolio p—is proportional to

$$\sum_{j=1}^{N} x_{jp}\sigma_{ij}/\sigma(\tilde{R}_p) = \text{cov}(\tilde{R}_i, \tilde{R}_p)/\sigma(\tilde{R}_p).$$

Note that since the weights x_{jp} vary from portfolio to portfolio, the risk of an asset is different for different portfolios.

For an individual investor the relationship between the risk of an asset and its expected return is implied by the fact that the investor's optimal portfolio is efficient. Thus, if he chooses the portfolio m, the fact that m is efficient means that the weights x_{im}, $i = 1, 2, \ldots, N$, maximize expected portfolio return

$$E(\tilde{R}_m) = \sum_{i=1}^{N} x_{im} E(\tilde{R}_i),$$

subject to the constraints

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is common when return distributions are assumed to be normal, whereas an interfractile range is usually suggested when returns are generated from some other symmetric stable distribution.

It is well known that the mean–standard deviation version of the two-parameter portfolio model can be derived from the assumption that investors have quadratic utility functions. But the problems with this approach are also well known. In any case, the empirical evidence of Fama (1965*a*), Blume (1970), Roll (1970), K. Miller (1971), and Officer (1971) provides support for the "distribution" approach to the model. For a discussion of the issues and a detailed treatment of the two-parameter model, see Fama and Miller (1972, chaps. 6–8).

We also concentrate on the special case of the two-parameter model obtained with the assumption of normally distributed returns. As shown in Fama (1971) or Fama and Miller (1972, chap. 7), the important testable implications of the general symmetric stable model are the same as those of the normal model.

[2] Tildes (~) are used to denote random variables. And the one-period percentage return is most often referred to as just the return.

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$$\sigma(\tilde{R}_p) = \sigma(\tilde{R}_m) \quad \text{and} \quad \sum_{i=1}^{N} x_{im} = 1.$$

Lagrangian methods can then be used to show that the weights x_{jm} must be chosen in such a way that for any asset i in m

$$E(\tilde{R}_i) - E(\tilde{R}_m) = S_m \left[\frac{\sum_{j=1}^{N} x_{jm}\sigma_{ij}}{\sigma(\tilde{R}_m)} - \sigma(\tilde{R}_m) \right], \tag{1}$$

where S_m is the rate of change of $E(\tilde{R}_p)$ with respect to a change in $\sigma(\tilde{R}_p)$ at the point on the efficient set corresponding to portfolio m. If there are nonnegativity constraints on the weights (that is, if short selling is prohibited), then (1) only holds for assets i such that $x_{im} > 0$.

Although equation (1) is just a condition on the weights x_{jm} that is required for portfolio efficiency, it can be interpreted as the relationship between the risk of asset i in portfolio m and the expected return on the asset. The equation says that the difference between the expected return on the asset and the expected return on the portfolio is proportional to the difference between the risk of the asset and the risk of the portfolio. The proportionality factor is S_m, the slope of the efficient set at the point corresponding to the portfolio m. And the risk of the asset is its contribution to total portfolio risk, $\sigma(\tilde{R}_m)$.

II. Testable Implications

Suppose now that we posit a market of risk-averse investors who make portfolio decisions period by period according to the two-parameter model.[3] We are concerned with determining what this implies for observable properties of security and portfolio returns. We consider two categories of implications. First, there are conditions on expected returns that are implied by the fact that in a two-parameter world investors hold efficient portfolios. Second, there are conditions on the behavior of returns through time that are implied by the assumption of the two-parameter model that the capital market is perfect or frictionless in the sense that there are neither transactions costs nor information costs.

A. Expected Returns

The implications of the two-parameter model for expected returns derive from the efficiency condition or expected return-risk relationship of equation (1). First, it is convenient to rewrite (1) as

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[3] A multiperiod version of the two-parameter model is in Fama (1970*a*) or Fama and Miller (1972, chap. 8).

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$$E(\tilde{R}_i) = [E(\tilde{R}_m) - S_m \sigma(\tilde{R}_m)] + S_m \sigma(\tilde{R}_m)\beta_i, \tag{2}$$

where

$$\beta_i \equiv \frac{\operatorname{cov}(\tilde{R}_i, \tilde{R}_m)}{\sigma^2(\tilde{R}_m)} = \frac{\sum_{j=1}^{N} x_{jm}\sigma_{ij}}{\sigma^2(\tilde{R}_m)} = \frac{\operatorname{cov}(\tilde{R}_i, \tilde{R}_m)/\sigma(\tilde{R}_m)}{\sigma(\tilde{R}_m)}. \tag{3}$$

The parameter β_i can be interpreted as the risk of asset i in the portfolio m, measured relative to $\sigma(\tilde{R}_m)$, the total risk of m. The intercept in (2),

$$E(\tilde{R}_0) \equiv E(\tilde{R}_m) - S_m \sigma(\tilde{R}_m), \tag{4}$$

is the expected return on a security whose return is uncorrelated with $\tilde{R}_m$—that is, a zero-β security. Since $\beta = 0$ implies that a security contributes nothing to $\sigma(\tilde{R}_m)$, it is appropriate to say that it is riskless in this portfolio. It is well to note from (3), however, that since $x_{im}\,\sigma_{ii} = x_{im}\,\sigma^2(\tilde{R}_i)$ is just one of the N terms in β_i, $\beta_i = 0$ does not imply that security i has zero variance of return.

From (4), it follows that

$$S_m = \frac{E(\tilde{R}_m) - E(\tilde{R}_0)}{\sigma(\tilde{R}_m)}, \tag{5}$$

so that (2) can be rewritten

$$E(\tilde{R}_i) = E(\tilde{R}_0) + [E(\tilde{R}_m) - E(\tilde{R}_0)]\beta_i. \tag{6}$$

In words, the expected return on security i is $E(\tilde{R}_0)$, the expected return on a security that is riskless in the portfolio m, plus a risk premium that is β_i times the difference between $E(\tilde{R}_m)$ and $E(\tilde{R}_0)$.

Equation (6) has three testable implications: (C1) The relationship between the expected return on a security and its risk in any efficient portfolio m is linear. (C2) β_i is a complete measure of the risk of security i in the efficient portfolio m; no other measure of the risk of i appears in (6). (C3) In a market of risk-averse investors, higher risk should be associated with higher expected return; that is, $E(\tilde{R}_m) - E(\tilde{R}_0) > 0$.

The importance of condition C3 is obvious. The importance of C1 and C2 should become clear as the discussion proceeds. At this point suffice it to say that if C1 and C2 do not hold, market returns do not reflect the attempts of investors to hold efficient portfolios: Some assets are systematically underpriced or overpriced relative to what is implied by the expected return-risk or efficiency equation (6).

B. Market Equilibrium and the Efficiency of the Market Portfolio

To test conditions C1–C3 we must identify some efficient portfolio m. This in turn requires specification of the characteristic of market equi-

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librium when investors make portfolio decisions according to the two-parameter model.

Assume again that the capital market is perfect. In addition, suppose that from the information available without cost all investors derive the same and correct assessment of the distribution of the future value of any asset or portfolio—an assumption usually called "homogeneous expectations." Finally, assume that short selling of all assets is allowed. Then Black (1972) has shown that in a market equilibrium, the so-called market portfolio, defined by the weights

$$x_{im} = \frac{\text{total market value of all units of asset } i}{\text{total market value of all assets}},$$

is always efficient.

Since it contains all assets in positive amounts, the market portfolio is a convenient reference point for testing the expected return-risk conditions C1–C3 of the two-parameter model. And the homogeneous-expectations assumption implies a correspondence between ex ante assessments of return distributions and distributions of ex post returns that is also required for meaningful tests of these three hypotheses.

C. *A Stochastic Model for Returns*

Equation (6) is in terms of expected returns. But its implications must be tested with data on period-by-period security and portfolio returns. We wish to choose a model of period-by-period returns that allows us to use observed average returns to test the expected-return conditions C1–C3, but one that is nevertheless as general as possible. We suggest the following stochastic generalization of (6):

$$\tilde{R}_{it} = \tilde{\gamma}_{0t} + \tilde{\gamma}_{1t}\beta_i + \tilde{\gamma}_{2t}\beta_i^2 + \tilde{\gamma}_{3t}s_i + \tilde{\eta}_{it}. \qquad (7)$$

The subscript t refers to period t, so that $\tilde{R}_{it}$ is the one-period percentage return on security i from $t - 1$ to t. Equation (7) allows $\tilde{\gamma}_{0t}$ and $\tilde{\gamma}_{1t}$ to vary stochastically from period to period. The hypothesis of condition C3 is that the expected value of the risk premium $\tilde{\gamma}_{1t}$, which is the slope $[E(\tilde{R}_{mt}) - E(\tilde{R}_{0t})]$ in (6), is positive—that is, $E(\tilde{\gamma}_{1t}) = E(\tilde{R}_{mt}) - E(\tilde{R}_{0t}) > 0$.

The variable β_i^2 is included in (7) to test linearity. The hypothesis of condition C1 is $E(\tilde{\gamma}_{2t}) = 0$, although $\tilde{\gamma}_{2t}$ is also allowed to vary stochastically from period to period. Similar statements apply to the term involving s_i in (7), which is meant to be some measure of the risk of security i that is not deterministically related to β_i. The hypothesis of condition C2 is $E(\tilde{\gamma}_{3t}) = 0$, but $\tilde{\gamma}_{3t}$ can vary stochastically through time.

The disturbance $\tilde{\eta}_{it}$ is assumed to have zero mean and to be independent of all other variables in (7). If all portfolio return distributions are to be

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normal (or symmetric stable), then the variables $\tilde{\eta}_{it}$, $\tilde{\gamma}_{0t}$, $\tilde{\gamma}_{1t}$, $\tilde{\gamma}_{2t}$ and $\tilde{\gamma}_{3t}$ must have a multivariate normal (or symmetric stable) distribution.

D. Capital Market Efficiency: The Behavior of Returns through Time

C1–C3 are conditions on expected returns and risk that are implied by the two-parameter model. But the model, and especially the underlying assumption of a perfect market, implies a capital market that is efficient in the sense that prices at every point in time fully reflect available information. This use of the word efficient is, of course, not to be confused with portfolio efficiency. The terminology, if a bit unfortunate, is at least standard.

Market efficiency in combination with condition C1 requires that scrutiny of the time series of the stochastic nonlinearity coefficient $\tilde{\gamma}_{2t}$ does not lead to nonzero estimates of expected future values of $\tilde{\gamma}_{2t}$. Formally, $\tilde{\gamma}_{2t}$ must be a fair game. In practical terms, although nonlinearities are observed ex post, because $\tilde{\gamma}_{2t}$ is a fair game, it is always appropriate for the investor to act ex ante under the presumption that the two-parameter model, as summarized by (6), is valid. That is, in his portfolio decisions he always assumes that there is a linear relationship between the risk of a security and its expected return. Likewise, market efficiency in the two-parameter model requires that the non-β risk coefficient $\tilde{\gamma}_{3t}$ and the time series of return disturbances $\tilde{\eta}_{it}$ are fair games. And the fair-game hypothesis also applies to the time series of $\tilde{\gamma}_{1t} - [E(\tilde{R}_{mt}) - E(\tilde{R}_{0t})]$, the difference between the risk premium for period t and its expected value.

In the terminology of Fama (1970*b*), these are "weak-form" propositions about capital market efficiency for a market where expected returns are generated by the two-parameter model. The propositions are weak since they are only concerned with whether prices fully reflect any information in the time series of past returns. "Strong-form" tests would be concerned with the speed-of-adjustment of prices to all available information.

E. Market Equilibrium with Riskless Borrowing and Lending

We have as yet presented no hypothesis about $\tilde{\gamma}_{0t}$ in (7). In the general two-parameter model, given $E(\tilde{\gamma}_{2t}) = E(\tilde{\gamma}_{3t}) = E(\tilde{\eta}_{it}) = 0$, then, from (6), $E(\tilde{\gamma}_{0t})$ is just $E(\tilde{R}_{0t})$, the expected return on any zero-β security. And market efficiency requires that $\tilde{\gamma}_{0t} - E(\tilde{R}_{0t})$ be a fair game.

But if we add to the model as presented thus far the assumption that there is unrestricted riskless borrowing and lending at the known rate R_{ft}, then one has the market setting of the original two-parameter "capital asset pricing model" of Sharpe (1964) and Lintner (1965). In this world, since $\beta_f = 0$, $E(\tilde{\gamma}_{0t}) = R_{ft}$. And market efficiency requires that $\tilde{\gamma}_{0t} - R_{ft}$ be a fair game.

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It is well to emphasize that to refute the proposition that $E(\tilde{\gamma}_{0t}) = R_{ft}$ is only to refute a specific two-parameter model of market equilibrium. Our view is that tests of conditions C1–C3 are more fundamental. We regard C1–C3 as the general expected return implications of the two-parameter model in the sense that they are the implications of the fact that in the two-parameter portfolio model investors hold efficient portfolios, and they are consistent with any two-parameter model of market equilibrium in which the market portfolio is efficient.

F. The Hypotheses

To summarize, given the stochastic generalization of (2) and (6) that is provided by (7), the testable implications of the two-parameter model for expected returns are:

C1 (linearity)—$E(\tilde{\gamma}_{2t}) = 0$.
C2 (no systematic effects of non-β risk)—$E(\tilde{\gamma}_{3t}) = 0$.
C3 (positive expected return-risk tradeoff)—$E(\tilde{\gamma}_{1t}) = E(\tilde{R}_{mt}) - E(\tilde{R}_{0t}) > 0$.
Sharpe-Lintner (S-L) Hypothesis—$E(\tilde{\gamma}_{0t}) = R_{ft}$.

Finally, capital market efficiency in a two-parameter world requires

ME (market efficiency)—the stochastic coefficients $\tilde{\gamma}_{2t}$, $\tilde{\gamma}_{3t}$, $\tilde{\gamma}_{1t} - [E(\tilde{R}_{mt}) - E(\tilde{R}_{0t})]$, $\tilde{\gamma}_{0t} - E(\tilde{R}_{0t})$, and the disturbances $\tilde{\eta}_{it}$ are fair games.[4]

III. Previous Work[5]

The earliest tests of the two-parameter model were done by Douglas (1969), whose results seem to refute condition C2. In annual and quarterly return data, there seem to be measures of risk, in addition to β, that contribute systematically to observed average returns. These results, if valid, are inconsistent with the hypothesis that investors attempt to hold efficient portfolios. Assuming that the market portfolio is efficient, premiums are paid for risks that do not contribute to the risk of an efficient portfolio.

Miller and Scholes (1972) take issue both with Douglas's statistical techniques and with his use of annual and quarterly data. Using different methods and simulations, they show that Douglas's negative results could be expected even if condition C2 holds. Condition C2 is tested below with extensive monthly data, and this avoids almost all of the problems discussed by Miller and Scholes.

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[4] If $\tilde{\gamma}_{2t}$ and $\tilde{\gamma}_{3t}$ are fair games, then $E(\tilde{\gamma}_{2t}) = E(\tilde{\gamma}_{3t}) = 0$. Thus, C1 and C2 are implied by ME. Keeping the expected return conditions separate, however, better emphasizes the economic basis of the various hypotheses.

[5] A comprehensive survey of empirical and theoretical work on the two-parameter model is in Jensen (1972).

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Much of the available empirical work on the two-parameter model is concerned with testing the S-L hypothesis that $E(\tilde{\gamma}_{0t}) = R_{ft}$. The tests of Friend and Blume (1970) and those of Black, Jensen, and Scholes (1972) indicate that, at least in the period since 1940, on average $\tilde{\gamma}_{0t}$ is systematically greater than R_{ft}. The results below support this conclusion.

In the empirical literature to date, the importance of the linearity condition C1 has been largely overlooked. Assuming that the market portfolio m is efficient, if $E(\tilde{\gamma}_{2t})$ in (7) is positive, the prices of high-β securities are on average too low—their expected returns are too high—relative to those of low-β securities, while the reverse holds if $E(\tilde{\gamma}_{2t})$ is negative. In short, if the process of price formation in the capital market reflects the attempts of investors to hold efficient portfolios, then the linear relationship of (6) between expected return and risk must hold.

Finally, the previous empirical work on the two-parameter model has not been concerned with tests of market efficiency.

IV. Methodology

The data for this study are monthly percentage returns (including dividends and capital gains, with the appropriate adjustments for capital changes such as splits and stock dividends) for all common stocks traded on the New York Stock Exchange during the period January 1926 through June 1968. The data are from the Center for Research in Security Prices of the University of Chicago.

A. *General Approach*

Testing the two-parameter model immediately presents an unavoidable "errors-in-the-variables" problem: The efficiency condition or expected return-risk equation (6) is in terms of true values of the relative risk measure β_i, but in empirical tests estimates, $\hat{\beta}_i$, must be used. In this paper

$$\hat{\beta}_i \equiv \frac{\widehat{\text{cov}}(\tilde{R}_i, \tilde{R}_m)}{\hat{\sigma}^2(\tilde{R}_m)},$$

where $\widehat{\text{cov}}(\tilde{R}_i, \tilde{R}_m)$ and $\hat{\sigma}^2(\tilde{R}_m)$ are estimates of $\text{cov}(\tilde{R}_i, \tilde{R}_m)$ and $\sigma^2(\tilde{R}_m)$ obtained from monthly returns, and where the proxy chosen for $\tilde{R}_{mt}$ is "Fisher's Arithmetic Index," an equally weighted average of the returns on all stocks listed on the New York Stock Exchange in month t. The properties of this index are analyzed in Fisher (1966).

Blume (1970) shows that for any portfolio p, defined by the weights x_{ip}, $i = 1, 2, \ldots, N$,

$$\hat{\beta}_p \equiv \frac{\widehat{\text{cov}}(\tilde{R}_p, \tilde{R}_m)}{\hat{\sigma}^2(\tilde{R}_m)} = \sum_{i=1}^{N} x_{ip} \frac{\widehat{\text{cov}}(\tilde{R}_i, \tilde{R}_m)}{\hat{\sigma}^2(\tilde{R}_m)} = \sum_{i=1}^{N} x_{ip} \hat{\beta}_i.$$

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If the errors in the $\hat{\beta}_i$ are substantially less than perfectly positively correlated, the $\hat{\beta}$'s of portfolios can be much more precise estimates of true β's than the $\hat{\beta}$'s for individual securities.

To reduce the loss of information in the risk-return tests caused by using portfolios rather than individual securities, a wide range of values of portfolio $\hat{\beta}_p$'s is obtained by forming portfolios on the basis of ranked values of $\hat{\beta}_i$ for individual securities. But such a procedure, naïvely executed could result in a serious regression phenomenon. In a cross section of $\hat{\beta}_i$, high observed $\hat{\beta}_i$ tend to be above the corresponding true β_i and low observed $\hat{\beta}_i$ tend to be below the true β_i. Forming portfolios on the basis of ranked $\hat{\beta}_i$ thus causes bunching of positive and negative sampling errors within portfolios. The result is that a large portfolio $\hat{\beta}_p$ would tend to overstate the true β_p, while a low $\hat{\beta}_p$ would tend to be an underestimate.

The regression phenomenon can be avoided to a large extent by forming portfolios from ranked $\hat{\beta}_i$ computed from data for one time period but then using a subsequent period to obtain the $\hat{\beta}_p$ for these portfolios that are used to test the two-parameter model. With fresh data, within a portfolio errors in the individual security $\hat{\beta}_i$ are to a large extent random across securities, so that in a portfolio $\hat{\beta}_p$ the effects of the regression phenomenon are, it is hoped, minimized.[6]

B. *Details*

The specifics of the approach are as follows. Let N be the total number of securities to be allocated to portfolios and let $\text{int}(N/20)$ be the largest integer equal to or less than $N/20$. Using the first 4 years (1926–29) of monthly return data, 20 portfolios are formed on the basis of ranked $\hat{\beta}_i$ for individual securities. The middle 18 portfolios each has $\text{int}(N/20)$ securities. If N is even, the first and last portfolios each has $\text{int}(N/20) + \frac{1}{2}[N - 20\,\text{int}(N/20)]$ securities. The last (highest $\hat{\beta}$) portfolio gets an additional security if N is odd.

The following 5 years (1930–34) of data are then used to recompute the $\hat{\beta}_i$, and these are averaged across securities within portfolios to obtain 20 initial portfolio $\hat{\beta}_{pt}$ for the risk-return tests. The subscript t is added to indicate that each month t of the following four years (1935–38) these $\hat{\beta}_{pt}$ are recomputed as simple averages of individual security $\hat{\beta}_i$, thus adjusting the portfolio $\hat{\beta}_{pt}$ month by month to allow for delisting of securities. The component $\hat{\beta}_i$ for securities are themselves updated yearly—that

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[6] The errors-in-the-variables problem and the technique of using portfolios to solve it were first pointed out by Blume (1970). The portfolio approach is also used by Friend and Blume (1970) and Black, Jensen, and Scholes (1972). The regression phenomenon that arises in risk-return tests was first recognized by Blume (1970) and then by Black, Jensen, and Scholes (1972), who offer a solution to the problem that is similar in spirit to ours.

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is, they are recomputed from monthly returns for 1930 through 1935, 1936, or 1937.

As a measure of the non-β risk of security i we use $s(\hat{\epsilon}_i)$, the standard deviation of the least-squares residuals $\hat{\epsilon}_{it}$ from the so-called market model

$$\tilde{R}_{it} = a_i + \beta^i \tilde{R}_{mt} + \tilde{\epsilon}_{it}. \tag{8}$$

The standard deviation $s(\hat{\epsilon}_i)$ is a measure of non-β risk in the following sense. One view of risk, antithetic to that of portfolio theory, says that the risk of a security is measured by the total dispersion of its return distribution. Given a market dominated by risk averters, this model would predict that a security's expected return is related to its total return dispersion rather than just to the contribution of the security to the dispersion in the return on an efficient portfolio.[7] If $B_i \equiv \operatorname{cov}(\tilde{R}_i, \tilde{R}_m)/\sigma^2(\tilde{R}_m)$, then in (8) $\operatorname{cov}(\tilde{\epsilon}_i, \tilde{R}_m) = 0$, and

$$\sigma^2(\tilde{R}_i) = \beta_i^2\sigma^2(\tilde{R}_m) + \sigma^2(\tilde{\epsilon}_i) + 2\beta_i \operatorname{cov}(\tilde{R}_m, \tilde{\epsilon}_i). \tag{9}$$

Thus, from (9), one can say that $s(\hat{\epsilon}_i)$ is an estimate of that part of the dispersion of the distribution of the return on security i that is not directly related to β_i.

The month-by-month returns on the 20 portfolios, with equal weighting of individual securities each month, are also computed for the 4-year period 1935–38. For each month t of this period, the following cross-sectional regression—the empirical analog of equation (7)—is run:

$$R_{pt} = \hat{\gamma}_{0t} + \hat{\gamma}_{1t}\hat{\beta}_{p,t-1} + \hat{\gamma}_{2t}\hat{\beta}^2_{p,t-1} + \hat{\gamma}_{3t}\bar{s}_{p,t-1}(\hat{\epsilon}_i) + \hat{\eta}_{pt}, \tag{10}$$
$$p = 1, 2, \ldots, 20.$$

The independent variable $\hat{\beta}_{p,t-1}$ is the average of the $\hat{\beta}_i$ for securities in portfolio p discussed above; $\hat{\beta}^2_{p,t-1}$ is the average of the squared values of these $\hat{\beta}_i$ (and is thus somewhat mislabeled); and $\bar{s}_{p,t-1}(\hat{\epsilon}_i)$ is likewise the average of $s(\hat{\epsilon}_i)$ for securities in portfolio p. The $s(\hat{\epsilon}_i)$ are computed from data for the same period as the component $\hat{\beta}_i$ of $\hat{\beta}_{p,t-1}$, and like these $\hat{\beta}_i$, they are updated annually.

The regression equation (10) is (7) averaged across the securities in a portfolio, with estimates $\hat{\beta}_{p,t-1}$, $\hat{\beta}^2_{p,t-1}$, and $\bar{s}_{p,t-1}(\hat{\epsilon}_i)$ used as explanatory variables, and with least-squares estimates of the stochastic coefficients $\hat{\gamma}_{0t}$, $\hat{\gamma}_{1t}$, $\hat{\gamma}_{2t}$, and $\hat{\gamma}_{3t}$. The results from (10)—the time series of month-by-month values of the regression coefficients $\hat{\gamma}_{0t}$, $\hat{\gamma}_{1t}$, $\hat{\gamma}_{2t}$, and $\hat{\gamma}_{3t}$ for the 4-year period 1935–38—are the inputs for our tests of the two-parameter model for this period. To get results for other periods, the steps described

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[7] For those accustomed to the portfolio viewpoint, this alternative model may seem so naïve that it should be classified as a straw man. But it is the model of risk and return implied by the "liquidity preference" and "market segmentation" theories of the term structure of interest rates and by the Keynesian "normal backwardation" theory of commodity futures markets. For a discussion of the issues with respect to these markets, see Roll (1970) and K. Miller (1971).

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above are repeated. That is, 7 years of data are used to form portfolios; the next 5 years are used to compute initial values of the independent variables in (10); and then the risk-return regressions of (10) are fit month by month for the following 4-year period.

The nine different portfolio formation periods (all except the first 7 years in length), initial 5-year estimation periods, and testing periods (all but the last 4 years in length) are shown in table 1. The choice of 4-year testing periods is a balance of computation costs against the desire to reform portfolios frequently. The choice of 7-year portfolio formation periods and 5–8-year periods for estimating the independent variables $\hat{\beta}_{p,t-1}$ and $\bar{s}_{p,t-1}(\hat{\epsilon}_i)$ in the risk-return regressions reflects a desire to balance the statistical power obtained with a large sample from a stationary process against potential problems caused by any nonconstancy of the β_i. The choices here are in line with the results of Gonedes (1973). His results also led us to require that to be included in a portfolio a security available in the first month of a testing period must also have data for all 5 years of the preceding estimation period and for at least 4 years of the portfolio formation period. The total number of securities available in the first month of each testing period and the number of securities meeting the data requirement are shown in table 1.

C. *Some Observations on the Approach*

Table 2 shows the values of the 20 portfolios $\hat{\beta}_{p,t-1}$ and their standard errors $s(\hat{\beta}_{p,t-1})$ for four of the nine 5-year estimation periods. Also shown are: $r(R_p, R_m)^2$, the coefficient of determination between R_{pt} and R_{mt}; $s(R_p)$, the sample standard deviation of R_p; and $s(\hat{\epsilon}_p)$, the standard deviation of the portfolio residuals from the market model of (8), not to be confused with $\bar{s}_{p,t-1}(\hat{\epsilon}_i)$, the average for individual securities, which is also shown. The $\hat{\beta}_{p,t-1}$ and $\bar{s}_{p,t-1}(\hat{\epsilon}_i)$ are the independent variables in the risk return regressions of (10) for the first month of the 4-year testing periods following the four estimation periods shown.

Under the assumptions that for a given security the disturbances $\tilde{\epsilon}_{jt}$ in (8) are serially independent, independent of $\tilde{R}_{mt}$, and identically distributed through time, the standard error of $\hat{\beta}_i$ is

$$\sigma(\hat{\beta}_i) = \frac{\sigma(\tilde{\epsilon}_i)}{\sqrt{n}\,\sigma(\tilde{R}_m)},$$

where n is the number of months used to compute $\hat{\beta}_i$. Likewise,

$$\sigma(\tilde{\beta}_{p,t-1}) = \frac{\sigma(\tilde{\epsilon}_p)}{\sqrt{n}\,\sigma(\tilde{R}_m)}.$$

Thus, the fact that in table 2, $s(\hat{\epsilon}_p)$ is generally on the order of one-third to one-seventh $\bar{s}_{p,t-1}(\hat{\epsilon}_i)$ implies that $s(\hat{\beta}_{p,t-1})$ is one-third to one-seventh

TABLE 1

PORTFOLIO FORMATION, ESTIMATION, AND TESTING PERIODS

	PERIODS				
	1	2	3	4	5
Portfolio formation period	1926–29	1927–33	1931–37	1935–41	1939–45
Initial estimation period	1930–34	1934–38	1938–42	1942–46	1946–50
Testing period	1935–38	1939–42	1943–46	1947–50	1951–54
No. of securities available	710	779	804	908	1,011
No. of securities meeting data requirement	435	576	607	704	751

$s(\hat{\beta}_i)$. Estimates of β for portfolios are indeed more precise than those for individual securities.

Nevertheless, it is interesting to note that if the disturbances $\tilde{\epsilon}_{jt}$ in (8) were independent from security to security, the relative increase in the precision of the $\hat{\beta}$ obtained by using portfolios rather than individual securities would be about the same for all portfolios. We argue in the Appendix, however, that the results from (10) imply that the $\tilde{\epsilon}_{it}$ in (8) are interdependent, and the interdependence is strongest among high-β securities and among low-β securities. This is evident in table 2: The ratios $s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$ are always highest at the extremes of the $\hat{\beta}_{p,t-1}$ range and lowest for $\hat{\beta}_{p,t-1}$ close to 1.0. But it is important to emphasize that since these ratios are generally less than .33, interdependence among the $\tilde{\epsilon}_{it}$ of different securities does not destroy the value of using portfolios to reduce the dispersion of the errors in estimated β's.

Finally, all the tests of the two-parameter model are predictive in the sense that the explanatory variables $\hat{\beta}_{p,t-1}$ and $\bar{s}_{p,t-1}(\hat{\epsilon}_i)$ in (10) are computed from data for a period prior to the month of the returns, the R_{pt}, on which the regression is run. Although we are interested in testing the two-parameter model as a positive theory—that is, examining the extent to which it is helpful in describing actual return data—the model was initially developed by Markowitz (1959) as a normative theory—that is, as a model to help people make better decisions. As a normative theory the model only has content if there is some relationship between future returns and estimates of risk that can be made on the basis of current information.

Now that the predictive nature of the tests has been emphasized, to simplify the notation, the explanatory variables in (10) are henceforth referred to as $\hat{\beta}_p$, $\hat{\beta}_p^2$, and $\bar{s}_p(\hat{\epsilon}_i)$.

V. Results

The major tests of the implications of the two-parameter model are in table 3. Results are presented for 10 periods: the overall period 1935–

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TABLE 1 (*Continued*)

	PERIODS			
	6	7	8	9
Portfolio formation period ...	1943–49	1947–53	1951–57	1955–61
Initial estimation period	1950–54	1954–58	1958–62	1962–66
Testing period	1955–58	1959–62	1963–66	1967–68
No. of securities available	1,053	1,065	1,162	1,261
No. of securities meeting data requirement	802	856	858	845

6/68; three long subperiods, 1935–45, 1946–55, and 1956–6/68; and six subperiods which, except for the first and last, cover 5 years each. This choice of subperiods reflects the desire to keep separate the pre– and post–World War II periods. Results are presented for four different versions of the risk-return regression equation (10): Panel D is based on (10) itself, but in panels A–C, one or more of the variables in (10) is suppressed. For each period and model, the table shows: $\bar{\hat{\gamma}}_j$, the average of the month-by-month regression coefficient estimates, $\hat{\gamma}_{jt}$; $s(\hat{\gamma}_j)$, the standard deviation of the monthly estimates; and $\bar{r}^2$ and $s(r^2)$, the mean and standard deviation of the month-by-month coefficients of determination, r_t^2, which are adjusted for degrees of freedom. The table also shows the first-order serial correlations of the various monthly $\hat{\gamma}_{jt}$ computed either about the sample mean of $\hat{\gamma}_{jt}$ [in which case the serial correlations are labeled $\rho_M(\hat{\gamma}_i)$] or about an assumed mean of zero [in which case they are labeled $\rho_0(\hat{\gamma}_j)$]. Finally, t-statistics for testing the hypothesis that $\bar{\hat{\gamma}}_j = 0$ are presented. These t-statistics are

$$t(\bar{\hat{\gamma}}_j) = \frac{\bar{\hat{\gamma}}_j}{s(\hat{\gamma}_j)/\sqrt{n}},$$

where n is the number of months in the period, which is also the number of estimates $\hat{\gamma}_{jt}$ used to compute $\bar{\hat{\gamma}}_j$ and $s(\hat{\gamma}_j)$.

In interpreting these t-statistics one should keep in mind the evidence of Fama (1965*a*) and Blume (1970) which suggests that distributions of common stock returns are "thick-tailed" relative to the normal distribution and probably conform better to nonnormal symmetric stable distributions than to the normal. From Fama and Babiak (1968), this evidence means that when one interprets large t-statistics under the assumption that the underlying variables are normal, the probability or significance levels obtained are likely to be overestimates. But it is important to note that, with the exception of condition C3 (positive expected return-risk tradeoff), upward-biased probability levels lead to biases toward rejection of the hypotheses of the two-parameter model. Thus, if these hypotheses cannot

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TABLE 2

SAMPLE STATISTICS FOR FOUR SELECTED ESTIMATION PERIODS

Statistic	1	2	3	4	5	6	7	8	9	10
Portfolios for Estimation Period 1934–38										
$\hat{\beta}_{p,t-1}$	.322	.508	.651	.674	.695	.792	.921	.942	.970	1.005
$s(\hat{\beta}_{p,t-1})$	.027	.027	.025	.023	.028	.026	.032	.029	.034	.027
$r(R_p, R_m)^2$	.709	.861	.921	.936	.912	.941	.932	.946	.933	.958
$s(R_p)$	.040	.058	.072	.074	.077	.087	.101	.103	.106	.109
$s(\hat{\epsilon}_p)$	.022	.022	.020	.019	.023	.021	.026	.024	.028	.022
$\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.085	.075	.083	.078	.090	.095	.109	.106	.111	.097
$s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.259	.293	.241	.244	.256	.221	.238	.226	.252	.227
Portfolios for Estimation Period 1942–46										
$\hat{\beta}_{p,t-1}$	.467	.537	.593	.628	.707	.721	.770	.792	.805	.894
$s(\hat{\beta}_{p,t-1})$	.045	.041	.044	.037	.027	.032	.035	.035	.028	.040
$r(R_p, R_m)^2$	.645	.745	.753	.829	.919	.898	.889	.898	.934	.896
$s(R_p)$	.035	.037	.041	.041	.044	.046	.049	.050	.050	.057
$s(\hat{\epsilon}_p)$	.021	.019	.020	.017	.013	.015	.016	.016	.013	.018
$\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.055	.055	.063	.058	.058	.063	.064	.064	.062	.069
$s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.382	.345	.317	.293	.224	.238	.250	.250	.210	.261
Portfolios for Estimation Period 1950–54										
$\hat{\beta}_{p,t-1}$	.418	.590	.694	.751	.777	.784	.929	.950	.996	1.014
$s(\hat{\beta}_{p,t-1})$	.042	.047	.045	.037	.038	.035	.050	.038	.035	.029
$r(R_p, R_m)^2$	.629	.723	.798	.872	.878	.895	.856	.913	.933	.954
$s(R_p)$	.019	.025	.028	.029	.030	.030	.036	.036	.037	.038
$s(\hat{\epsilon}_p)$	.012	.013	.013	.010	.010	.010	.014	.011	.010	.008
$\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.040	.044	.046	.048	.051	.051	.052	.053	.054	.057
$s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.300	.295	.283	.208	.196	.196	.269	.208	.185	.140
Portfolios for Estimation Period 1958–62										
$\hat{\beta}_{p,t-1}$	.626	.635	.719	.801	.817	.860	.920	.950	.975	.995
$s(\hat{\beta}_{p,t-1})$	.043	.048	.039	.046	.047	.033	.037	.038	.032	.037
$r(R_p, R_m)^2$	.783	.745	.851	.835	.838	.920	.913	.915	.939	.925
$s(R_p)$	.030	.031	.033	.037	.038	.038	.041	.042	.043	.044
$s(\hat{\epsilon}_p)$	.014	.016	.013	.015	.015	.011	.012	.012	.011	.012
$\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.049	.052	.056	.059	.064	.061	.070	.069	.068	.064
$s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.286	.308	.232	.254	.234	.180	.171	.174	.162	.188

be rejected when *t*-statistics are interpreted under the assumption of normality, the hypotheses are on even firmer ground when one takes into account the thick tails of empirical return distributions.

Further justification for using *t*-statistics to test hypotheses on monthly common stock returns is in the work of Officer (1971). Under the assumption that distributions of monthly returns are symmetric stable, he estimates that in the post–World War II period the characteristic exponent

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TABLE 2 (*Continued*)

Statistic	11	12	13	14	15	16	17	18	19	20
	Portfolios for Estimation Period 1934–38									
$\hat{\beta}_{p,t-1}$	1.046	1.122	1.181	1.192	1.196	1.295	1.335	1.396	1.445	1.458
$s(\hat{\beta}_{p,t-1})$	.028	.031	.035	.028	.029	.032	.032	.053	.039	.053
$r(R_p, R_m)^2$	.959	.956	.951	.969	.966	.966	.967	.922	.958	.927
$s(R_p)$	.113	.122	.128	.128	.129	.140	.144	.154	.156	.160
$s(\hat{\epsilon}_p)$	.023	.026	.029	.023	.024	.026	.026	.043	.032	.043
$\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.094	.124	.120	.122	.132	.125	.129	.158	.145	.170
$s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.245	.210	.242	.188	.182	.208	.202	.272	.221	.253
	Portfolios for Estimation Period 1942–46									
$\hat{\beta}_{p,t-1}$	.949	.952	1.010	1.038	1.254	1.312	1.316	1.473	1.631	1.661
$s(\hat{\beta}_{p,t-1})$	.031	.036	.040	.030	.034	.039	.041	.084	.083	.077
$r(R_p, R_m)^2$	.942	.923	.917	.954	.958	.951	.945	.839	.867	.887
$s(R_p)$	.059	.060	.063	.064	.077	.081	.081	.097	.105	.106
$s(\hat{\epsilon}_p)$	.014	.016	.018	.014	.016	.018	.019	.039	.038	.036
$\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.073	.074	.085	.077	.096	.083	.086	.134	.117	.122
$s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.192	.216	.212	.182	.167	.217	.221	.291	.325	.295
	Portfolios for Estimation Period 1950–54									
$\hat{\beta}_{p,t-1}$	1.117	1.123	1.131	1.134	1.186	1.235	1.295	1.324	1.478	1.527
$s(\hat{\beta}_{p,t-1})$	.039	.027	.044	.033	.037	.049	.045	.046	.058	.086
$r(R_p, R_m)^2$	.934	.968	.919	.952	.944	.915	.933	.934	.917	.841
$s(R_p)$	.042	.041	.043	.042	.044	.047	.049	.050	.056	.060
$s(\hat{\epsilon}_p)$	.011	.007	.012	.009	.010	.014	.013	.013	.016	.024
$\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.066	.057	.066	.060	.064	.064	.065	.068	.076	.088
$s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.167	.123	.182	.150	.156	.219	.200	.192	.210	.273
	Portfolios for Estimation Period 1958–62									
$\hat{\beta}_{p,t-1}$	1.013	1.019	1.037	1.048	1.069	1.081	1.092	1.098	1.269	1.388
$s(\hat{\beta}_{p,t-1})$	.038	.031	.036	.033	.036	.038	.045	.045	.048	.065
$r(R_p, R_m)^2$	.922	.948	.934	.945	.936	.931	.907	.910	.922	.886
$s(R_p)$	.045	.045	.046	.046	.047	.048	.049	.049	.056	.063
$s(\hat{\epsilon}_p)$	.013	.010	.012	.011	.012	.013	.015	.015	.016	.021
$\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.069	.066	.067	.062	.070	.072	.076	.068	.070	.078
$s(\hat{\epsilon}_p)/\bar{s}_{p,t-1}(\hat{\epsilon}_i)$	.188	.152	.179	.177	.171	.180	.197	.220	.228	.269

for these distributions is about 1.8 (as compared with a value of 2.0 for a normal distribution). From Fama and Roll (1968), for values of the characteristic exponent so close to 2.0 stable nonnormal distributions differ noticeably from the normal only in their extreme tails—that is, beyond the .05 and .95 fractiles. Thus, as long as one is not concerned with precise estimates of probability levels (always a somewhat meaningless activity), interpreting t-statistics in the usual way does not lead to serious errors.

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TABLE 3

SUMMARY RESULTS FOR THE REGRESSION

$$R_p = \hat{\gamma}_{0t} + \hat{\gamma}_{1t}\hat{\beta}_p + \hat{\gamma}_{2t}\hat{\beta}^2{}_p + \hat{\gamma}_{3t}\bar{s}_p(\hat{\epsilon}_i) + \hat{\eta}_{pt}$$

Period	Statistic																			
	$\bar{\hat{\gamma}}_0$	$\bar{\hat{\gamma}}_1$	$\bar{\hat{\gamma}}_2$	$\bar{\hat{\gamma}}_3$	$\overline{\hat{\gamma}_0 - R_f}$	$s(\hat{\gamma}_0)$	$s(\hat{\gamma}_1)$	$s(\hat{\gamma}_2)$	$s(\hat{\gamma}_3)$	$\rho_0(\hat{\gamma}_0 - R_f)$	$\rho_M(\hat{\gamma}_1)$	$\rho_0(\hat{\gamma}_2)$	$\rho_0(\hat{\gamma}_3)$	$t(\bar{\hat{\gamma}}_0)$	$t(\bar{\hat{\gamma}}_1)$	$t(\bar{\hat{\gamma}}_2)$	$t(\bar{\hat{\gamma}}_3)$	$t(\overline{\hat{\gamma}_0 - R_f})$	$\bar{r}^2$	$s(r^2)$
Panel A:																				
1935–6/68	.0061	.0085	...	...	.0048	.038	.066	...	...	.15	.02	...	...	3.24	2.57	...	...	2.55	.29	.30
1935–45	.0039	.0163	...	...	.0037	.052	.098	...	...	.10	—.03	...	...	.86	1.92	...	...	.82	.29	.29
1946–55	.0087	.0027	...	...	.0078	.026	.041	...	...	.18	.07	...	...	3.71	.70	...	...	3.31	.31	.32
1956–6/68	.0060	.0062	...	...	.0034	.030	.044	...	...	.27	.15	...	...	2.45	1.73	...	...	1.39	.28	.29
1935–40	.0024	.0109	...	...	.0023	.064	.116	...	...	.07	—.09	...	...	.32	.79	...	...	.31	.23	.30
1941–45	.0056	.0229	...	...	.0054	.034	.069	...	...	.23	.15	...	...	1.27	2.55	...	...	1.22	.37	.28
1946–50	.0050	.0029	...	...	.0044	.031	.047	...	...	.20	.04	...	...	1.27	.48	...	...	1.10	.39	.33
1951–55	.0123	.0024	...	...	.0111	.019	.035	...	...	.20	.08	...	...	5.06	.53	...	...	4.56	.24	.29
1956–60	.0148	—.0059	...	...	.0128	.020	.034	...	...	.37	.18	...	...	5.68	—1.37	...	...	4.89	.22	.31
1961–6/68	.0001	.0143	...	...	—.0029	.034	.048	...	...	.22	.09	...	...	.03	2.81	...	...	—.80	.32	.27
Panel B:																				
1935–6/68	.0049	.0105	—.0008	...	.0036	.052	.118	.056	...	.03	—.11	—.11	...	1.92	1.79	—.29	...	1.42	.32	.31
1935–45	.0074	.0079	.0040	...	.0073	.061	.139	.074	...	—.10	—.31	—.21	...	1.39	.65	.61	...	1.36	.32	.30
1946–55	—.0002	.0217	—.0087	...	—.0012	.036	.095	.034	...	.04	.00	.00	...	—.07	2.51	—2.83	...	—.38	.36	.32
1956–6/68	.0069	.0040	.0013	...	.0043	.054	.116	.053	...	.17	.07	.03	...	1.56	.42	.29	...	.97	.30	.30
1935–40	.0013	.0141	—.0017	...	.0012	.069	.160	.075	...	—.13	—.36	—.35	...	.16	.75	—.19	...	.14	.24	.30
1941–45	.0148	.0004	.0108	...	.0146	.050	.111	.073	...	—.04	—.19	—.04	...	2.28	.03	1.15	...	2.24	.39	.29
1946–50	—.0008	.0152	—.0051	...	—.0015	.037	.104	.032	...	.14	.04	.00	...	—.18	1.14	—1.24	...	—.32	.44	.32
1951–55	.0004	.0281	—.0122	...	—.0008	.030	.085	.035	...	—.17	—.14	—.01	...	.10	2.55	—2.72	...	—.20	.28	.29
1956–60	.0128	—.0015	—.0020	...	.0108	.030	.072	.029	...	.35	.11	.26	...	3.38	—.16	—.54	...	2.84	.25	.31
1961–6/68	.0029	.0077	.0034	...	—.0000	.066	.138	.064	...	.14	.06	—.01	...	.42	.53	.51	...	—.01	.34	.29

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TABLE 3 (*Continued*)

	STATISTIC																			
PERIOD	$\bar{\hat{\gamma}}_0$	$\bar{\hat{\gamma}}_1$	$\bar{\hat{\gamma}}_2$	$\bar{\hat{\gamma}}_3$	$\overline{\hat{\gamma}_0 - R_f}$	$s(\hat{\gamma}_0)$	$s(\hat{\gamma}_1)$	$s(\hat{\gamma}_2)$	$s(\hat{\gamma}_3)$	$\rho_0(\hat{\gamma}_0 - R_f)$	$\rho_M(\hat{\gamma}_1)$	$\rho_0(\hat{\gamma}_2)$	$\rho_0(\hat{\gamma}_3)$	$t(\bar{\hat{\gamma}}_0)$	$t(\bar{\hat{\gamma}}_1)$	$t(\bar{\hat{\gamma}}_2)$	$t(\bar{\hat{\gamma}}_3)$	$t(\overline{\hat{\gamma}_0 - R_f})$	$\bar{r}^2$	$s(r^2)$
Panel C:																				
1935–6/68 ..	.0054	.0072	...	.0198	.0041	.052	.065	...	.868	.04	—.12	...	—.04	2.10	2.20	...	.46	1.59	.32	.31
1935–45	.0017	.0104	...	.0841	.0015	.073	.083	...	.921	—.00	—.26	...	—.08	.26	1.41	...	1.05	.24	.32	.31
1946–55	.0110	.0075	...	—.1052	.0100	.032	.056	...	.609	.08	.02	...	—.20	3.78	1.47	...	—1.89	3.46	.34	.32
1956–6/68 ..	.0042	.0041	...	.0633	.0016	.040	.052	...	.984	.12	.08	...	.03	1.28	.96	...	.79	.50	.30	.29
1935–40	.0036	.0119	...	—.0170	.0035	.082	.105	...	.744	—.03	—.26	...	—.18	.37	.97	...	—.19	.36	.25	.30
1941–45	—.0006	.0085	...	.2053	—.0009	.061	.052	...	1.091	.07	—.29	...	—.02	—.08	1.25	...	1.46	—.11	.41	.30
1946–50	.0069	.0081	...	—.0920	.0062	.034	.066	...	.504	.14	.06	...	—.02	1.56	.95	...	—1.41	1.40	.42	.33
1951–55	.0150	.0069	...	—.1185	.0138	.029	.043	...	.702	.06	—.18	...	—.32	4.05	1.24	...	—1.31	3.72	.27	.29
1956–60	.0127	—.0081	...	.0728	.0107	.037	.045	...	1.164	.15	.15	...	.21	2.68	—1.40	...	.48	2.26	.26	.30
1961–6/68 ..	—.0014	.0122	...	.0570	—.0044	.042	.055	...	.850	.10	.00	...	—.19	—.32	2.12	...	.64	—.98	.33	.27
Panel D:																				
1935–6/68 ..	.0020	.0114	—.0026	.0516	.0008	.075	.123	.060	.929	—.09	—.09	—.12	—.10	.55	1.85	—.86	1.11	.20	.34	.31
1935–45	.0011	.0118	—.0009	.0817	.0010	.103	.146	.079	1.003	—.20	—.23	—.24	—.15	.13	.94	—.14	.94	.11	.34	.31
1946–55	.0017	.0209	—.0076	—.0378	.0008	.042	.096	.038	.619	—.10	—.00	—.01	—.20	.44	2.39	—2.16	—.67	.20	.36	.32
1956–6/68 ..	.0031	.0034	—.0000	.0966	.0005	.065	.122	.055	1.061	.12	.03	.01	—.05	.59	.34	—.00	1.11	.10	.32	.29
1935–40	.0009	.0156	—.0029	.0025	.0008	.112	.171	.085	.826	—.16	—.23	—.26	—.12	.07	.78	—.29	.03	.06	.26	.30
1941–45	.0015	.0073	.0014	.1767	.0012	.092	.109	.072	1.181	—.28	—.21	—.22	—.18	.12	.52	.15	1.16	.10	.43	.31
1946–50	.0011	.0141	—.0040	—.0313	.0004	.047	.106	.042	.590	—.10	.03	—.01	—.12	.18	1.03	—.73	—.41	.07	.44	.33
1951–55	.0023	.0277	—.0112	—.0443	.0011	.037	.085	.034	.651	—.11	—.13	—.01	—.28	.48	2.53	—2.54	—.53	.23	.29	.30
1956–60	.0103	—.0047	—.0020	.0979	.0083	.049	.078	.032	1.286	—.16	.19	—.01	.02	1.63	—.47	—.49	.59	1.31	.28	.30
1961–6/68 ..	—.0017	.0088	.0013	.0957	—.0046	.073	.144	.066	.887	.20	.00	.01	—.15	—.21	.58	.19	1.02	—.60	.35	.29

Inferences based on approximate normality are on even safer ground if one assumes, again in line with the results of Officer (1971), that although they are well approximated by stable nonnormal distributions with $\alpha \cong 1.8$, distributions of monthly returns in fact have finite variances and converge—but very slowly—toward the normal as one takes sums or averages of individual returns. Then the distributions of the means of month-by-month regression coefficients from the risk-return model are likely to be close to normal since each mean is based on coefficients for many months.

A. Tests of the Major Hypotheses of the Two-Parameter Model

Consider first condition C2 of the two-parameter model, which says that no measure of risk, in addition to β, systematically affects expected returns. This hypothesis is not rejected by the results in panels C and D of table 3. The values of $t(\bar{\hat{\gamma}}_3)$ are small, and the signs of the $t(\bar{\hat{\gamma}}_3)$ are randomly positive and negative.

Likewise, the results in panels B and D of table 3 do not reject condition C1 of the two-parameter model, which says that the relationship between expected return and β is linear. In panel B, the value of $t(\bar{\hat{\gamma}}_2)$ for the overall period 1935–6/68 is only $-.29$. In the 5-year subperiods, $t(\bar{\hat{\gamma}}_2)$ for 1951–55 is approximately -2.7, but for subperiods that do not cover 1951–55, the values of $t(\bar{\hat{\gamma}}_2)$ are much closer to zero.

So far, then, the two-parameter model seems to be standing up well to the data. All is for naught, however, if the critical condition C3 is rejected. That is, we are not happy with the model unless there is on average a positive tradeoff between risk and return. This seems to be the case. For the overall period 1935–6/68, $t(\bar{\hat{\gamma}}_1)$ is large for all models. Except for the period 1956–60, the values of $t(\bar{\hat{\gamma}}_1)$ are also systematically positive in the subperiods, but not so systematically large.

The small *t*-statistics for subperiods reflect the substantial month-to-month variability of the parameters of the risk-return regressions. For example, in the one-variable regressions summarized in panel A, for the period 1935–40, $\bar{\hat{\gamma}}_1 = .0109$. In other words, for this period the average incremental return per unit of β was almost 1.1 percent per month, so that on average, bearing risk had substantial rewards. Nevertheless, because of the variability of $\hat{\gamma}_{1t}$—in this period $s(\hat{\gamma}_1)$ is 11.6 percent per month (!)—$t(\bar{\hat{\gamma}}_1)$ is only .79. It takes the statistical power of the large sample for the overall period before values of $\bar{\hat{\gamma}}_1$ that are large in practical terms also yield large *t*-values.

But at least with the sample of the overall period $t(\bar{\hat{\gamma}}_1)$ achieves values supportive of the conclusion that on average there is a statistically observable positive relationship between return and risk. This is not the case with respect to $t(\bar{\hat{\gamma}}_2)$ and $t(\bar{\hat{\gamma}}_3)$. Even, or indeed especially, for the overall period, these *t*-statistics are close to zero.

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The behavior through time of $\hat{\gamma}_{1t}$, $\hat{\gamma}_{2t}$, and $\hat{\gamma}_{3t}$ is also consistent with hypothesis ME that the capital market is efficient. The serial correlations $\rho_M(\hat{\gamma}_1)$, $\rho_0(\hat{\gamma}_2)$, and $\rho_0(\hat{\gamma}_3)$, are always low in terms of explanatory power and generally low in terms of statistical significance. The proportion of the variance of $\tilde{\gamma}_{jt}$ explained by first-order serial correlation is estimated by $\rho(\hat{\gamma}_j)^2$ which in all cases is small. As for statistical significance, under the hypothesis that the true serial correlation is zero, the standard deviation of the sample coefficient can be approximated by $\sigma(\hat{\rho}) = 1/\sqrt{n}$. For the overall period, $\sigma(\hat{\rho})$ is approximately .05, while for the 10- and 5-year subperiods $\sigma(\hat{\rho})$ is approximately .09 and .13, respectively. Thus, the values of $\rho_M(\hat{\gamma}_1)$, $\rho_0(\hat{\gamma}_2)$, and $\rho_0(\hat{\gamma}_3)$ in table 3 are generally statistically close to zero. The exceptions involve primarily periods that include the 1935–40 subperiod, and the results for these periods are not independent.[8]

To conserve space, the serial correlations of the portfolio residuals, $\hat{\eta}_{pt}$, are not shown. In these serial correlations, negative values predominate. But like the serial correlations of the $\hat{\gamma}$'s, those of the $\hat{\eta}$'s are close to zero. Higher-order serial correlations of the $\hat{\gamma}$'s and $\hat{\eta}$'s have been computed, and these also are never systematically large.

In short, one cannot reject the hypothesis that the pricing of securities is in line with the implications of the two-parameter model for expected returns. And given a two-parameter pricing model, the behavior of returns through time is consistent with an efficient capital market.

B. The Behavior of the Market

Some perspective on the behavior of the market during different periods and on the interpretation of the coefficients $\hat{\gamma}_{0t}$ and $\hat{\gamma}_{1t}$ in the risk-return regressions can be obtained from table 4. For the various periods of table 3, table 4 shows the sample means (and with some exceptions), the standard

---

[8] The serial correlations of $\hat{\gamma}_2$ and $\hat{\gamma}_3$ about means that are assumed to be zero provide a test of the fair game property of an efficient market, given that expected returns are generated by the two-parameter model—that is, given $E(\tilde{\gamma}_{2t}) = E(\tilde{\gamma}_{3t}) = 0$. Likewise, $\rho_0(\hat{\gamma}_{0t} - R_{ft})$ provides a test of market efficiency with respect to the behavior of $\hat{\gamma}_{0t}$ through time, given the validity of the Sharpe-Lintner hypothesis (about which we have as yet said nothing). But, at least for $\hat{\gamma}_{2t}$ and $\hat{\gamma}_{3t}$, computing the serial correlations about sample means produces essentially the same results.

To test the market efficiency hypothesis on $\tilde{\gamma}_{1t} - [E(\tilde{R}_{mt}) - E(\tilde{R}_{0t})]$, the sample mean of the $\hat{\gamma}_{1t}$ is used to estimate $E(\tilde{R}_{mt}) - E(\tilde{R}_{0t})$, thus implicitly assuming that the expected risk premium is constant. That this is a reasonable approximation [in the sense that the $\rho_M(\hat{\gamma}_1)$ are small], probably reflects the fact that variation in $E(\tilde{R}_{mt}) - E(\tilde{R}_{0t})$ is trivial relative to the month-by-month variation in $\hat{\gamma}_{1t}$.

Finally, it is well to note that in terms of the implications of the serial correlations for making good portfolio decisions—and thus for judging whether market efficiency is a workable representation of reality—the fact that the serial correlations are low in terms of explanatory power is more important than whether or not they are low in terms of statistical significance.

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TABLE 4

The Behavior of the Market

Period	Statistic*								
	$\bar{R}_m$	$\overline{R_m - R_f}$	$\bar{\hat{\gamma}}_1$	$\bar{\hat{\gamma}}_0$	$\bar{R}_f$	$\frac{\overline{R_m - R_f}}{s(R_m)}$	$\frac{\bar{\hat{\gamma}}_1}{s(R_m)}$	$s(R_m)$	$s(R_m)$
1935–6/68	.0143	.0130	.0085	.0061	.0013	.2136	.1388	.061	.066
1935–45	.0197	.0195	.0163	.0039	.0002	.2207	.1844	.089	.098
1946–55	.0112	.0103	.0027	.0087	.0009	.2378	.0614	.043	.041
1956–6/68	.0121	.0095	.0062	.0060	.0026	.2387	.1560	.040	.044
1935–40	.0132	.0132	.0109	.0024	.0001	.1221	.1009	.108	.116
1941–45	.0274	.0272	.0229	.0056	.0002	.4715	.3963	.058	.069
1946–50	.0077	.0070	.0029	.0050	.0007	.1351	.0564	.052	.047
1951–55	.0148	.0136	.0024	.0123	.0012	.4174	.0735	.033	.035
1956–60	.0090	.0070	−.0059	.0148	.0020	.2080	−.1755	.034	.034
1961–6/68	.0141	.0111	.0143	.0001	.0030	.2567	.3294	.043	.048

* Since $s(R_f)$ is so small relative to $s(R_m)$, $s(R_m - R_f)$, which is not shown, is essentially the same as $s(R_m)$. The standard deviations of $(R_m - R_f)/s(R_m)$ and $\hat{\gamma}_1/s(R_m)$, also not shown, can be obtained directly from $s(R_m - R_f)$, $s(\hat{\gamma}_1)$ and $s(R_m)$. Finally, the t-statistics for $(\overline{R_m - R_f})/s(R_m)$ and $\bar{\hat{\gamma}}_1/s(R_m)$ are identical with those for $\overline{R_m - R_f}$ and $\bar{\hat{\gamma}}_1$.

deviations, t-statistics for sample means, and first-order serial correlations for the month-by-month values of the following variables and coefficients: the market return R_{mt}; the riskless rate of interest R_{ft}, taken to be the yield on 1-month Treasury bills; $R_{mt} - R_{ft}$; $(R_{mt} - R_{ft})/s(R_m)$; $\hat{\gamma}_{0t}$ and $\hat{\gamma}_{1t}$, repeated from panel A of table 3; and $\hat{\gamma}_{1t}/s(R_m)$. The t-statistics on sample means are computed in the same way as those in table 3.

If the two-parameter model is valid, then in equation (7), $E(\tilde{\gamma}_{0t}) = E(\tilde{R}_{0t})$, where $E(\tilde{R}_{0t})$ is the expected return on any zero-β security or portfolio. Likewise, the expected risk premium per unit of β is $E(\tilde{R}_{mt}) - E(\tilde{R}_{0t}) = E(\tilde{\gamma}_{1t})$. In fact, for the one-variable regressions of panel A, table 3, that is,

$$R_{pt} = \hat{\gamma}_{0t} + \hat{\gamma}_{1t}\,\hat{\beta}_p + \hat{\eta}_{pt}, \tag{11}$$

we have, period by period,

$$\hat{\gamma}_{1t} = R_{mt} - \hat{\gamma}_{0t}. \tag{12}$$

This condition is obtained by averaging (11) over p and making use of the least-squares constraint

$$\sum_p \hat{\eta}_{pt} = 0.$$[9]

Moreover, the least-squares estimate $\hat{\gamma}_{0t}$ can always be interpreted as the return for month t on a zero-$\hat{\beta}$ portfolio, where the weights given to each

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[9] There is some degree of approximation in (12). The averages over p of R_{pt} and $\hat{\beta}_p$ are R_{mt} and 1.0, respectively, only if every security in the market is in some portfolio. With our methodology (see table 1) this is never true. But the degree of approximation turns out to be small: The average of the R_{pt} is always close to R_{mt} and the average $\hat{\beta}_p$ is always close to 1.0.

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TABLE 4 (*Continued*)

STATISTIC*										
$s(\hat{\gamma}_0)$	$s(R_f)$	$t(\bar{R}_m)$	$t(\overline{R_m - R_f})$	$t(\bar{\hat{\gamma}}_1)$	$t(\bar{\hat{\gamma}}_0)$	$\rho_M(R_m)$	$\rho_M(R_m - R_f)$	$\rho_M(\hat{\gamma}_1)$	$\rho_M(\hat{\gamma}_0)$	$\rho_M(R_f)$
.038	.0012	4.71	4.28	2.57	3.24	—.01	—.01	.02	.14	.98
.052	.0001	2.56	2.54	1.92	.86	—.07	—.07	—.03	.10	.88
.026	.0004	2.84	2.60	.70	3.71	.09	.09	.07	.10	.94
.030	.0009	3.72	2.92	1.73	2.45	.14	.14	.15	.25	.92
.064	.0001	1.04	1.04	.79	.32	—.13	—.13	—.09	.07	.72
.034	.0001	3.68	3.65	2.55	1.27	.14	.14	.15	.21	.83
.031	.0003	1.15	1.05	.48	1.27	.09	.09	.04	.18	.97
.019	.0004	3.51	3.22	.53	5.06	—.02	—.01	.08	—.07	.89
.020	.0007	2.07	1.60	—1.37	5.68	.12	.13	.18	.13	.80
.034	.0008	3.08	2.44	2.81	.03	.13	.13	.09	.21	.93

of the 20 portfolios to form this zero-$\hat{\beta}$ portfolio are the least-squares weights that are applied to the R_{pt} in computing $\hat{\gamma}_{0t}$.[10]

In the Sharpe-Lintner two-parameter model of market equilibrium $E(\tilde{\gamma}_{0t}) = E(\tilde{R}_{0t}) = R_{ft}$ and $E(\tilde{\gamma}_{1t}) = E(\tilde{R}_{mt}) - E(\tilde{R}_{0t}) = E(\tilde{R}_{mt}) - R_{ft}$. In the period 1935–40 and in the most recent period 1961–6/68, $\hat{\gamma}_{1t}$ is close to $\overline{R_m - R_f}$ and the t-statistics for the two averages are similar. In other periods, and especially in the period 1951–60, $\bar{\hat{\gamma}}_1$ is substantially less than $\overline{R_m - R_f}$. This is a consequence of the fact that for these periods $\bar{\hat{\gamma}}_0$ is noticeably greater than $\bar{R}_f$. In economic terms, the tradeoff of average return for risk between common stocks and short-term bonds has been more consistently large through time than the tradeoff of average return for risk among common stocks. Testing whether the differences between $\overline{R_m - R_f}$ and $\bar{\hat{\gamma}}_1$ are statistically large, however, is equivalent to testing the S-L hypothesis $E(\tilde{\gamma}_{0t}) = R_{ft}$, which we prefer to take up after examining further the stochastic process generating monthly returns.

Finally, although the differences between values of $\overline{R_m - R_f}$ for different periods or between values of $\bar{\hat{\gamma}}_1$ are never statistically large, there is a hint in table 4 that average-risk premiums declined from the pre– to the post–World War II periods. These are average risk premiums per unit of $\hat{\beta}$, however, which are not of prime interest to the investor. In making his portfolio decision, the investor is more concerned with the tradeoff of expected portfolio return for dispersion of return—that is, the slope of the efficient set of portfolios. In the Sharpe-Lintner model this slope is

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[10] That $\hat{\gamma}_{0t}$ is the return on a zero-$\hat{\beta}$ portfolio can be shown to follow from the unbiasedness of the least-squares coefficients in the cross-sectional risk-return regressions. If one makes the Gauss-Markov assumptions that the underlying disturbances $\tilde{\eta}_{pt}$ of (11) have zero means, are uncorrelated across p, and have the same variance for all p, then it follows almost directly from the Gauss-Markov Theorem that the least-squares estimate $\hat{\gamma}_{0t}$ is also the return for month t on the minimum variance zero-$\hat{\beta}$ portfolio that can be constructed from the 20 portfolio $\hat{\beta}_p$.

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always $[E(\tilde{R}_{mt}) - R_{ft}]/\sigma(\tilde{R}_{mt})$, and in the more general model of Black (1972), it is $[E(\tilde{R}_{mt}) - E(\tilde{R}_{0t})]/\sigma(\tilde{R}_{mt})$ at the point on the efficient set corresponding to the market portfolio m. In table 4, especially for the three long subperiods, dividing $\overline{R_m - R_f}$ and $\bar{\hat{\gamma}}_1$, by $s(R_m)$ seems to yield estimated risk premiums that are more constant through time. This results from the fact that any declines in $\bar{\hat{\gamma}}_1$ or $\overline{R_m - R_f}$ are matched by a quite noticeable downward shift in $s(R_m)$ from the early to the later periods (cf. Blume [1970] or Officer [1971]).

C. Errors and True Variation in the Coefficients $\hat{\gamma}_{jt}$

Each cross-sectional regression coefficient $\hat{\gamma}_{jt}$ in (10) has two components: the true $\tilde{\gamma}_{jt}$ and the estimation error, $\tilde{\phi}_{jt} = \hat{\gamma}_{jt} - \tilde{\gamma}_{jt}$. A natural question is: To what extent is the variation in $\hat{\gamma}_{jt}$ through time due to variation in $\tilde{\gamma}_{jt}$ and to what extent is it due to $\tilde{\phi}_{jt}$? In addition to providing important information about the precision of the coefficient estimates used to test the two-parameter model, the answer to this question can be used to test hypotheses about the stochastic process generating returns. For example, although we cannot reject the hypothesis that $E(\tilde{\gamma}_{2t}) = 0$, does including the term involving $\hat{\beta}_p^2$ in (10) help in explaining the month-by-month behavior of returns? That is, can we reject the hypothesis that for all t, $\tilde{\gamma}_{2t} = 0$? Likewise, can we reject the hypothesis that month-by-month $\tilde{\gamma}_{3t} = 0$? And is the variation through time in $\hat{\gamma}_{0t}$ due entirely to $\tilde{\phi}_{0t}$ and to variation in R_{ft}?

The answers to these questions are in table 5. For the models and time periods of table 3, table 5 shows for each $\hat{\gamma}_j$: $s^2(\hat{\gamma}_j)$, the sample variance of the month-by-month $\hat{\gamma}_{jt}$; $\overline{s^2(\tilde{\phi}_j)}$, the average of the month-by-month values of $s^2(\tilde{\phi}_{jt})$, where $s(\tilde{\phi}_{jt})$ is the standard error of $\hat{\gamma}_{jt}$ from the cross-sectional risk-return regression of (10) for month t; $s^2(\tilde{\gamma}_j) \equiv s^2(\hat{\gamma}_j) - \overline{s^2(\tilde{\phi}_j)}$; and the F-statistic $F = s^2(\hat{\gamma}_j)/\overline{s^2(\tilde{\phi}_j)}$, which is relevant for testing the hypothesis, $s^2(\hat{\gamma}_j) = \overline{s^2(\tilde{\phi}_j)}$. The numerator of F has $n - 1$ df, where n is the number of months in the sample period; and the denominator has $n(20 - K)$ df, where K is the number of coefficients $\hat{\gamma}_j$ in the model.[11]

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[11] The standard error of $\hat{\gamma}_{jt}$, $s(\tilde{\phi}_{jt})$, is proportional to the standard error of the risk-return residuals, $\hat{\eta}_{pt}$, for month t, which has $20 - K$ df. And n values of $s^2(\tilde{\phi}_{jt})$ are averaged to get $\overline{s^2(\tilde{\phi}_j)}$, so that the latter has $n(20 - K)$ df. Note that if the underlying return disturbances $\tilde{\eta}_{pt}$ of (10) are independent across p and have identical normal distributions for all p, then $\hat{\gamma}_{jt}$ is the sample mean of a normal distribution and $s^2(\tilde{\phi}_{jt})$ is proportional to the sample variance of the same normal distribution. If the process is also assumed to be stationary through time, it then follows that $s^2(\hat{\gamma}_{jt})$ and $\overline{s^2(\tilde{\phi}_{jt})}$ are independent, as required by the F-test. Finally, in the F-statistics of table 5, the values of n are 60 or larger, so that, since K is from 2 to 4, $n(20 - K) \geqslant 960$. From Mood and Graybill (1963), some upper percentage points of the F-distribution are:

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One clear-cut result in table 5 is that there is a substantial decline in the reliability of the coefficients $\hat{\gamma}_{0t}$ and $\hat{\gamma}_{1t}$—that is, a substantial increase in $s^2(\overline{\tilde{\phi}_0})$ and $s^2(\overline{\tilde{\phi}_1})$—when $\hat{\beta}_p^2$ and/or $\bar{s}_p(\hat{\epsilon}_j)$ are included in the risk-return regressions. The variable $\hat{\beta}_p^2$ is obviously collinear with $\hat{\beta}_p$, and, as can be seen from table 2, $\bar{s}_p(\hat{\epsilon}_i)$ likewise increases with $\hat{\beta}_p$. From panels B and C of table 5, the collinearity with $\hat{\beta}_p$ is stronger for $\hat{\beta}_p^2$ than for $\bar{s}_p(\hat{\epsilon}_j)$.

In spite of the loss in precision that arises from multicollinearity, however, the F-statistics for $\hat{\gamma}_2$ (the coefficient of $\hat{\beta}_p^2$) and $\hat{\gamma}_3$ [the coefficient of $\bar{s}_p(\hat{\epsilon}_j)$] are generally large for the models of panels B and C of table 5, and for the model of panel D which includes both variables. From the F-statistics in panel D, it seems that, except for the period 1935–45, the variation through time of $\tilde{\gamma}_{2t}$ is statistically more noticeable than that of $\tilde{\gamma}_{3t}$, but there are periods (1941–45, 1956–60) when the values of F for both $\tilde{\gamma}_{2t}$ and $\tilde{\gamma}_{3t}$ are large.

The F-statistics for $\hat{\gamma}_{1t} = \tilde{\gamma}_{1t} + \tilde{\phi}_{1t}$ also indicate that $\tilde{\gamma}_{1t}$ has substantial variation through time. This is not surprising, however, since $\hat{\gamma}_{1t}$ is always directly related to $\tilde{R}_{mt}$. For example, from equation (12), for the one-variable model of panel A, $\hat{\gamma}_{1t} = \tilde{R}_{mt} - \hat{\gamma}_{0t}$.

Finally, the F-statistics for $\hat{\gamma}_{0t} = \tilde{\gamma}_{0t} + \tilde{\phi}_{0t}$ are also in general large. And the month-by-month variation in $\tilde{\gamma}_{0t}$ cannot be accounted for by variation in R_{ft}. The variance of R_{ft} is so small relative to $s^2(\hat{\gamma}_{0t})$, $s^2(\tilde{\gamma}_{0t})$, and $\overline{s^2(\tilde{\phi}_{0t})}$ that doing the F-tests in terms of $\hat{\gamma}_{0t} - R_{ft}$ produces results almost identical with those for $\hat{\gamma}_{0t}$.

Rejection of the hypothesis that $\tilde{\gamma}_{0t} - R_{ft} = 0$ does not imply rejection of the S-L hypothesis—to be tested next—that $E(\tilde{\gamma}_{0t}) = R_{ft}$. Likewise, to find that month-by-month $\tilde{\gamma}_{2t} \neq 0$ and $\tilde{\gamma}_{3t} \neq 0$ does not imply rejection of hypotheses C1 and C2 of the two-parameter model. These hypotheses, which we are unable to reject on the basis of the results in table 3, say that $E(\tilde{\gamma}_{2t}) = 0$ and $E(\tilde{\gamma}_{3t}) = 0$.

What we have found in table 5 is that there are variables in addition to $\hat{\beta}_p$ that systematically affect period-by-period returns. Some of these omitted variables are apparently related to $\hat{\beta}_p^2$ and $\bar{s}_p(\hat{\epsilon}_i)$. But the latter are almost surely proxies, since there is no economic rationale for their presence in our stochastic risk-return model.

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n	$F_{.90}$	$F_{.95}$	$F_{.975}$	$F_{.99}$	$F_{.995}$
60 (120)	1.35	1.47	1.58	1.73	1.83
60 (∞)	1.29	1.39	1.48	1.60	1.69
120 (120)	1.26	1.35	1.43	1.53	1.61
120 (∞)	1.19	1.25	1.31	1.38	1.43

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TABLE 5

COMPONENTS OF THE VARIANCES OF THE $\hat{\gamma}_{jt}$

PERIOD	$s^2(\tilde{\gamma}_0)$	$s^2(\hat{\gamma}_0)$	$\overline{s^2(\tilde{\phi}_0)}$	F	$s^2(\tilde{\gamma}_1)$	$s^2(\hat{\gamma}_1)$	$\overline{s^2(\tilde{\phi}_1)}$	F
Panel A:								
1935–6/68	.00105	.00142	.00037	3.84	.00401	.00436	.00035	12.46
1935–45	.00182	.00273	.00091	3.00	.00863	.00950	.00087	10.92
1946–55	.00057	.00066	.00009	7.33	.00163	.00171	.00008	21.38
1956–6/68	.00077	.00090	.00013	6.92	.00181	.00193	.00012	16.08
1935–40	.00265	.00404	.00139	2.91	.01212	.01347	.00135	9.98
1941–45	.00086	.00118	.00032	3.69	.00452	.00481	.00029	16.59
1946–50	.00086	.00094	.00008	11.75	.00216	.00224	.00008	28.00
1951–55	.00027	.00036	.00009	4.00	.00113	.00121	.00008	15.12
1956–60	.00032	.00041	.00009	4.56	.00104	.00112	.00008	21.50
1961–6/68	.00100	.00114	.00014	8.14	.00217	.00231	.00014	16.50
Panel B:								
1935–6/68	.00092	.00267	.00175	1.52	.00564	.01403	.00839	1.67
1935–45	.00057	.00377	.00320	1.18	.00372	.01941	.01569	1.24
1946–55	.00053	.00112	.00059	1.90	.00651	.00897	.00245	3.66
1956–6/68	.00155	.00294	.00139	2.12	.00667	.01338	.00671	1.99
1935–40	.00018	.00476	.00458	1.04	.00374	.02555	.02181	1.17
1941–45	.00101	.00254	.00153	1.66	.00389	.01225	.00836	1.46
1946–50	.00084	.00136	.00052	2.62	.00862	.01071	.00209	5.12
1951–55	.00024	.00090	.00066	1.36	.00447	.00729	.00282	2.58
1956–60	.00037	.00087	.00050	1.74	.00289	.00517	.00228	2.27
1961–6/68	.00232	.00431	.00199	2.16	.00928	.01894	.00966	1.96
Panel C:								
1935–6/68	.00192	.00266	.00075	3.55	.00285	.00428	.00142	3.01
1935–45	.00394	.00533	.00139	3.83	.00433	.00717	.00283	2.52
1946–55	.00083	.00101	.00018	5.61	.00261	.00310	.00050	6.20
1956–6/68	.00100	.00164	.00063	2.60	.00178	.00270	.00092	2.93
1935–40	.00473	.00669	.00196	3.41	.00732	.01094	.00362	3.02
1941–45	.00307	.00377	.00070	5.38	.00085	.00274	.00189	1.45
1946–50	.00103	.00117	.00014	8.36	.00386	.00439	.00053	8.28
1951–55	.00061	.00083	.00022	3.77	.00140	.00188	.00047	4.00
1956–60	.00079	.00134	.00055	2.44	.00106	.00204	.00098	2.08
1961–6/68	.00109	.00177	.00068	2.60	.00212	.00300	.00088	3.41
Panel D:								
1935–6/68	.00150	.00566	.00406	1.39	.00608	.01521	.00913	1.66
1935–45	.00233	.01065	.00832	1.28	.00402	.02118	.01716	1.23
1946–55	.00013	.00176	.00163	1.08	.00647	.00916	.00269	3.41
1956–6/68	.00194	.00420	.00226	1.86	.00763	.01485	.00722	2.06
1935–40	.00157	.01263	.01106	1.14	.00457	.02910	.02453	1.19
1941–45	.00340	.00843	.00503	1.68	.00365	.01196	.00832	1.44
1946–50	.00023	.00220	.00197	1.12	.00858	.01119	.00261	4.29
1951–55	.00006	.00136	.00130	1.05	.00442	.00719	.00277	2.60
1956–60	.00092	.00239	.00147	1.62	.00328	.00602	.00274	2.20
1961–6/68	.00260	.00539	.00279	1.93	.01060	.02081	.01021	2.04

D. Tests of the S-L Hypothesis

In the Sharpe-Lintner two-parameter model of market equilibrium one has, in addition to conditions C1–C3, the hypothesis that $E(\tilde{\gamma}_{0t}) = R_{ft}$. The work of Friend and Blume (1970) and Black, Jensen, and Scholes (1972) suggests that the S-L hypothesis is not upheld by the data. At least in the post–World War II period, estimates of $E(\tilde{\gamma}_{0t})$ seem to be significantly greater than R_{ft}.

Each of the four models of table 3 can be used to test the S-L hypothe-

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TABLE 5 (*Continued*)

Period	$s^2(\tilde{\gamma}_2)$	$s^2(\hat{\gamma}_2)$	$\overline{s^2(\tilde{\phi}_2)}$	F	$s^2(\tilde{\gamma}_3)$	$s^2(\hat{\gamma}_3)$	$\overline{s^2(\tilde{\phi}_3)}$	F
Panel A:								
1935–6/68	...	...	...	...	...	...	...	...
1935–45	...	...	...	...	...	...	...	...
1946–55	...	...	...	...	...	...	...	...
1956–6/68	...	...	...	...	...	...	...	...
1935–40	...	...	...	...	...	...	...	...
1941–45	...	...	...	...	...	...	...	...
1946–50	...	...	...	...	...	...	...	...
1951–55	...	...	...	...	...	...	...	...
1956–60	...	...	...	...	...	...	...	...
1961–6/68	...	...	...	...	...	...	...	...
Panel B:								
1935–6/68	.00121	.00318	.00197	1.61	...	...	...	...
1935–45	.00171	.00548	.00377	1.45	...	...	...	...
1946–55	.00063	.00112	.00049	2.29	...	...	...	...
1956–6/68	.00122	.00278	.00156	1.78	...	...	...	...
1935–40	.00041	.00566	.00524	1.08	...	...	...	...
1941–45	.00327	.00527	.00201	2.62	...	...	...	...
1946–50	.00066	.00103	.00037	2.78	...	...	...	...
1951–55	.00058	.00120	.00062	1.94	...	...	...	...
1956–60	.00033	.00083	.00050	1.66	...	...	...	...
1961–6/68	.00182	.00410	.00227	1.81	...	...	...	...
Panel C:								
1935–6/68	...	...	...	...	.341	.753	.412	1.83
1935–45	...	...	...	...	.535	.847	.313	2.71
1946–55	...	...	...	...	.165	.370	.206	1.80
1956–6/68	...	...	...	...	.304	.968	.664	1.46
1935–40	...	...	...	...	.270	.553	.282	1.96
1941–45	...	...	...	...	.840	1.189	.349	3.41
1946–50	...	...	...	...	.118	.254	.136	1.87
1951–55	...	...	...	...	.217	.493	.276	1.79
1956–60	...	...	...	...	.622	1.355	.734	1.85
1961–6/68	...	...	...	...	.105	.722	.617	1.17
Panel D:								
1935–6/68	.00061	.00362	.00301	1.21	.276	.864	.588	1.47
1935–45	...	.00624	.00644	.97	.392	1.001	.613	1.63
1946–55	.00061	.00148	.00087	1.70	.028	.383	.355	1.08
1956–6/68	.00134	.00304	.00169	1.80	.374	1.125	.751	1.50
1935–40	...	.00723	.00886	.82	.120	.682	.562	1.21
1941–45	.00162	.00515	.00353	1.46	.720	1.395	.675	2.07
1946–50	.00083	.00180	.00096	1.87	.023	.348	.325	1.07
1951–55	.00039	.00116	.00077	1.51	.038	.424	.386	1.10
1956–60	.00037	.00103	.00066	1.56	.712	1.654	.941	1.76
1961–6/68	.00202	.00440	.00238	1.85	.163	.787	.624	1.26

sis.[12] The most efficient tests, however, are provided by the one-variable

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[12] The least-squares intercepts $\hat{\gamma}_{0t}$ in the four cross-sectional risk-return regressions can always be interpreted as returns for month t on zero-$\hat{\beta}$ portfolios (n. 10). For the three-variable model of panel D, table 3, the unbiasedness of the least-squares coefficients can be shown to imply that in computing $\hat{\gamma}_{0t}$, negative and positive weights are assigned to the 20 portfolios in such a way that the resulting portfolio has not only zero-$\hat{\beta}$ but also zero averages of the 20 $\hat{\beta}_p^2$ and of the 20 $\bar{s}_p(\hat{\epsilon}_i)$. Analogous statements apply to the two-variable models of panels B and C.

Black, Jensen, and Scholes test the S-L hypothesis with a time series of monthly returns on a "minimum variance zero-$\hat{\beta}$ portfolio" which they derive directly. It turns

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model of panel A, since the values of $s(\hat{\gamma}_0)$ for this model [which are nearly identical with the values of $s(\hat{\gamma}_0 - R_f)$] are substantially smaller than those for other models. Except for the most recent period 1961–6/68, the values of $\overline{\hat{\gamma}_0 - R_f}$ in panel A are all positive and generally greater than 0.4 percent per month. The value of $t(\overline{\hat{\gamma}_0 - R_f})$ for the overall period 1935–6/68 is 2.55, and the t-statistics for the subperiods 1946–55, 1951–55, and 1956–60 are likewise large. Thus, the results in panel A, table 3, support the negative conclusions of Friend and Blume (1970) and Black, Jensen, and Scholes (1972) with respect to the S-L hypothesis.

The S-L hypothesis seems to do somewhat better in the two-variable quadratic model of panel B, table 3 and especially in the three-variable model of panel D. The values of $t(\overline{\hat{\gamma}_0 - R_f})$ are substantially closer to zero for these models than for the model of panel A. This is due to values of $\overline{\hat{\gamma}_0 - R_f}$ that are closer to zero, but it also reflects the fact that $s(\hat{\gamma}_0)$ is substantially higher for the models of panels B and D than for the model of panel A.

But the effects of $\hat{\beta}_p{}^2$ and $\bar{s}_p(\hat{\epsilon}_i)$ on tests of the S-L hypothesis are in fact not at all so clear-cut. Consider the model

$$\tilde{R}_{it} = \tilde{\gamma}'_{0t} + \tilde{\gamma}'_{1t}\beta_i + \tilde{\gamma}_{2t}(1 - \beta_i)^2 + \tilde{\gamma}_{3t}s_i + \tilde{\eta}_{it}. \tag{13}$$

Equations (7) and (13) are equivalent representations of the stochastic process generating returns, with $\tilde{\gamma}_{1t} = \tilde{\gamma}'_{1t} - 2\tilde{\gamma}_{2t}$ and $\tilde{\gamma}_{0t} = \tilde{\gamma}'_{0t} + \tilde{\gamma}_{2t}$. Moreover, if the steps used to obtain the regression equation (10) from the stochastic model (7) are applied to (13), we get the regression equation,

$$R_{pt} = \hat{\gamma}'_{0t} + \hat{\gamma}'_{1t}\hat{\beta}_p + \hat{\gamma}_{2t}(1 - \hat{\beta}_p)^2 + \hat{\gamma}_{3t}\bar{s}_p(\hat{\epsilon}_i) + \hat{\eta}_{pt}, \tag{14}$$

where, just as $\hat{\beta}_p{}^2$ in (10) is the average of $\hat{\beta}_i{}^2$ for securities i in portfolio p, $(1 - \hat{\beta}_p)^2$ is the average of $(1 - \hat{\beta}_i)^2$. The values of the estimates $\hat{\gamma}_{2t}$ and $\hat{\gamma}_{3t}$ are identical in (10) and (14); in addition, $\hat{\gamma}_{1t} = \hat{\gamma}'_{1t} - 2\hat{\gamma}_{2t}$ and $\hat{\gamma}_{0t} = \hat{\gamma}'_{0t} + \hat{\gamma}_{2t}$. But although the regression equations (10) and (14) are statistically indistinguishable, tests of the hypothesis $E(\tilde{\gamma}_{0t}) =$

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out, however, that this portfolio is constructed under what amounts to the assumptions of the Gauss-Markov Theorem on the underlying disturbances of the one-variable risk-return regression (11). With these assumptions the least-squares estimate $\hat{\gamma}_{0t}$, obtained from the cross-sectional risk-return regression of (11) for month t, is precisely the return for month t on the minimum variance zero-$\hat{\beta}$ portfolio that can be constructed from the 20 portfolio $\hat{\beta}_p$. Thus, the tests of the S-L hypothesis in panel A of table 3 are conceptually the same as those of Black, Jensen, and Scholes.

If one makes the assumptions of the Gauss-Markov Theorem on the underlying disturbances of the models of panels B–D of table 3, the regression intercepts for these models can likewise be interpreted as returns on minimum-variance zero-$\hat{\beta}$ portfolios. These portfolios then differ in terms of whether or not they also constrain the averages of the 20 $\hat{\beta}_p{}^2$ and of the 20 $\bar{s}_p(\hat{\epsilon}_i)$ to be zero. Given the collinearity of $\hat{\beta}_p$, $\hat{\beta}_p{}^2$, and $\bar{s}_p(\hat{\epsilon}_i)$, however, the assumptions of the Gauss-Markov Theorem cannot apply to all four of the models.

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R_{ft} from (10) do not yield the same results as tests of the hypothesis $E(\tilde{\gamma}'_{0t}) = R_{ft}$ from (14). In panel D of table 3, $\overline{\hat{\gamma}_0 - R_f}$ is never statistically very different from zero, whereas in tests (not shown) from (14), the results are similar to those of panel A, table 3. That is, $\overline{\hat{\gamma}'_0 - R_f}$ is systematically positive for all periods but 1961–6/68 and statistically very different from zero for the overall period 1935–6/68 and for the 1946–55, 1951–55, and 1956–60 subperiods.

Thus, tests of the S-L hypothesis from our three-variable models are ambiguous. Perhaps the ambiguity could be resolved and more efficient tests of the hypothesis could be obtained if the omitted variables for which $\bar{s}_p(\hat{\epsilon}_i)$, $\hat{\beta}_p^2$, or $(1 - \hat{\beta}_p)^2$ are almost surely proxies were identified. As indicated above, however, at the moment the most efficient tests of the S-L hypothesis are provided by the one-variable model of panel A, table 3, and the results for that model support the negative conclusions of others.

Given that the S-L hypothesis is not supported by the data, tests of the market efficiency hypothesis that $\tilde{\gamma}_{0t} - E(\tilde{R}_{0t})$ is a fair game are difficult since we no longer have a specific hypothesis about $E(\tilde{R}_{0t})$. And using the mean of the $\hat{\gamma}_{0t}$ as an estimate of $E(\tilde{R}_{0t})$ does not work as well in this case as it does for the market efficiency tests on γ_{1t}. One should note, however, that although the serial correlations $\rho_M(\hat{\gamma}_0)$ in table 4 are often large relative to estimates of their standard errors, they are small in terms of the proportion of the time series variance of $\hat{\gamma}_{0t}$ that they explain, and the latter is the more important criterion for judging whether market efficiency is a workable representation of reality (see n. 8).

VI. Conclusions

In sum our results support the important testable implications of the two-parameter model. Given that the market portfolio is efficient—or, more specifically, given that our proxy for the market portfolio is at least approximately efficient—we cannot reject the hypothesis that average returns on New York Stock Exchange common stocks reflect the attempts of risk-averse investors to hold efficient portfolios. Specifically, on average there seems to be a positive tradeoff between return and risk, with risk measured from the portfolio viewpoint. In addition, although there are "stochastic nonlinearities" from period to period, we cannot reject the hypothesis that on average their effects are zero and unpredictably different from zero from one period to the next. Thus, we cannot reject the hypothesis that in making a portfolio decision, an investor should assume that the relationship between a security's portfolio risk and its expected return is linear, as implied by the two-parameter model. We also cannot reject the hypothesis of the two-parameter model that no measure of risk, in addition to portfolio risk, systematically affects average returns. Finally, the observed fair game properties of the coefficients and residuals of the

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risk-return regressions are consistent with an efficient capital market—that is, a market where prices of securities fully reflect available information.

Appendix

Some Related Issues

A1. Market Models and Tests of Market Efficiency

The time series of regression coefficients from (10) are, of course, the inputs for the tests of the two-parameter model. But these coefficients can also be useful in tests of capital market efficiency—that is, tests of the speed of price adjustment to different types of new information. Since the work of Fama et al. (1969), such tests have commonly been based on the "one-factor market model":

$$R_{it} = \hat{a}_i + \hat{\beta}_i R_{mt} + \hat{\epsilon}_{it}. \tag{15}$$

In this regression equation, the term involving R_{mt} is assumed to capture the effects of market-wide factors. The effects on returns of events specific to company *i*, like a stock split or a change in earnings, are then studied through the residuals $\hat{\epsilon}_{it}$.

But given that there is period-to-period variation in $\hat{\gamma}_{0t}$, $\hat{\gamma}_{2t}$, and $\hat{\gamma}_{3t}$ in (10) that is above and beyond pure sampling error, then these coefficients can be interpreted as market factors, (in addition to R_{mt}) that influence the returns on all securities. To see this, substitute (12) into (11) to obtain the "two-factor market model":

$$R_{pt} = \hat{\gamma}_{0t}(1 - \hat{\beta}_p) + \hat{\beta}_p R_{mt} + \hat{\eta}_{pt}. \qquad 16$$

In like fashion, from equation (10) itself we easily obtain the "four-factor market model":

$$R_{pt} = \hat{\gamma}_{0t}(1 - \hat{\beta}_p) + \hat{\beta}_p R_{mt} + \hat{\gamma}_{2t}(\hat{\beta}^2{}_p - \hat{\beta}_p \bar{\hat{\beta}}{}^2) + \hat{\gamma}_{3t} [\bar{s}_p(\hat{\epsilon}_i) - \hat{\beta}_p \bar{\bar{s}}(\hat{\epsilon}_i)] + \hat{\eta}_{pt}, \tag{17}$$

where $\bar{\hat{\beta}}{}^2$ and $\bar{\bar{s}}(\hat{\epsilon}_i)$ are the averages over p of the $\hat{\beta}_p{}^2$ and the $\bar{s}_p(\hat{\epsilon}_i)$.

Comparing equations (15–17) it is clear that the residuals $\hat{\epsilon}_{it}$ from the one-factor market model contain variation in the market factors $\hat{\gamma}_{0t}$, $\hat{\gamma}_{2t}$, and $\hat{\gamma}_{3t}$. Thus, if one is interested in the effect on a security's return of an event specific to the given company, this effect can probably be studied more precisely from the residuals of the two- or even the four-factor market models of (16) and (17) than from the one-factor model of (15). This has in fact already been done in a study of changes in accounting techniques by Ball (1972), in a study of insider trading by Jaffe (1972), and in a study of mergers by Mandelker (1972).

Ball, Jaffe, and Mandelker use the two-factor rather than the four-factor market model, and there is probably some basis for this. First, one can see from table 5 that because of the collinearity of $\hat{\beta}_p$, $\hat{\beta}_p{}^2$, and $\bar{s}_p(\hat{\epsilon}_i)$, the coefficient estimates $\hat{\gamma}_{0t}$ and $\hat{\gamma}_{1t}$ have much smaller standard errors in the two-factor model. Second, we have computed residual variances for each of our 20 portfolios for various time periods from the time series of $\hat{\epsilon}_{pt}$ and $\hat{\eta}_{pt}$ from (15), (16), and (17). The decline in residual variance that is obtained in

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going from (15) to (16) is as predicted: That is, the decline is noticeable over more or less the entire range of $\hat{\beta}_p$ and it is proportional to $(1 - \hat{\beta}_p)^2$. On the other hand, in going from the two- to the four-factor model, reductions in residual variance are generally noticeable only in the portfolios with the lowest and highest $\hat{\beta}_p$, and the reductions for these two portfolios are generally small. Moreover, including $\bar{s}_p(\hat{\epsilon}_i)$ as an explanatory variable in addition to $\hat{\beta}_p$ and $\hat{\beta}_p{}^2$ never results in a noticeable reduction in residual variances.

A2. Multifactor Models and Errors in the $\hat{\beta}$

If the return-generating process is a multifactor market model, then the usual estimates of β_i from the one-factor model of (15) are not most efficient. For example, if the return-generating process is the population analog of (16), more efficient estimates of β_i could in principle be obtained from a constrained regression applied to

$$\tilde{R}_{it} - \tilde{\gamma}_{0t} = \beta_i(\tilde{R}_{mt} - \tilde{\gamma}_{0t}) + \tilde{\eta}_{it}.$$

But this approach requires the time series of the true $\tilde{\gamma}_{0t}$. All we have are estimates $\hat{\gamma}_{0t}$, themselves obtained from estimates of $\hat{\beta}_p$ from the one-factor model of (15).

It can also be shown that with a multifactor return-generating process the errors in the $\hat{\beta}$ computed from the one-factor market model of (8) and (15) are correlated across securities and portfolios. This results from the fact that if the true process is a multifactor model, the disturbances of the one-factor model are correlated across securities and portfolios. Moreover, the interdependence of the errors in the $\hat{\beta}$ is higher the farther the true β's are from 1.0. This was already noted in the discussion of table 2 where we found that the relative reduction in the standard errors of the $\hat{\beta}$'s obtained by using portfolios rather than individual securities is lower the farther $\hat{\beta}_p$ is from 1.0.

Interdependence of the errors in the $\hat{\beta}_p$ also complicates the formal analysis of the effects of errors-in-the-variables on properties of the estimated coefficients (the $\hat{\gamma}_{jt}$) in the risk-return regressions of (10). This topic is considered in detail in an appendix to an earlier version of this paper that can be made available to the reader on request.

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Investor growth expectations: Analysts vs. history

Analysts' growth forecasts dominate past trends in predicting stock prices.

James H. Vander Weide and Willard T. Carleton

For the purposes of implementing the Discounted Cash Flow (DCF) cost of equity model, the analyst must know which growth estimate is embodied in the firm's stock price. A study by Cragg and Malkiel (1982) suggests that the stock valuation process embodies analysts' forecasts rather than historically based growth figures such as the ten-year historical growth in dividends per share or the five-year growth in book value per share. The Cragg and Malkiel study is based on data for the 1960s, however, a decade that was considerably more stable than the recent past.

As the issue of which growth rate to use in implementing the DCF model is so important to applications of the model, we decided to investigate whether the Cragg and Malkiel conclusions continue to hold in more recent periods. This paper describes the results of our study.

STATISTICAL MODEL

The DCF model suggests that the firm's stock price is equal to the present value of the stream of dividends that investors expect to receive from owning the firm's shares. Under the assumption that investors expect dividends to grow at a constant rate, g, in perpetuity, the stock price is given by the following simple expression:

$$P_S = \frac{D\,(1 + g)}{k - g} \qquad (1)$$

where:

P_S = current price per share of the firm's stock;
D = current annual dividend per share;
g = expected constant dividend growth rate; and
k = required return on the firm's stock.

Dividing both sides of Equation (1) by the firm's current earnings, E, we obtain:

$$\frac{P_S}{E} = \frac{D}{E} \cdot \frac{(1 + g)}{k - g} \qquad (2)$$

Thus, the firm's price/earnings (P/E) ratio is a non-linear function of the firm's dividend payout ratio (D/E), the expected growth in dividends (g), and the required rate of return.

To investigate what growth expectation is embodied in the firm's current stock price, it is more convenient to work with a linear approximation to Equation (2). Thus, we will assume that:

$$P/E = a_0(D/E) + a_1 g + a_2 k. \qquad (3)$$

(Cragg and Malkiel found this assumption to be reasonable throughout their investigation.)

Furthermore, we will assume that the required

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rate of return, k, in Equation (3) depends on the values of the risk variables B, Cov, Rsq, and Sa, where B is the firm's Value Line beta; Cov is the firm's pretax interest coverage ratio; Rsq is a measure of the stability of the firm's five-year historical EPS; and Sa is the standard deviation of the consensus analysts' five-year EPS growth forecast for the firm. Finally, as the linear form of the P/E equation is only an approximation to the true P/E equation, and B, Cov, Rsq, and Sa are only proxies for k, we will add an error term, e, that represents the degree of approximation to the true relationship.

With these assumptions, the final form of our P/E equation is as follows:

$$P/E = a_0(D/E) + a_1g + a_2B + a_3Cov + a_4Rsq + a_5Sa + e. \qquad (4)$$

The purpose of our study is to use more recent data to determine which of the popular approaches for estimating future growth in the Discounted Cash Flow model is embodied in the market price of the firm's shares.

We estimated Equation (4) to determine which estimate of future growth, g, when combined with the payout ratio, D/E, and risk variables B, Cov, Rsq, and Sa, provides the best predictor of the firm's P/E ratio. To paraphrase Cragg and Malkiel, we would expect that growth estimates found in the best-fitting equation more closely approximate the expectation used by investors than those found in poorer-fitting equations.

DESCRIPTION OF DATA

Our data sets include both historically based measures of future growth and the consensus analysts' forecasts of five-year earnings growth supplied by the Institutional Brokers Estimate System of Lynch, Jones & Ryan (IBES). The data also include the firm's dividend payout ratio and various measures of the firm's risk. We include the latter items in the regression, along with earnings growth, to account for other variables that may affect the firm's stock price.

The data include:

Earnings Per Share. Because our goal is to determine which earnings variable is embodied in the firm's market price, we need to define this variable with care. Financial analysts who study a firm's financial results in detail generally prefer to "normalize" the firm's reported earnings for the effect of extraordinary items, such as write-offs of discontinued operations, or mergers and acquisitions. They also attempt, to the extent possible, to state earnings for different firms using a common set of accounting conventions.

We have defined "earnings" as the consensus analyst estimate (as reported by IBES) of the firm's earnings for the forthcoming year.[1] This definition approximates the normalized earnings that investors most likely have in mind when they make stock purchase and sell decisions. It implicitly incorporates the analysts' adjustments for differences in accounting treatment among firms and the effects of the business cycle on each firm's results of operations. Although we thought at first that this earnings estimate might be highly correlated with the analysts' five-year earnings growth forecasts, that was not the case. Thus, we avoided a potential spurious correlation problem.

Price/Earnings Ratio. Corresponding to our definition of "earnings," the price/earnings ratio (P/E) is calculated as the closing stock price for the year divided by the consensus analyst earnings forecast for the forthcoming fiscal year.

Dividends. Dividends per share represent the common dividends declared per share during the calendar year, after adjustment for all stock splits and stock dividends). The firm's dividend payout ratio is then defined as common dividends per share divided by the consensus analyst estimate of the earnings per share for the forthcoming calendar year (D/E). Although this definition has the deficiency that it is obviously biased downward — it divides this year's dividend by next year's earnings — it has the advantage that it implicitly uses a "normalized" figure for earnings. We believe that this advantage outweighs the deficiency, especially when one considers the flaws of the apparent alternatives. Furthermore, we have verified that the results are insensitive to reasonable alternative definitions (see footnote 1).

Growth. In comparing historically based and consensus analysts' forecasts, we calculated forty-one different historical growth measures. These included the following: 1) the past growth rate in EPS as determined by a log-linear least squares regression for the latest year,[2] two years, three years, . . ., and ten years; 2) the past growth rate in DPS for the latest year, two years, three years, . . ., and ten years; 3) the past growth rate in book value per share (computed as the ratio of common equity to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; 4) the past growth rate in cash flow per share (computed as the ratio of pretax income, depreciation, and deferred taxes to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; and 5) plowback growth (computed as the firm's retention ratio for the current year times the firm's latest annual return on common equity).

We also used the five-year forecast of earnings

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per share growth compiled by IBES and reported in mid-January of each year. This number represents the consensus (i.e., mean) forecast produced by analysts from the research departments of leading Wall Street and regional brokerage firms over the preceding three months. IBES selects the contributing brokers "because of the superior quality of their research, professional reputation, and client demand" (IBES *Monthly Summary Book*).

Risk Variables. Although many risk factors could potentially affect the firm's stock price, most of these factors are highly correlated with one another. As shown above in Equation (4), we decided to restrict our attention to four risk measures that have intuitive appeal and are followed by many financial analysts: 1) B, the firm's beta as published by Value Line; 2) Cov, the firm's pretax interest coverage ratio (obtained from Standard & Poor's Compustat); 3) Rsq, the stability of the firm's five-year historical EPS (measured by the R^2 from a log-linear least squares regression); and 4) Sa, the standard deviation of the consensus analysts' five-year EPS growth forecast (mean forecast) as computed by IBES.

After careful analysis of the data used in our study, we felt that we could obtain more meaningful results by imposing six restrictions on the companies included in our study:

1. Because of the need to calculate ten-year historical growth rates, and because we studied three different time periods, 1981, 1982, and 1983, our study requires data for the thirteen-year period 1971-1983. We included only companies with at least a thirteen-year operating history in our study.
2. As our historical growth rate calculations were based on log-linear regressions, and the logarithm of a negative number is not defined, we excluded all companies that experienced negative EPS during any of the years 1971-1983.
3. For similar reasons, we also eliminated companies that did not pay a dividend during any one of the years 1971-1983.
4. To insure comparability of time periods covered by each consensus earnings figure in the P/E ratios, we eliminated all companies that did not have a December 31 fiscal year-end.
5. To eliminate distortions caused by highly unusual events that distort current earnings but not expected future earnings, and thus the firm's price/earnings ratio, we eliminated any firm with a price/earnings ratio greater than 50.
6. As the evaluation of analysts' forecasts is a major part of this study, we eliminated all firms that IBES did not follow.

Our final sample consisted of approximately sixty-five utility firms.[3]

RESULTS

To keep the number of calculations in our study to a reasonable level, we performed the study in two stages. In Stage 1, all forty-one historically oriented approaches for estimating future growth were correlated with each firm's P/E ratio. In Stage 2, the historical growth rate with the highest correlation to the P/E ratio was compared to the consensus analyst growth rate in the multiple regression model described by Equation (4) above. We performed our regressions for each of three recent time periods, because we felt the results of our study might vary over time.

First-Stage Correlation Study

Table 1 gives the results of our first-stage correlation study for each group of companies in each of the years 1981, 1982, and 1983. The values in this table measure the correlation between the historically oriented growth rates for the various time periods and the firm's end-of-year P/E ratio.

The four variables for which historical growth rates were calculated are shown in the left-hand column: EPS indicates historical earnings per share growth, DPS indicates historical dividend per share growth, BVPS indicates historical book value per share growth, and CFPS indicates historical cash flow per share growth. The term "plowback" refers to the product of the firm's retention ratio in the currennt year and its return on book equity for that year. In all, we calculated forty-one historically oriented growth rates for each group of firms in each study period.

The goal of the first-stage correlation analysis was to determine which historically oriented growth rate is most highly correlated with each group's year-end P/E ratio. Eight-year growth in CFPS has the highest correlation with P/E in 1981 and 1982, and ten-year growth in CFPS has the highest correlation with year-end P/E in 1983. In all cases, the plowback estimate of future growth performed poorly, indicating that — contrary to generally held views — plowback is not a factor in investor expectations of future growth.

Second-Stage Regression Study

In the second stage of our regression study, we ran the regression in Equation (4) using two different measures of future growth, g: 1) the best historically oriented growth rate (g_h) from the first-stage correlation study, and 2) the consensus analysts' forecast (g_a) of five-year EPS growth. The regression results, which are shown in Table 2, support at least

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TABLE 1

Correlation Coefficients of All Historically Based Growth Estimates by Group and by Year with P/E

Current Year	*Historical Growth Rate Period in Years* 1	2	3	4	5	6	7	8	9	10
1981										
EPS	-0.02	0.07	0.03	0.01	0.03	0.12	0.08	0.09	0.09	0.09
DPS	0.05	0.18	0.14	0.15	0.14	0.15	0.19	0.23	0.23	0.23
BVPS	0.01	0.11	0.13	0.13	0.16	0.18	0.15	0.15	0.15	0.15
CFPS	-0.05	0.04	0.13	0.22	0.28	0.31	0.30	0.31	-0.57	-0.54
Plowback	0.19									
1982										
EPS	-0.10	-0.13	-0.06	-0.02	-0.02	-0.01	-0.03	-0.03	0.00	0.00
DPS	-0.19	-0.10	0.03	0.05	0.07	0.08	0.09	0.11	0.13	0.13
BVPS	0.07	0.08	0.11	0.11	0.09	0.10	0.11	0.11	0.09	0.09
CFPS	-0.02	-0.08	0.00	0.10	0.16	0.19	0.23	0.25	0.24	0.07
Plowback	0.04									
1983										
EPS	-0.06	-0.25	-0.25	-0.24	-0.16	-0.11	-0.05	0.00	0.02	0.02
DPS	0.03	-0.10	-0.03	0.08	0.15	0.21	0.21	0.21	0.22	0.24
BVPS	0.03	0.10	0.04	0.09	0.15	0.16	0.19	0.21	0.22	0.21
CFPS	-0.08	0.01	0.02	0.08	0.20	0.29	0.35	0.38	0.40	0.42
Plowback	-0.08									

two general conclusions regarding the pricing of equity securities.

First, we found overwhelming evidence that the consensus analysts' forecast of future growth is superior to historically oriented growth measures in predicting the firm's stock price. In every case, the R^2 in the regression containing the consensus analysts' forecast is higher than the R^2 in the regression containing the historical growth measure. The regression coefficients in the equation containing the consensus analysts' forecast also are considerably more significant than they are in the alternative regression. These results are consistent with those found by Cragg and Malkiel for data covering the period 1961-1968. Our results also are consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy-and-sell decisions.

TABLE 2

Regression Results
Model I

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	-6.42*	10.31*	7.67*	3.24	0.54*	1.42*	57.43	0.83	46.49
	(5.50)	(14.79)	(2.20)	(2.86)	(2.50)	(2.85)	(4.07)		
1982	-2.90*	9.32*	8.49*	2.85	0.45*	-0.42	3.63	0.86	65.53
	(2.75)	(18.52)	(4.18)	(2.83)	(2.60)	(0.05)	(0.26)		
1983	-5.96*	10.20*	19.78*	4.85	0.44*	0.33	32.49	0.82	45.26
	(3.70)	(12.20)	(4.83)	(2.95)	(1.89)	(0.50)	(1.29)		

Part B: *Analysis*

$P/E = a_0 + a_1 D/E + a_2 g_a + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	-4.97*	10.62*	54.85*	-0.61	0.33*	0.63*	4.34	0.91	103.10
	(6.23)	(21.57)	(8.56)	(0.68)	(2.28)	(1.74)	(0.37)		
1982	-2.16*	9.47*	50.71*	-1.07	0.36*	-0.31	119.05*	0.90	97.62
	(2.59)	(22.46)	(9.31)	(1.14)	(2.53)	(1.09)	(1.60)		
1983	-8.47*	11.96*	79.05*	2.16	0.56*	0.20	-34.43	0.87	69.81
	(7.07)	(16.48)	(7.84)	(1.55)	(3.08)	(0.38)	(1.44)		

Notes:

* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

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Second, there is some evidence that investors tend to view risk in traditional terms. The interest coverage variable is statistically significant in all but one of our samples, and the stability of the operating income variable is statistically significant in six of the twelve samples we studied. On the other hand, the beta is never statistically significant, and the standard deviation of the analysts' five-year growth forecasts is statistically significant in only two of our twelve samples. This evidence is far from conclusive, however, because, as we demonstrate later, a significant degree of cross-correlation among our four risk variables makes any general inference about risk extremely hazardous.

Possible Misspecification of Risk

The stock valuation theory says nothing about which risk variables are most important to investors. Therefore, we need to consider the possibility that the risk variables of our study are only proxies for the "true" risk variables used by investors. The inclusion of proxy variables may increase the variance of the parameters of most concern, which in this case are the coefficients of the growth variables.[4]

To allow for the possibility that the use of risk proxies has caused us to draw incorrect conclusions concerning the relative importance of analysts' growth forecasts and historical growth extrapolations, we have also estimated Equation (4) with the risk variables excluded. The results of these regressions are shown in Table 3.

TABLE 3

Regression Results
Model II

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	−1.05	9.59	21.20	0.73	82.95
	(1.61)	(12.13)	(7.05)		
1982	0.54	8.92	12.18	0.83	167.97
	(1.38)	(17.73)	(6.95)		
1983	−0.75	8.92	12.18	0.77	107.82
	(1.13)	(12.38)	(7.94)		

Part B: *Analysis*

$P/E + a_0 + a_1 D/E + a_2 g_a$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	3.96	10.07	60.53	0.90	274.16
	(8.31)	(8.31)	(20.91)	(15.79)	
1982	−1.75	9.19	44.92	0.88	246.36
	(4.00)	(4.00)	(21.35)	(11.06)	
1983	−4.97	10.95	82.02	0.83	168.28
	(6.93)	(6.93)	(15.93)	(11.02)	

Notes:
* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

Again, there is overwhelming evidence that the consensus analysts' growth forecast is superior to the historically oriented growth measures in predicting the firm's stock price. The R^2 and t-statistics are higher in every case.

CONCLUSION

The relationship between growth expectations and share prices is important in several major areas of finance. The data base of analysts' growth forecasts collected by Lynch, Jones & Ryan provides a unique opportunity to test the hypothesis that investors rely more heavily on analysts' growth forecasts than on historical growth extrapolations in making security buy–and–sell decisions. With the help of this data base, our studies affirm the superiority of analysts' forecasts over simple historical growth extrapolations in the stock price formation process. Indirectly, this finding lends support to the use of valuation models whose input includes expected growth rates.

[1] We also tried several other definitions of "earnings," including the firm's most recent primary earnings per share prior to any extraordinary items or discontinued operations. As our results were insensitive to reasonable alternative definitions of "earnings" we report only the results for the IBES consensus.

[2] For the latest year, we actually employed a point-to-point growth calculation because there were only two available observations.

[3] We use the word "approximately," because the set of available firms varied each year. In any case, the number varied only from zero to three firms on either side of the figures cited here.

[4] See Maddala (1977).

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INVESTOR GROWTH EXPECTATIONS

Summer 2004

A study done by Vander Weide and Carleton in 1988[1] suggests that consensus analysts' forecast of future growth is superior to historically oriented growth measures in stock valuation process for domestic companies. We worked with one of the original authors of the study, Dr. James H. Vander Weide, and closely followed his suggestions and methodology to investigate whether the results still hold in more recent times (2001- 2003).

We used the following equation to determine which estimate of future growth (g) best predicts the firm's P/E ratio when combined with the dividend payout ratio, D/E, and risk variables, B, Cov, Stb, and Sa.

$$P/E = a_0(D/E) + a_1 g(\text{Growth}) + a_2 B(\text{Beta}) + a_3 Cov(\text{Interest Coverage Ratio}) + a_4 Stb(\text{Stability}) + a_5 Sa(\text{Std Dev}) + e$$

Data Description

Earnings Per Share:	IBES consensus analyst estimate of the firm's earnings for the unreported year.
Price/Earnings Ratio:	Closing stock price for the year divided by the consensus analyst earnings per share for the forthcoming year.
Dividends:	Ratio of common dividends per share to the consensus analyst earnings forecast for the forthcoming fiscal year (D/E).

Historical Growth measures

EPS Growth Rate:	Determined by a log-linear least squares regression for the latest year, two years, three years, …, and ten years.
Dividend per Share Growth Rate:	Determined by a log-linear least squares regression for the latest year, two years, three years, …, and ten years.
Book Value per Share Growth Rate:	Common equity divided by the common shares outstanding. Determined by a log-linear least squares regression for the latest year, two years, three years, …, and ten years.
Cash Flow per Share Growth Rate:	Ratio of gross cash flow to common shares outstanding. Determined by a log-linear least squares regression for the latest year, two years, three years, …, and ten years.
Plowback Growth:	Firm's retention ratio for the current year times the firm's latest annual return on equity.
3yr Plowback Growth:	Firm's three-year average retention ratio times the firm's three-year average return on equity.

Consensus Analysts' Forecasts

Five-Year Earnings Per Share Growth: Mean analysts' forecast compiled by IBES.

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[1] Vander Weide, J. H., and W. T. Carleton. "Investor Growth Expectations: Analysts vs. History." *The Journal of Portfolio Management*, Spring 1988, pp. 78-82.

Risk Variables

B:	Beta, the firm's beta versus NYSE from Value Line.
Cov:	The firm's pretax interest coverage ratio from Compustat.
Stb:	Five-year historical earnings per share stability. Average absolute percentage difference between actual reported EPS and a 5yr historical EPS growth trend line from IBES.
Sa:	The standard deviation of earnings per share estimate for the fiscal year from IBES.

We set five restrictions on the companies included in the study in order to be consistent with the original study and to obtain more meaningful results.

- Excluded all firms that IBES did not follow.
- Eliminated companies with:
    - Negative EPS during any of the years 1991-2003.
    - No dividend during any one of the years 1991-2003.
    - P/E ratio greater than 60 in years 2001-2003.
    - Less than five years of operating history.

The final universe consisted of 411 US firms, fifty-nine of which are utility companies.

Results

The study was performed in two stages.

Stage 1

In order to determine which historically oriented growth measure is most highly correlated with each firm's end-of-year P/E ratio, we computed spearman (rank) correlations between all forty-two historically oriented future growth measures and P/E.

The result of the stage 1 study is displayed in Table 1. Three-year plowback ratio has the highest correlation with P/E in 2001 and 2002, and five-year EPS growth rate has the highest correlation with P/E in 2003.

Table 1

Stage1 Results for Utility and Non-Utility Companies Combined

Correlations between Historically Based Growth Estimates by Year with P/E

Current Year		y1	y2	y3	y4	y5	y6	y7	y8	y9	y10
2001	EPS	0.232	0.210	0.145	0.122	0.059	0.034	-0.007	-0.076	-0.117	-0.154
	DPS	-0.243	-0.297	-0.296	-0.293	-0.313	-0.316	-0.336	-0.334	-0.329	-0.333
	BVPS	0.059	-0.017	-0.098	-0.138	-0.150	-0.182	-0.219	-0.259	-0.271	-0.273
	CFPS	0.092	0.092	0.087	0.042	-0.063	-0.102	-0.141	-0.193	-0.237	-0.262
	plowback	0.203									
	plowback3	0.308									
2002	EPS	-0.007	0.147	0.076	0.080	0.083	0.050	0.030	-0.018	-0.060	-0.089
	DPS	-0.126	-0.202	-0.251	-0.224	-0.215	-0.239	-0.232	-0.233	-0.211	-0.198
	BVPS	-0.036	-0.036	-0.078	-0.115	-0.114	-0.127	-0.152	-0.162	-0.175	-0.171
	CFPS	0.056	0.045	0.017	0.021	0.030	-0.024	-0.050	-0.080	-0.125	-0.162
	plowback	0.093									
	plowback3	0.180									
2003	EPS	0.073	0.084	0.214	0.231	0.244	0.228	0.182	0.158	0.104	0.049
	DPS	0.120	0.054	-0.001	-0.078	-0.090	-0.126	-0.152	-0.165	-0.183	-0.185
	BVPS	0.097	0.076	0.067	0.036	-0.045	-0.062	-0.063	-0.083	-0.105	-0.131
	CFPS	0.146	0.196	0.243	0.239	0.206	0.178	0.107	0.089	0.039	-0.022
	plowback	-0.017									
	plowback3	0.038									

We also independently examined utility and non-utility firms. Table 2 shows the result for the fifty-nine utility firms. Two-year growth in EPS has the highest correlation with P/E in 2001, four-year EPS has the highest correlation in 2002, and six-year EPS has the highest correlation in 2003.

Table 3 exhibits the result for the remaining non-utility firms. EPS one-year growth, two-year growth, and five-year growth has the highest correlation with P/E in 2001, 2002, and 2003, respectively.

Table 2

Stage1 Results for Utility Companies

Correlations between Historically Based Growth Estimates by Year with P/E

Current Year		y1	y2	y3	y4	y5	y6	y7	y8	y9	y10
2001	EPS	0.305	0.330	0.305	0.319	0.238	0.157	0.129	0.107	0.079	0.048
	DPS	-0.215	-0.321	-0.302	-0.294	-0.316	-0.281	-0.332	-0.414	-0.435	-0.429
	BVPS	0.164	0.137	0.147	-0.027	-0.072	-0.135	-0.117	-0.104	-0.106	-0.140
	CFPS	0.194	0.135	0.020	-0.018	-0.122	-0.157	-0.135	-0.134	-0.103	-0.219
	plowback	-0.143									
	plowback3	-0.027									
2002	EPS	-0.065	0.044	0.069	0.119	0.071	0.004	-0.038	-0.069	-0.061	-0.070
	DPS	-0.333	-0.327	-0.278	-0.313	-0.280	-0.321	-0.277	-0.226	-0.203	-0.210
	BVPS	-0.325	-0.239	-0.182	-0.177	-0.230	-0.237	-0.250	-0.247	-0.235	-0.235
	CFPS	-0.205	-0.132	-0.172	-0.166	-0.216	-0.289	-0.285	-0.265	-0.227	-0.218
	plowback	-0.151									
	plowback3	-0.133									
2003	EPS	0.010	0.136	0.186	0.263	0.365	0.367	0.344	0.343	0.309	0.302
	DPS	0.151	-0.029	-0.014	-0.022	-0.054	-0.117	-0.142	-0.137	-0.105	-0.092
	BVPS	0.212	0.060	0.047	0.019	0.003	0.040	0.022	0.005	0.003	-0.002
	CFPS	0.222	-0.046	0.173	0.115	0.165	0.100	0.017	0.077	0.057	0.077
	plowback	-0.365									
	plowback3	-0.403									

Table 3

Stage1 Results for Non-Utility Companies

Correlations between Historically Based Growth Estimates by Year with P/E

Current Year		y1	y2	y3	y4	y5	y6	y7	y8	y9	y10
2001	EPS	0.1843	0.1660	0.1293	0.1218	0.0873	0.0829	0.0618	0.0106	-0.0194	-0.0412
	DPS	-0.2036	-0.2211	-0.2042	-0.1935	-0.2098	-0.2066	-0.2186	-0.2155	-0.2046	-0.1975
	BVPS	0.0757	0.0084	-0.0791	-0.0997	-0.0916	-0.1146	-0.1388	-0.1783	-0.1866	-0.1823
	CFPS	0.0864	0.0710	0.0956	0.0704	-0.0033	-0.0162	-0.0366	-0.0747	-0.1186	-0.1325
	plowback	0.0781									
	plowback3	0.1781									
2002	EPS	0.0762	0.1767	0.0755	0.0817	0.0936	0.0757	0.0708	0.0316	-0.0011	-0.0254
	DPS	-0.0804	-0.1693	-0.2103	-0.1672	-0.1519	-0.1720	-0.1645	-0.1636	-0.1394	-0.1226
	BVPS	0.0527	0.0236	-0.0363	-0.0777	-0.0710	-0.0753	-0.0953	-0.1019	-0.1118	-0.1061
	CFPS	0.0905	0.0488	0.0143	0.0237	0.0563	0.0246	0.0097	-0.0079	-0.0458	-0.0821
	plowback	0.0634									
	plowback3	0.1306									
2003	EPS	0.1254	0.1783	0.2788	0.2689	0.2791	0.2622	0.2219	0.2039	0.1559	0.1090
	DPS	0.1810	0.1290	0.0655	-0.0128	-0.0101	-0.0400	-0.0630	-0.0772	-0.0930	-0.0952
	BVPS	0.1555	0.1740	0.1534	0.1056	0.0127	-0.0069	-0.0054	-0.0218	-0.0416	-0.0636
	CFPS	0.1479	0.2200	0.2512	0.2429	0.2004	0.1839	0.1349	0.1286	0.0892	0.0388
	plowback	-0.1109									
	plowback3	-0.0402									

Stage 2

We compared the multiple regression model of historical growth rate with the highest correlation to the P/E ratio from stage 1 to the five-year earnings per share growth forecast.

$$P/E = a_0(D/E) + a_1 g + a_2 B + a_3 Cov + a_4 Stb + a_5 Sa + e$$

The regression results are displayed in table 4. The results show that the consensus analysts' forecast of future growth better approximates the firm's P/E ratio, which is consistent with the results found by Vander Weide and Carleton. In both regressions, R^2 in the regression with the consensus analysts' forecast is higher than the R^2 in the regression with the historical growth.

Table 4

Stage2 Results for Utility and Non-Utility Companies Combined

Multiple Regression Results

P/E = a0 + a1 **D/E** + a2 **g** + a3 **B** + a4 **Cov** + a5 **Stb** + a6 **Sa**

Historical

	a0	a1	a2	a3	a4	a5	a6	Rsq	F Ratio
2001	10.43	8.46	10.79	6.79	0.02	-0.03	-18.83	0.20	13.90
	4.73	5.53	2.93	3.54	3.05	-3.06	-3.32		
2002	12.36	7.60	6.66	1.01	0.00	0.01	-32.48	0.15	9.46
	7.21	6.18	2.61	0.66	1.57	1.48	-4.04		
2003	13.34	5.96	9.87	5.27	0.01	-0.01	-20.46	0.24	17.61
	7.29	4.04	2.95	3.39	3.62	-1.31	-4.25		

Analysts' Forecasts

	a0	a1	a2	a3	a4	a5	a6	Rsq	F Ratio
2001	-1.26	16.14	144.75	-0.64	0.01	-0.03	-10.76	0.47	48.00
	-0.62	11.63	13.22	-0.38	3.07	-4.04	-2.29		
2002	3.37	13.37	106.07	-3.60	0.00	0.01	-21.85	0.35	29.73
	1.93	10.97	10.59	-2.57	1.25	1.50	-3.06		
2003	4.77	12.76	61.93	4.38	0.01	0.00	-19.41	0.33	26.38
	2.65	9.48	7.25	3.01	2.45	-0.81	-4.33		

*T-stats below the coefficients in smaller font

For utility companies shown in table 5, consensus analysts' forecast of future growth is superior to historically oriented growth in 2002 and 2003. R^2 is lower in the regression with the consensus analysts' forecast in 2001. For non-utility companies, we found that consensus analysts' forecast of future growth is superior to the alternative in all three years (table 6).

Table 5

Stage2 Results for Utility Companies

Multiple Regression Results

P/E = a0 + a1 **D/E** + a2 **g** + a3 **B** + a4 **Cov** + a5 **Stb** + a6 **Sa**

Historical

	a0	a1	a2	a3	a4	a5	a6	Rsq	F Ratio
2001	7.90	11.07	-11.19	-3.00	0.29	0.00	-9.37	0.44	6.38
	2.16	4.80	-5.71	-0.86	0.88	0.64	-1.51		
2002	13.87	7.00	-3.80	-6.89	0.56	0.00	-29.89	0.38	5.11
	4.02	3.54	-0.66	-2.01	1.48	0.42	-2.70		
2003	11.29	7.74	-1.65	-1.40	0.32	0.00	-5.69	0.25	2.68
	3.22	3.30	-0.23	-0.43	1.05	-0.73	-0.75		

Analysts' Forecasts

	a0	a1	a2	a3	a4	a5	a6	Rsq	F Ratio
2001	9.61	9.20	66.61	-7.92	0.50	-0.01	-12.83	0.27	2.95
	2.31	3.45	3.66	-1.86	1.31	-1.33	-1.76		
2002	12.43	7.86	50.74	-9.61	0.50	0.00	-24.94	0.48	7.56
	3.89	5.29	3.10	-2.94	1.50	0.17	-2.41		
2003	5.81	11.06	101.12	-1.69	-0.19	0.00	-4.75	0.50	7.81
	1.89	6.32	4.80	-0.58	-0.74	-0.22	-0.74		

*T-stats below the coefficients in smaller font

Table 6

Stage2 Results for Non-Utility Companies

Multiple Regression Results

P/E = a0 + a1 **D/E** + a2 **g** + a3 **B** + a4 **Cov** + a5 **Stb** + a6 **Sa**

Historical

	a0	a1	a2	a3	a4	a5	a6	Rsq	F Ratio
2001	15.90	8.39	2.82	3.53	0.02	-0.03	-21.05	0.21	12.45
	6.57	4.13	1.96	1.68	2.97	-2.14	-3.40		
2002	17.76	8.46	6.02	-3.06	0.00	0.02	-36.97	0.27	16.78
	9.39	5.19	3.28	-1.88	1.37	2.52	-4.31		
2003	14.24	9.86	8.85	3.46	0.01	0.00	-19.00	0.30	19.89
	7.49	5.89	2.49	2.11	3.23	-0.15	-3.73		

Analysts' Forecasts

	a0	a1	a2	a3	a4	a5	a6	Rsq	F Ratio
2001	-0.51	17.28	140.84	-1.06	0.01	-0.03	-8.63	0.44	36.00
	-0.22	11.21	10.73	-0.59	2.88	-2.62	-1.63		
2002	5.05	15.67	91.22	-4.06	0.00	0.02	-22.93	0.38	27.65
	2.48	11.23	7.66	-2.74	1.18	2.33	-2.87		
2003	7.25	14.47	45.60	3.47	0.01	0.00	-19.09	0.33	22.30
	3.56	9.42	4.68	2.20	2.36	-0.12	-3.89		

*T-stats below the coefficients in smaller font

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Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency

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Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency

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ABSTRACT

This paper documents that strategies which buy stocks that have performed well in the past and sell stocks that have performed poorly in the past generate significant positive returns over 3- to 12-month holding periods. We find that the profitability of these strategies are not due to their systematic risk or to delayed stock price reactions to common factors. However, part of the abnormal returns generated in the first year after portfolio formation dissipates in the following two years. A similar pattern of returns around the earnings announcements of past winners and losers is also documented.

A POPULAR VIEW HELD by many journalists, psychologists, and economists is that individuals tend to overreact to information.[1] A direct extension of this view, suggested by De Bondt and Thaler (1985, 1987), is that stock prices also overreact to information, suggesting that contrarian strategies (buying past losers and selling past winners) achieve abnormal returns. De Bondt and Thaler (1985) show that over 3- to 5-year holding periods stocks that performed poorly over the previous 3 to 5 years achieve higher returns than stocks that performed well over the same period. However, the interpretation of the De Bondt and Thaler results are still being debated. Some have argued that the De Bondt and Thaler results can be explained by the systematic risk of their contrarian portfolios and the size effect.[2] In addition, since the long-term losers outperform the long-term winners only in Januaries, it is unclear whether their results can be attributed to overreaction.

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[1] See for example, the academic papers by Kahneman and Tversky (1982), De Bondt and Thaler (1985) and Shiller (1981).

[2] See for example, Chan (1988), Ball and Kothari (1989), and Zarowin (1990). For an alternate view, see the recent paper by Chopra, Lakonishok, and Ritter (1992).

More recent papers by Jegadeesh (1990) and Lehmann (1990) provide evidence of shorter-term return reversals. These papers show that contrarian strategies that select stocks based on their returns in the previous week or month generate significant abnormal returns. However, since these strategies are transaction intensive and are based on short-term price movements, their apparent success may reflect the presence of short-term price pressure or a lack of liquidity in the market rather than overreaction. Jegadeesh and Titman (1991) provide evidence on the relation between short-term return reversals and bid-ask spreads that supports this interpretation. In addition, Lo and MacKinlay (1990) argue that a large part of the abnormal returns documented by Jegadeesh and Lehmann is attributable to a delayed stock price reaction to common factors rather than to overreaction.

Although contrarian strategies have received a lot of attention in the recent academic literature, the early literature on market efficiency focused on relative strength strategies that buy past winners and sell past losers. Most notably, Levy (1967) claims that a trading rule that buys stocks with current prices that are substantially higher than their average prices over the past 27 weeks realizes significant abnormal returns. Jensen and Bennington (1970), however, point out that Levy had come up with his trading rule after examining 68 different trading rules in his dissertation and because of this express skepticism about his conclusions. Jensen and Bennington analyze the profitability of Levy's trading rule over a long time period that was, for the most part, outside Levy's original sample period. They find that in their sample period Levy's trading rule does not outperform a buy and hold strategy and hence attribute Levy's result to a selection bias.

Although the current academic debate has focused on contrarian rather than relative strength trading rules, a number of practitioners still use relative strength as one of their stock selection criteria. For example, a majority of the mutual funds examined by Grinblatt and Titman (1989, 1991) show a tendency to buy stocks that have increased in price over the previous quarter. In addition, the Value Line rankings are known to be based in large part on past relative strength. The success of many of the mutual funds in the Grinblatt and Titman sample and the predictive power of Value Line rankings (see Copeland and Mayers (1982) and Stickel (1985)) provide suggestive evidence that the relative strength strategies may generate abnormal returns.

How can we reconcile the success of Value Line rankings and the mutual funds that use relative strength rules with the current academic literature that suggests that the opposite strategy generates abnormal returns? One possibility is that the abnormal returns realized by these practitioners are either spurious or are unrelated to their tendencies to buy past winners. A second possibility is that the discrepancy is due to the difference between the time horizons used in the trading rules examined in the recent academic papers and those used in practice. For instance, the above cited evidence favoring contrarian strategies focuses on trading strategies based on either very short-term return reversals (1 week or 1 month), or very long-term return reversals (3 to 5 years). However, anecdotal evidence suggests that practitioners who use relative strength rules base their selections on price movements over the past 3 to 12 months.[3] This paper provides an analysis of relative strength trading strategies over 3- to 12-month horizons. Our analysis of NYSE and AMEX stocks documents significant profits in the 1965 to 1989 sample period for each of the relative strength strategies examined. We provide a decomposition of these profits into different sources and develop tests that allow us to evaluate their relative importance. The results of these tests indicate that the profits are not due to the systematic risk of the trading strategies. In addition, the evidence indicates that the profits cannot be attributed to a lead-lag effect resulting from delayed stock price reactions to information about a common factor similar to that proposed by Lo and MacKinlay (1990). The evidence is, however, consistent with delayed price reactions to firm-specific information.

Further tests suggest that part of the predictable price changes that occur during these 3- to 12-month holding periods may not be permanent. The stocks included in the relative strength portfolios experience negative abnormal returns starting around 12 months after the formation date and continuing up to the thirty-first month. For example, the portfolio formed on the basis of returns realized in the past 6 months generates an average cumulative return of 9.5% over the next 12 months but loses more than half of this return in the following 24 months.

Our analysis of stock returns around earnings announcement dates suggests a similar bias in market expectations. We find that past winners realize consistently higher returns around their earnings announcements in the 7 months following the portfolio formation date than do past losers. However, in each of the following 13 months past losers realize higher returns than past winners around earnings announcements.

The rest of this paper is organized as follows: Section I describes the trading strategies that we examine and Section II documents their excess returns. Section III provides a decomposition of the profits from relative strength strategies and evaluates the relative importance of the different components. Section IV documents these returns in subsamples stratified on the basis of ex ante beta and firm size and Section V measures these profits across calendar months and over 5-year subperiods. The longer term performance of the stocks included in the relative strength portfolios is examined in Section VI and Section VII back tests the strategy over the 1927 to 1964 period. Section VIII examines the returns of past winners and past losers around earnings announcement dates and Section IX concludes the paper.

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[3] For instance, one of the inputs used by Value Line to assign a timeliness rank for each stock is a price momentum factor computed based on the stock's past 3- to 12-month returns. Value Line reports that the price momentum factor is computed by "dividing the stock's latest 10-week average relative price by its 52-week average relative price." These timeliness ranks, according to Value Line, are "designed to discriminate among stocks on the basis of relative price performance over the next 6 to 12 months" (see Bernard (1984), pp. 52–53).

I. Trading Strategies

If stock prices either overreact or underreact to information, then profitable trading strategies that select stocks based on their past returns will exist. This study investigates the efficiency of the stock market by examining the profitability of a number of these strategies. The strategies we consider select stocks based on their returns over the past 1, 2, 3, or 4 quarters. We also consider holding periods that vary from 1 to 4 quarters. This gives a total of 16 strategies. In addition, we examine a second set of 16 strategies that skip a week between the portfolio formation period and the holding period. By skipping a week, we avoid some of the bid-ask spread, price pressure, and lagged reaction effects that underlie the evidence documented in Jegadeesh (1990) and Lehmann (1990).

To increase the power of our tests, the strategies we examine include portfolios with overlapping holding periods. Therefore, in any given month t, the strategies hold a series of portfolios that are selected in the current month as well as in the previous $K - 1$ months, where K is the holding period. Specifically, a strategy that selects stocks on the basis of returns over the past J months and holds them for K months (we will refer to this as a J-month/K-month strategy) is constructed as follows: At the beginning of each month t the securities are ranked in ascending order on the basis of their returns in the past J months. Based on these rankings, ten decile portfolios are formed that equally weight the stocks contained in the top decile, the second decile, and so on. The top decile portfolio is called the "losers" decile and the bottom decile is called the "winners" decile. In each month t, the strategy buys the winner portfolio and sells the loser portfolio, holding this position for K months. In addition, the strategy closes out the position initiated in month $t - K$. Hence, under this trading strategy we revise the weights on $\frac{1}{K}$ of the securities in the entire portfolio in any given month and carry over the rest from the previous month.

The profits of the above strategies were calculated for both a series of buy and hold portfolios and a series of portfolios that were rebalanced monthly to maintain equal weights. Since the returns for these two strategies were very similar (the buy and hold strategies yielded slightly higher returns) we present only the rebalanced returns which are also used in the event study presented in Section VI.

II. The Returns of Relative Strength Portfolios

This section documents the returns of the portfolio strategies described in the last section over the 1965 to 1989 period using data from the CRSP daily returns file.[4] All stocks with available returns data in the J months preceding the portfolio formation date are included in the sample from which the buy and sell portfolios are constructed.

Table I reports the average returns of the different buy and sell portfolios as well as the zero-cost, winners minus losers portfolio, for the 32 strategies described above. The returns of all the zero-cost portfolios (i.e., the returns per dollar long in this portfolio) are positive. All these returns are statistically significant except for the 3-month/3-month strategy that does not skip a week. Many of the individual t-statistics are sufficiently large to be significant even after considering the fact that we have conducted 32 separate tests. The probability of obtaining a single t-statistic as large as 4.28 (obtained with the 12-month/3-month strategy that skips a week) with 32 observations is less than 0.0006, as given by the Bonferroni inequality.[5]

The most successful zero-cost strategy selects stocks based on their returns over the previous 12 months and then holds the portfolio for 3 months. This strategy yields 1.31% per month (shown in Panel A) when there is no time lag between the portfolio formation period and the holding period and it yields 1.49% per month (shown in Panel B) when there is a 1-week lag between the formation period and the holding period.[6] The 6-month formation period produces returns of about 1% per month regardless of the holding period. These holding period returns are slightly higher when there is a 1-week lag between the formation period and the holding period (Panel B) than when the formation and holding periods are contiguous (Panel A).

Having established that the relative strength strategies are on average quite profitable, we now examine one specific strategy in detail, the 6-month/6-month strategy that does not skip a week between the portfolio formation period and the holding period. The results for this strategy are representative of the results for the other strategies.

III. Sources of Relative Strength Profits

This section presents two simple return-generating models that allow us to decompose the excess returns documented in the last section and identify the important sources of relative strength profits. The first model allows for factor-mimicking portfolio returns to be serially correlated but requires indi-

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[4] The latest version of the CRSP daily returns file at the time this study was initiated covers the July 1962 to December 1989 period. Monthly returns were obtained by compounding the daily returns recorded in this data set. Since the 12-month/12-month strategy considered here requires lagged returns data over 23 months the first full calendar year for which we could examine portfolio returns is 1965.

[5] The Bonferroni inequality provides a bound for the probability of observing a t-statistic of a certain magnitude with N tests that are not necessarily independent.

[6] De Bondt and Thaler (1985) report 1-year holding period returns in their tables that are consistent with our findings here. However, they do not examine strategies based on 1-year horizons in any detail and based on their analysis of longer horizon strategies conclude that the market overreacts.

Table I

Returns of Relative Strength Portfolios

The relative strength portfolios are formed based on J-month lagged returns and held for K months. The values of J and K for the different strategies are indicated in the first column and row, respectively. The stocks are ranked in ascending order on the basis of J-month lagged returns and an equally weighted portfolio of stocks in the lowest past return decile is the *sell* portfolio and an equally weighted portfolio of the stocks in the highest return decile is the *buy* portfolio. The average monthly returns of these portfolios are presented in this table. The relative strength portfolios in Panel A are formed immediately after the lagged returns are measured for the purpose of portfolio formation. The relative strength portfolios in Panel B are formed 1 week after the lagged returns used for forming these portfolios are measured. The t-statistics are reported in parentheses. The sample period is January 1965 to December 1989.

		Panel A				Panel B			
J	$K =$	3	6	9	12	3	6	9	12
3	Sell	0.0108	0.0091	0.0092	0.0087	0.0083	0.0079	0.0084	0.0083
		(2.16)	(1.87)	(1.92)	(1.87)	(1.67)	(1.64)	(1.77)	(1.79)
3	Buy	0.0140	0.0149	0.0152	.0156	0.0156	0.0158	0.0158	0.0160
		(3.57)	(3.78)	(3.83)	(3.89)	(3.95)	(3.98)	(3.96)	(3.98)
3	Buy-sell	0.0032	0.0058	0.0061	0.0069	0.0073	0.0078	0.0074	0.0077
		(1.10)	(2.29)	(2.69)	(3.53)	(2.61)	(3.16)	(3.36)	(4.00)
6	Sell	0.0087	0.0079	0.0072	0.0080	0.0066	0.0068	0.0067	0.0076
		(1.67)	(1.56)	(1.48)	(1.66)	(1.28)	(1.35)	(1.38)	(1.58)
6	Buy	0.0171	0.0174	0.0174	0.0166	0.0179	0.0178	0.0175	0.0166
		(4.28)	(4.33)	(4.31)	(4.13)	(4.47)	(4.41)	(4.32)	(4.13)
6	Buy-sell	0.0084	0.0095	0.0102	0.0086	0.0114	0.0110	0.0108	0.0090
		(2.44)	(3.07)	(3.76)	(3.36)	(3.37)	(3.61)	(4.01)	(3.54)
9	Sell	0.0077	0.0065	0.0071	0.0082	0.0058	0.0058	0.0066	0.0078
		(1.47)	(1.29)	(1.43)	(1.66)	(1.13)	(1.15)	(1.34)	(1.59)
9	Buy	0.0186	0.0186	0.0176	0.0164	0.0193	0.0188	0.0176	0.0164
		(4.56)	(4.53)	(4.30)	(4.03)	(4.72)	(4.56)	(4.30)	(4.04)
9	Buy-sell	0.0109	0.0121	0.0105	0.0082	0.0135	0.0130	0.0109	0.0085
		(3.03)	(3.78)	(3.47)	(2.89)	(3.85)	(4.09)	(3.67)	(3.04)
12	Sell	0.0060	0.0065	0.0075	0.0087	0.0048	0.0058	0.0070	0.0085
		(1.17)	(1.29)	(1.48)	(1.74)	(0.93)	(1.15)	(1.40)	(1.71)
12	Buy	0.0192	0.0179	0.0168	0.0155	0.0196	0.0179	0.0167	0.0154
		(4.63)	(4.36)	(4.10)	(3.81)	(4.73)	(4.36)	(4.09)	(3.79)
12	Buy-sell	0.0131	0.0114	0.0093	0.0068	0.0149	0.0121	0.0096	0.0069
		(3.74)	(3.40)	(2.95)	(2.25)	(4.28)	(3.65)	(3.09)	(2.31)

vidual stocks to react instantaneously to factor realizations. This model is used to decompose relative strength profits into two components relating to systematic risk, which would exist in an efficient market, and a third component relating to firm-specific returns, which would contribute to relative strength profits only if the market were inefficient. The second return-generating model relaxes the assumption that stocks react instantaneously to the common factor. This model enables us to evaluate the possibility that the relative strength profits arise because of a lead-lag relationship in stock prices similar to that proposed by Lo and MacKinlay (1990) as a partial explanation for short horizon contrarian profits.

A. A Simple One-Factor Model

Consider the following one-factor model describing stock returns:[7]

$$\begin{aligned} r_{it} &= \mu_i + b_i f_t + e_{it}, \\ \mathrm{E}(f_t) &= 0 \\ \mathrm{E}(e_{it}) &= 0 \\ \mathrm{Cov}(e_{it}, f_t) &= 0, \quad \forall i \\ \mathrm{Cov}(e_{it}, e_{jt-1}) &= 0, \quad \forall i \neq j \end{aligned} \tag{1}$$

where μ_i is the unconditional expected return on security i, r_{it} is the return on security i, f_t is the unconditional unexpected return on a factor-mimicking portfolio, e_{it} is the firm-specific component of return at time t, and b_i is the factor sensitivity of security i. For the 6-month/6-month strategy that we consider in the rest of this paper the length of a period is 6 months.

The superior performance of the relative strength strategies documented in the last section implies that stocks that generate higher than average returns in one period also generate higher than average returns in the period that follows. In other words, these results imply that:

$$\mathrm{E}(r_{it} - \bar{r}_t | r_{it-1} - \bar{r}_{t-1} > 0) > 0$$

and

$$\mathrm{E}(r_{it} - \bar{r}_t | r_{it-1} - \bar{r}_{t-1} < 0) < 0,$$

where a bar above a variable denotes its cross-sectional average.

Therefore,

$$\mathrm{E}\{(r_{it} - \bar{r}_t)(r_{it-1} - \bar{r}_{t-1})\} > 0. \tag{2}$$

The above cross-sectional covariance equals the expected profits from the zero-cost contrarian trading strategy examined by Lehmann (1990) and Lo and MacKinlay (1990) that weights stocks by their past returns less the past equally weighted index returns. This weighted relative strength strategy (WRSS) is closely related to our strategy. The WRSS yields a profit of 4.5% per dollar long semiannually (t-statistic = 2.99) and the correlation between the returns of this strategy and that of the trading strategy examined in the last section is 0.95. The equally weighted decile portfolios are used in most of our empirical tests since they provide relatively more information than the WRSS. However, as the following analysis demonstrates, the closely related WRSS provides a tractable framework for analytically examining the sources of relative strength profits and evaluating the relative importance of each of these sources.

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[7] Our analysis in this subsection is similar to that in Jegadeesh (1987) and Lo and MacKinlay (1990).

Given the one-factor model defined in (1), the WRSS profits given in expression (2) can be decomposed into the following three terms:

$$E\{(r_{it} - \bar{r}_t)(r_{it-1} - \bar{r}_{t-1})\} = \sigma_\mu^2 + \sigma_b^2 \mathrm{Cov}(f_t, f_{t-1}) + \overline{\mathrm{Cov}}_i(e_{it}, e_{it-1}), \tag{3}$$

where σ_μ^2 and σ_b^2 are the cross-sectional variances of expected returns and factor sensitivities respectively.

The above decomposition suggests three potential sources of the relative strength profits. The first term in this expression is the cross-sectional dispersion in expected returns. Intuitively, since realized returns contain a component related to expected returns, securities that experience relatively high returns in one period can be expected to have higher than average returns in the following period. The second term is related to the potential to time the factor. If the factor portfolio returns exhibit positive serial correlation, the relative strength strategy will tend to pick stocks with high b's when the conditional expectation of the factor portfolio return is high. As the above expression demonstrates, the extent to which relative strength strategies generate profits because of the serial correlation of the factor portfolio return is a function of the cross-sectional variance of the b's. The last term in the above expression is the average serial covariance of the idiosyncratic components of security returns.

To assess whether the existence of relative strength profits imply market inefficiency, it is important to identify the sources of the profits. If the profits are due to either the first or the second term in expression (3) they may be attributed to compensation for bearing systematic risk and need not be an indication of market inefficiency. However, if the superior performance of the relative strength strategies is due to the third term, then the results would suggest market inefficiency.

B. The Average Size and Beta of Relative Strength Portfolios

This subsection considers the possibility that relative strength strategies systematically pick high-risk stocks and benefit from the first term in expression (3). Table II reports estimates of the two most common indicators of systematic risk, the post-ranking betas of the ten 6-month/6-month relative strength portfolios and the average capitalizations of the stocks in these portfolios. The betas of the extreme past returns portfolios are higher than the average beta for the full sample. In addition, since the beta of the portfolio of past losers is higher than the beta of the portfolio of past winners, the beta of the zero-cost winners minus losers portfolio is negative. The average capitalizations of the stocks in the different portfolios show that the highest and the lowest past returns portfolios consist of smaller than average stocks, with the stocks in the losers portfolios being smaller than the stocks in the winners portfolio. This evidence suggests that the observed relative strength profits are not due to the first source of profits in expression (3).

Table II

Betas and Market Capitalization of Relative Strength Portfolios

The relative strength portfolios are formed based on 6-month lagged returns and held for 6 months. The stocks are ranked in ascending order on the basis of 6-month lagged returns. The equally weighted portfolio of stocks in the lowest past return decile is portfolio P1, the equally weighted portfolio of stocks in the next decile is portfolio P2, and so on. The betas with respect to the value-weighted index and the average market capitalizations of the stocks included in these portfolios are reported here. The sample period is January 1965 to December 1989.

	Beta	Average Market Capitalization
P1	1.36	208.24
P2	1.19	480.07
P3	1.14	545.31
P4	1.11	618.85
P5	1.09	692.89
P6	1.08	702.51
P7	1.09	738.09
P8	1.12	758.87
P9	1.17	680.18
P10	1.28	495.13
P10-P1	−0.08	—

Additional evidence relating to the extent to which the dispersion in expected returns explains these profits is given in the next section.

C. The Serial Covariance of 6-Month Returns

This subsection examines the serial covariance of 6-month returns in order to assess the potential contribution of the second and third source of profits from our decomposition. Given the model expressed in (1), the serial covariance of an equally weighted portfolio of a large number of stocks is:[8]

$$\mathrm{cov}(\bar{r}_t, \bar{r}_{t-1}) = \bar{b}_i^2 \mathrm{Cov}(f_t, f_{t-1}). \tag{4}$$

If the source of relative strength profits is the serial covariance of factor-related returns then, from the above expression, the in-sample serial covariance of the equally weighted index returns is required to be positive. However, we find that the serial covariance of 6-month returns of the equally weighted index is negative (−0.0028) which, from the decomposition in expression (3), reduces the relative strength profits. This result indicates that the serial covariance of factor portfolio returns is unlikely to be the source of relative strength profits.

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[8] The contribution of the serial covariances of e_{it} to the serial covariance of the equally weighted index becomes arbitrarily small as the number of stocks in the index becomes arbitrarily large.

The estimates of the serial covariance of market model residuals for individual stocks are on average positive (0.0012). This evidence suggests that the relative strength profits may arise from stocks underreacting to firm-specific information. However, this evidence is also potentially consistent with an alternative model in which some stocks react with a lag to factor realizations, and we address this possibility in the next subsection.

D. Lead-Lag Effects and Relative Strength Profits

This subsection examines whether the relative strength profits can arise from a lead-lag relationship in stock prices similar to that considered in Lo and MacKinlay (1990). In contrast to the model previously presented, the model in this subsection assumes that stocks can either overreact or underreact to the common factor but that the factor-mimicking portfolio returns are serially uncorrelated.

Consider the following return generating process:

$$r_{it} = \mu_i + b_{1i} f_t + b_{2i} f_{t-1} + e_{it}, \tag{5}$$

where b_{1i} and b_{2i} are sensitivities to the contemporaneous and lagged factor realizations. $b_{2i} > 0$ implies that stock i partly reacts to the factor with a lag as in Lo and MacKinlay and $b_{2i} < 0$ implies that the stock overreacts to contemporaneous factor realizations and this overreaction gets corrected in the subsequent period.

Given this model, the WRSS profits and the serial covariance of the equally weighted index are given by:

$$\mathrm{E}\{(r_{it} - \bar{r}_t)(r_{it-1} - \bar{r}_{t-1})\} = \sigma_\mu^2 + \delta\sigma_f^2 \tag{6}$$

and

$$\mathrm{cov}(\bar{r}_t, \bar{r}_{t-1}) = \bar{b}_1 \bar{b}_2 \sigma_f^2, \tag{7}$$

where $\bar{b}_1$ and $\bar{b}_2$ are cross-sectional averages of b_{1i} and b_{2i}, and,

$$\delta \equiv \frac{1}{N} \sum_{i=1}^{N} \left(b_{1i} - \bar{b}_1\right)\left(b_{2i} - \bar{b}_2\right).$$

From expression (6), when $\delta < 0$ the lead-lag relation has a negative effect on the profitability of the WRSS, or equivalently, a positive effect on contrarian profits as in Lo and MacKinlay. However, when $\delta > 0$, the lead-lag relation will generate positive relative strength profits. In addition, if $\bar{b}_2$ is positive (negative) then the equally weighted index returns will be positively (negatively) serially correlated. This parameter, however, does not affect the profitability of the WRSS.

If the lead-lag effect is an important source of relative strength profits, then the profit in any period will depend on the magnitude of factor portfolio return in the previous period. Formally, consider the expected WRSS profits conditional on the past factor portfolio return:

$$E\{(r_{it} - \bar{r}_t)(r_{it-1} - \bar{r}_{t-1})|f_{t-1}\} = \sigma_\mu^2 + \delta f_{t-1}^2. \tag{8}$$

In contrast, under model (1), the conditional expectation of the WRSS profits given in expression (3), assuming that the factor portfolio returns are normally distributed, is:

$$E\{(r_{it} - \bar{r}_t)(r_{it-1} - \bar{r}_{t-1})|f_{t-1}\} = \sigma_\mu^2 + \sigma_b^2 \rho f_{t-1}^2,$$

where ρ is the first order serial correlation of the factor portfolio returns.

Expression (8) implies that if the relative strength profits come entirely from the lead-lag effect in stock returns, then the magnitude of the profits should be positively related to the squared factor portfolio return in the previous period. Intuitively, if inefficient stock price reactions to factor realizations are important for the profitability of relative strength strategies, then large factor realizations should result in large WRSS profits. Alternatively, if the lead-lag effect does not contribute to the profits, then the observed negative serial covariance of the market index implies a negative relation between the magnitude of the WRSS profits and squared lagged factor portfolio returns.

To examine which of these predictions best explains the time-series variation in relative strength profits we estimate the following regression using the value-weighted index as a proxy for the factor portfolio:

$$r_{pt,6} = \alpha_i + \theta r_{mt,-6}^2 + u_{it},$$

where $r_{pt,6}$ is the 6-month return of the relative strength portfolio formed in month t based on 6-month lagged returns and $r_{mt,-6}$ is the demeaned return on the value-weighted index in the months $t-6$ through $t-1$. The estimates of θ and the corresponding autocorrelation-consistent t-statistic over the 1965 to 1989 sample period are -2.29 and -1.74 respectively. The estimates (t-statistic) of θ in the first and second half of this sample period are -2.55 (-2.65) and -1.83 (-2.52) respectively.[9] This reliably negative relation between the relative strength profits and lagged squared market returns is consistent with the model presented in the last subsection which assumed no lead-lag relationship and is inconsistent with the lead-lag model. This evidence indicates that the lead-lag effect is not an important source of relative strength profits and that the profitability of these strategies is therefore related to market underreaction to the firm-specific information.

[9] When this regression is fitted with the WRSS profits as the dependent variable, the estimate (t-statistic) of θ over 1965–1989 is -1.77 (-3.56) and the corresponding statistics in the two equal subperiods are -1.94 (-2.52) and -1.51 (-2.53).

IV. Profitability of Relative Strength Strategies Within Size- and Beta-Based Subsamples

In this section we examine the profitability of the 6-month/6-month strategy within subsamples stratified on the basis of firm size and ex ante estimates of betas. Specifically, we implement this strategy on three size-based subsamples (small, medium, and large), and three beta-based subsamples (low-beta, medium-beta, and high-beta stocks).

Measuring relative strength profits on size- and beta-based subsamples allows us to examine whether the profitability of the strategy is confined to any particular subsample of stocks. This analysis also provides additional evidence about the source of the observed relative strength profits. Since extant empirical evidence indicates that size and beta are related to both risk and expected returns,[10] the cross-sectional dispersion in expected returns should be less within these subsamples than in the full sample. Therefore, if the relative strength strategy profits are related to differences in expected returns, they will be less when they are implemented on stocks within each subsample rather than on all the stocks in the sample. The profits need not be reduced in these subsamples, however, if the profits of the strategies are due to serial covariances in idiosyncratic returns. In fact, if the profits are not factor-related, the strategies are likely to generate higher returns when they are implemented within the small-firm subsample that consists of less actively traded stocks and to generate lower returns when they are implemented within the large-firm subsample.

Table III presents the average returns of the 6-month/6-month strategy for each of the subsamples. The results in Panel A indicate that the observed abnormal returns are of approximately the same magnitude when the strategies are implemented on the various subsamples of stocks as when they are implemented on the entire sample. They do, however, appear to be somewhat related to firm size and beta; for the zero-cost, winners minus losers portfolio, the subsample with the largest firms generates lower abnormal returns than the other two subsamples and the returns in the subsamples segmented by beta are monotonically increasing in beta.[11] These findings indicate that the relative strength profits are not primarily due to the cross-sectional differences in the systematic risk of the stocks in the sample. This evidence suggests that the profits are due to the serial correlation in the firm-specific component of returns. Furthermore, these results indicate that the profitabil-

[10] See Fama and MacBeth (1973) and Banz (1981).

[11] One thing that is interesting to note here is that the average returns of low beta stocks are higher than the returns of the medium and high beta stocks. The average returns of stocks in the low, medium and high beta groups are 1.48%, 1.39%, and 1.16% respectively. These results, obtained with daily betas, should be contrasted with earlier findings of positive relations between monthly betas and average returns (e.g., Fama and MacBeth (1973)). The difference between our results using daily betas and the earlier results using monthly betas is due to the lower correlation between firm size and daily betas. Jegadeesh (1992) and Fama and French (1992) document that there is no reliable relation between monthly betas and average returns after controlling for firm size.

ity of the relative strength strategies is not confined to any particular subsample of stocks.

As a further test Panel B of Table III presents the risk-adjusted returns of the relative strength strategies implemented within the size- and beta-based subsamples. The risk-adjusted returns are estimated as the intercepts from the following market model regression:

$$r_{pt} - r_{ft} = \alpha_p + \beta_p(r_{mt} - r_{ft}) + e_{it}, \tag{9}$$

where r_{pt} is the return on the portfolio p, r_{mt} is the return on the value-weighted index, and r_{ft} is the interest rate on 1-month Treasury Bill. Consistent with the negative betas of the zero-cost strategies, the abnormal returns of the relative strength strategies estimated from these regressions slightly exceed the raw returns given in Table III (Panel A). With the exception of the F-statistics becoming somewhat more significant, the findings in Table III (Panel B) are virtually the same as those reported in Table III (Panel A).

An additional implication of the results in Table III (Panel B) is that the abnormal performance of the zero-cost portfolio is due to the buy side of the transaction rather than the sell side. The portfolio of past winners achieves significant positive abnormal return when the value-weighted index is used as the benchmark, while the abnormal return of the portfolio of past losers is not statistically significant with this benchmark. However, in unreported regressions that used the equally weighted index as the benchmark, the positive and the negative abnormal returns of the winners and losers portfolios were both statistically significant. The magnitude and statistical significance of the abnormal returns of the zero-cost, winners minus losers, portfolio (0.0115 with a t-statistic of 3.84) was slightly higher when the equally weighted index was used in place of the value-weighted index as the benchmark.

From a practical investment perspective, it is important to assess whether the relative strength strategies will be profitable after accounting for transaction costs. On average, the relative strength trading rule results in a turnover of 84.8% semiannually.[12] The risk-adjusted return of the relative strength trading rule after considering a 0.5% one-way transaction cost[13] is 9.29% per year, which is reliably different from zero. The risk-adjusted returns after transaction costs are also significantly positive in each of the three size-based subsamples.

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[12] The average turnovers for the buy and sell sides of the zero-cost portfolio are 86.6% and 83.1% respectively. These percentages are significantly less than the 90% turnover that would be expected if the transition probabilities are equal across the return decile portfolios.

[13] Berkowitz, Logue, and Noser (1988) estimate one way transaction costs of 23 basis points for institutional investors, suggesting that the assumed transaction cost of 0.5% per trade is conservative.

V. Subperiod Analysis

A. Seasonal Patterns in Relative Strength Portfolio Returns

This section tests for possible seasonal effects in the performance of the relative strength portfolios. Based on earlier papers, e.g., Roll (1983), we have reason to expect that the relative strength strategies will not be successful in the month of January. Table IV reports the average returns of the zero-cost portfolio in each calendar month and the results here support this conjecture.

Table III

Returns of Size-Based and Beta-Based Relative Strength Portfolios

The relative strength portfolios are formed based on 6-month lagged returns and held for 6 months. The stocks are ranked in ascending order on the basis of 6-month lagged returns and the equally weighted portfolio of stocks in the lowest past return decile is portfolio P1, the equally weighted portfolio of stocks in the next decile is portfolio P2, and so on. Average monthly returns and excess returns of these portfolios and the returns of the relative strength portfolios formed using size-based and beta-based subsamples of securities are reported here. The subsample S1 contains the smallest firms, S2 contains the medium-sized firms, and S3 contains the largest firms. The subsamples β_1, β_2, and β_3 contain the firms with the smallest, medium, and the largest Scholes-Williams betas estimated from the returns data in the calendar year prior to portfolio formation. The sample period is January 1965 to December 1989.

Panel A: Average Monthly Returns

	All	S1	S2	S3	β_1	β_2	β_3
P1	0.0079	0.0083	0.0047	0.0082	0.0129	0.0097	0.0052
	(1.56)	(1.35)	(0.99)	(2.22)	(2.92)	(2.01)	(0.95)
P2	0.0112	0.0117	0.0102	0.0098	0.0140	0.0128	0.0086
	(2.78)	(2.29)	(2.54)	(3.08)	(4.38)	(3.37)	(1.83)
P3	0.0125	0.0152	0.0125	0.0105	0.0132	0.0133	0.0102
	(3.40)	(3.23)	(3.34)	(3.53)	(4.59)	(3.77)	(2.28)
P4	0.0124	0.0163	0.0130	0.0105	0.0134	0.0128	0.0110
	(3.59)	(3.59)	(3.58)	(3.66)	(5.02)	(3.82)	(2.50)
P5	0.0128	0.0164	0.0134	0.0109	0.0135	0.0135	0.0121
	(3.87)	(3.74)	(3.83)	(3.85)	(5.14)	(4.15)	(2.86)
P6	0.0134	0.0174	0.0146	0.0102	0.0135	0.0142	0.0122
	(4.14)	(4.08)	(4.22)	(3.66)	(5.23)	(4.38)	(2.92)
P7	0.0136	0.0175	0.0143	0.0109	0.0136	0.0142	0.0126
	(4.19)	(4.13)	(4.12)	(3.90)	(5.09)	(4.43)	(3.01)
P8	0.0143	0.0174	0.0148	0.0111	0.0143	0.0146	0.0132
	(4.30)	(4.11)	(4.16)	(3.86)	(5.12)	(4.44)	(3.15)
P9	0.0153	0.0183	0.0154	0.0126	0.0165	0.0156	0.0141
	(4.36)	(4.28)	(4.11)	(4.17)	(5.34)	(4.56)	(3.28)
P10	0.0174	0.0182	0.0173	0.0157	0.0191	0.0176	0.0160
	(4.33)	(3.99)	(4.11)	(4.41)	(5.17)	(4.53)	(3.50)
P10−P1	0.0095	0.0099	0.0126	0.0075	0.0062	0.0079	0.0108
	(3.07)	(2.77)	(4.57)	(3.03)	(2.05)	(2.64)	(3.35)
F-Statistics[a]	2.83	2.65	4.51	4.38	2.51	1.99	1.69
p-Value	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.04)	(0.09)

Table III—*Continued*

Panel B: Excess Returns Using the CRSP Value-Weighted Index as the Market Proxy

	All	S1	S2	S3	β_1	β_2	β_3
P1	−0.0030	−0.0029	−0.0062	−0.0020	0.0031	−0.0009	−0.0062
	(−0.89)	(−0.60)	(−2.11)	(−1.17)	(0.94)	(−0.28)	(−1.71)
P2	0.0011	0.0012	−0.0001	0.0000	0.0051	0.0029	−0.0024
	(0.43)	(0.31)	(−0.03)	(0.03)	(2.36)	(1.26)	(−0.87)
P3	0.0026	0.0051	0.0024	0.0009	0.0045	0.0035	−0.0007
	(1.24)	(1.46)	(1.18)	(0.93)	(2.45)	(1.83)	(−0.29)
P4	0.0026	0.0062	0.0030	0.0011	0.0048	0.0031	0.0000
	(1.48)	(1.90)	(1.57)	(1.24)	(2.98)	(1.83)	(0.01)
P5	0.0031	0.0064	0.0036	0.0014	0.0049	0.0038	0.0012
	(1.96)	(2.06)	(1.98)	(1.84)	(3.21)	(2.55)	(0.58)
P6	0.0037	0.0075	0.0048	0.0008	0.0048	0.0045	0.0013
	(2.55)	(2.51)	(2.74)	(1.13)	(3.46)	(3.12)	(0.69)
P7	0.0039	0.0075	0.0044	0.0015	0.0049	0.0045	0.0017
	(2.70)	(2.57)	(2.61)	(2.15)	(3.29)	(3.25)	(0.90)
P8	0.0045	0.0074	0.0048	0.0016	0.0054	0.0049	0.0023
	(3.01)	(2.56)	(2.76)	(2.12)	(3.53)	(3.29)	(1.19)
P9	0.0053	0.0082	0.0052	0.0029	0.0074	0.0057	0.0031
	(3.20)	(2.89)	(2.76)	(3.23)	(4.10)	(3.60)	(1.54)
P10	0.0070	0.0077	0.0067	0.0056	0.0094	0.0074	0.0048
	(3.24)	(2.56)	(2.91)	(3.50)	(4.10)	(3.47)	(2.02)
P10–P1	0.0100	0.0106	0.0129	0.0076	0.0063	0.0083	0.0111
	(3.23)	(2.97)	(4.69)	(3.08)	(2.09)	(2.76)	(3.42)
F-Statistics[b]	5.2910	5.4401	8.3713	4.7386	3.6045	4.0171	2.5872

[a] The F-statistics are computed under the hypothesis that the returns on portfolios P1 through P10 are jointly equal.

[b] The F-statistics are computed under the hypothesis that the abnormal returns on portfolios P1 through P10 are jointly equal to zero. All F-statistics are significant at the 1 percent level.

The relative strength strategy loses about 7% on average in each January but achieves positive abnormal returns in each of the other months.[14] The relative strength strategy realizes positive returns in 67% of the months, and 71% of the months when January is excluded (see Table V). The average return in non-January months is 1.66% per month.[15] Consistent with earlier papers, we find the magnitude of the negative January performance of the relative strength strategy to be inversely related to firm size. The negative

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[14] It is possible that at least part of the negative January returns of the relative strength strategy is due to a tendency of past winners to trade at the ask prices and past losers to sell at the bid prices at the close of the last trading day in the year. See Keim (1989) for a discussion of bid-ask spread biases and the January effect.

[15] If we were to use our priors about the performance of relative strength strategies in January and reverse the buy and sell portfolios in that calendar month (taking a long position in the past losers and a short position in the past winners in January only), then the abnormal returns would be even larger. Such a strategy generates close to 25% per year in abnormal returns, and loses money (about −0.7%) only in 1 year out of the 25 years in the sample period.

Table IV

Returns on Size-Based Relative Strength Portfolios (P10–P1) by Calendar Months

The relative strength portfolios are formed based on 6-month lagged returns and held for 6 months. The stocks are ranked in ascending order on the basis of 6-month lagged returns and the equally weighted portfolio of stocks in the lowest past return decile is the *sell* portfolio and the equally weighted portfolio of stocks in the highest past return decile is the *buy* portfolio. This table reports the average monthly returns of the zero-cost, buy minus sell, portfolio in each calendar month. The average returns of the zero-cost portfolios formed using size-based subsamples of securities are also reported. The subsample S1 contains the smallest firms, S2 contains the medium-sized firms, and S3 contains the largest firms. The sample period is January 1965 to December 1989.

	All	S1	S2	S3
Jan.	−0.0686	−0.0797	−0.0347	−0.0161
	(−3.52)	(−3.36)	(−2.14)	(−1.28)
Feb.	0.0063	0.0089	0.0149	0.0099
	(0.85)	(0.81)	(2.44)	(1.35)
Mar.	0.0105	0.0196	0.0103	0.0108
	(1.37)	(2.08)	(1.49)	(1.49)
Apr.	0.0333	0.0323	0.0368	0.0215
	(7.39)	(5.35)	(7.29)	(4.91)
May	0.0102	0.0046	0.0091	0.0079
	(1.32)	(0.56)	(1.18)	(1.19)
June	0.0238	0.0237	0.0231	0.0185
	(3.86)	(3.50)	(3.23)	(2.59)
July	0.0075	0.0112	0.0084	0.0035
	(0.96)	(1.44)	(0.96)	(0.41)
Aug.	0.0027	0.0079	−0.0011	−0.0058
	(0.35)	(0.97)	(−0.14)	(−0.71)
Sept.	0.0116	0.0126	0.0137	0.0053
	(1.10)	(1.20)	(1.27)	(0.60)
Oct.	0.0137	0.0160	0.0151	0.0025
	(1.30)	(1.40)	(1.44)	(0.22)
Nov.	0.0372	0.0352	0.0331	0.0248
	(5.31)	(5.01)	(4.12)	(2.78)
Dec.	0.0264	0.0265	0.0224	0.0070
	(2.61)	(2.13)	(2.86)	(0.99)
Feb.–Dec.	0.0166	0.0181	0.0169	0.0096
	(6.67)	(6.47)	(6.83)	(4.00)
F-Statistics[a]	7.90	7.14	4.11	1.81
p-Value	(0.00)	(0.00)	(0.00)	(0.51)
F-Statistics[b]	2.04	1.23	1.91	1.28
p-Value	(0.03)	(0.27)	(0.04)	(0.24)

[a] The F-statistics are computed under the hypothesis that the returns on the zero-cost portfolio are jointly equal in all calendar months.

[b] The F-statistics are computed under the hypothesis that the returns on the zero-cost portfolios are jointly equal in the calendar months February through December.

Table V

Proportion of Positive Returns of Relative Strength Portfolios by Calendar Months

The relative strength portfolios are formed based on 6-month lagged returns and held for 6 months. The stocks are ranked in ascending order on the basis of 6-month lagged returns and the equally weighted portfolio of stocks in the lowest past return decile is the *sell* portfolio and the equally weighted portfolio of stocks in the highest past return decile is the *buy* portfolio. This table reports the proportion of months when the average return of the zero-cost, buy minus sell, portfolio is positive. This proportion for the zero-cost portfolio formed within each size-based subsample of securities is also reported. The subsample S1 contains the smallest firms, S2 contains the medium-sized firms, and S3 contains the largest firms. The sample period is January 1965 to December 1989.

	All	S1	S2	S3
Jan.	0.24	0.16	0.20	0.44
Feb.	0.60	0.60	0.76	0.60
Mar.	0.80	0.76	0.72	0.72
Apr.	0.96	0.92	0.96	0.80
May	0.68	0.68	0.72	0.56
June	0.76	0.64	0.76	0.72
July	0.56	0.68	0.56	0.52
Aug.	0.52	0.60	0.48	0.48
Sept.	0.80	0.72	0.80	0.68
Oct.	0.64	0.60	0.64	0.56
Nov.	0.84	0.84	0.84	0.68
Dec.	0.68	0.76	0.68	0.44
Feb.-Dec.	0.71	0.71	0.72	0.61
All	0.67	0.66	0.68	0.60

average relative strength return in January is not statistically significant for the subsample of large firms.

The findings in Table IV suggest that there is also a seasonal pattern outside January. For example, the returns are fairly low in August and are particularly high in April, November, and December. The F-statistics reported in this table indicate that these monthly differences outside January are statistically significant for the whole sample as well as for the sample of medium-size firms.

One of the interesting findings documented in this table is that the relative strength strategy produces positive returns in 96% (24 out of 25) of the Aprils. The large (3.33%) and consistently positive April returns may be related to the fact that corporations must transfer money to their pension funds prior to April 15 if the funds are to qualify for a tax deduction in the previous year. If these pension fund assets are primarily invested by portfolio managers who follow relative strength rules, then the winners portfolio may benefit from additional price pressure in this month. Similarly, the larger than average returns in November and December may in part be due to price pressure arising from portfolio managers selling their losers in these months for tax or window dressing reasons.

Table VI

Returns of Size-Based Relative Strength Portfolios: Subperiod Analysis

The relative strength portfolios are formed based on 6-month lagged returns and held for 6 months. The stocks are ranked in ascending order on the basis of 6-month lagged returns and the equally weighted portfolio of stocks in the lowest past return decile is the *sell* portfolio and the equally weighted portfolio of stocks in the highest past return decile is the *buy* portfolio. This table reports the average monthly returns of the zero-cost, buy minus sell, portfolio within 5-year subperiods. The average returns of the zero-cost portfolios formed using size-based subsamples of securities within subperiods are also reported. The subsample S1 contains the smallest firms, S2 contains the medium-sized firms, and S3 contains the largest firms. The sample period is January 1965 to December 1989.

Sample	Months	65–69	70–74	75–79	80–84	85–89
All	All	0.0123	0.0109	−0.0044	0.0127	0.0162
		(1.94)	(1.23)	(−0.51)	(2.67)	(3.42)
	Jan.	−0.0524	−0.1070	−0.1017	−0.0253	−0.0569
		(−1.28)	(−2.54)	(−1.31)	(−1.38)	(−2.76)
	Feb.–Dec.	0.0182	0.0217	0.0044	0.0161	0.0229
		(3.36)	(2.88)	(0.78)	(3.44)	(6.09)
S1	All	0.0082	0.0128	−0.0064	0.0153	0.0197
		(1.14)	(1.63)	(−0.58)	(2.61)	(2.89)
	Jan.	−0.0838	−0.0853	−0.1107	−0.0124	−0.1064
		(−1.60)	(−2.29)	(−1.09)	(−0.62)	(−4.45)
	Feb.–Dec.	0.0165	0.0217	0.0031	0.0179	0.0311
		(3.19)	(3.18)	(0.41)	(2.94)	(6.59)
S2	All	0.0177	0.0115	0.0018	0.0172	0.0146
		(3.08)	(1.57)	(0.24)	(3.38)	(3.40)
	Jan.	−0.0264	−0.0465	−0.0795	−0.0100	−0.0112
		(−1.05)	(−1.81)	(−1.16)	(−0.46)	(−0.48)
	Feb.–Dec.	0.0217	0.0168	0.0092	0.0197	0.0170
		(3.86)	(2.29)	(1.87)	(3.83)	(4.08)
S3	All	0.0129	0.0115	0.0018	0.0076	0.0035
		(2.71)	(1.62)	(0.35)	(1.41)	(0.73)
	Jan.	−0.0073	−0.0154	−0.0335	−0.0094	−0.0147
		(−0.32)	(−0.48)	(−0.77)	(−0.33)	(−0.78)
	Feb.–Dec.	0.0148	0.0139	0.0050	0.0092	0.0052
		(3.08)	(1.95)	(1.21)	(1.70)	(1.04)

B. Portfolio Returns Over 5-Year Subperiods

This section documents the returns of the 6-month/6-month zero-cost strategy in each of the five 5-year subperiods in the 1965 to 1989 sample period. The evidence in Table VI indicates that the returns of the strategy, when implemented on the entire sample of stocks, produces average returns that are positive in all but one time period (1975 to 1979). An analysis of this strategy applied to size-based subsamples indicates that the negative returns in the 1975 to 1979 time period is due primarily to the January returns of the small firms. The strategy yields positive profits in each of the 5-year time periods when it is implemented on the subsamples of large- and medium-size firms. In addition, the returns are positive in each of the 5-year periods as well as in each size-based subsample when the month of January is excluded.

VI. Performance of Relative Strength Portfolios in Event Time

In this section we examine the returns of the relative strength portfolio in event time. We track the average portfolio returns in each of the 36 months following the portfolio formation date.

This event study analysis provides both additional insights about the riskiness of the strategy and about whether the profits are due to overreaction or underreaction. Significant positive returns in months beyond the holding period would indicate that the zero-cost portfolio systematically selects stocks that have higher than average unconditional returns either because of their risk or for other reasons such as differential tax exposures. Significant negative returns of the zero-cost portfolio in the months following the holding period would suggest that the price changes during the holding period are at least partially temporary.

Table VII presents the average monthly and cumulative returns of the zero-cost portfolio in event time in the 36 months after the formation date.[16] With the exception of month 1, the average return in each month is positive in the first year. The average return is negative in each month in year 2 as well as in the first half of year 3 and virtually zero thereafter. The cumulative returns reach a maximum of 9.5% at the end of 12 months but decline to about 4% by the end of month 36.

The negative returns beyond month 12 indicate that the relative strength strategy does not tend to pick stocks that have high unconditional expected returns. The observed pattern of initially positive and then negative returns of the zero-cost portfolio also suggests that the observed price changes in the first 12 months after the formation period may not be permanent. Unfortunately, estimates of expected returns over 2-year periods are not very precise. As a result, the negative returns for the zero-cost portfolio in years 2 and 3 are not statistically significant (t-statistic of -1.27). Similarly, since the abnormal return over the entire 36-month period is not statistically different from zero, we cannot rule out the possibility that the positive returns over the first 12 months is entirely temporary.[17]

[16] Since overlapping returns are used to calculate the cumulative returns in event time, the autocorrelation-consistent Newey-West standard errors are used to compute the t-statistics for the cumulative returns (see Newey and West (1987)).

[17] Another reason why we find this evidence hard to interpret is that the entire negative return over this holding period occurs in Januaries. The returns beyond the first year are close to zero in non-January months.

Table VII

Performance of Relative Strength Portfolios in Event Time

The relative strength portfolios are formed based on 6-month lagged returns. The stocks are ranked in ascending order on the basis of 6-month lagged returns. The equally weighted portfolio of stocks in the lowest past return decile is the *sell* portfolio and the equally weighted portfolio of stocks in the highest past return decile is the *buy* portfolio. This table reports the average returns of the zero-cost, buy minus sell, portfolio in each month following the formation period. t is the month after portfolio formation. The sample period is January 1965 to December 1989. Autocorrelation-consistent estimates of standard errors are used to compute the t-statistics for cumulative returns.

t	Monthly Return	Cumulative Return	t	Monthly Return	Cumulative Return	t	Monthly Return	Cumulative Return
1	−0.0025	−0.0025	13	−0.0036	0.0915	25	−0.0035	0.0521
	(−0.59)	(−0.59)		(−1.12)	(3.35)		(−1.36)	(1.41)
2	0.0124	0.0099	14	−0.0039	0.0876	26	−0.0030	0.0492
	(3.29)	(1.37)		(−1.34)	(3.07)		(−1.14)	(1.22)
3	0.0116	0.0216	15	−0.0034	0.0842	27	−0.0024	0.0467
	(3.18)	(2.20)		(−1.21)	(2.89)		(−0.98)	(1.10)
4	0.0110	0.0326	16	−0.0038	0.0804	28	−0.0032	0.0435
	(3.19)	(2.67)		(−1.41)	(2.76)		(−1.33)	(0.98)
5	0.0093	0.0419	17	−0.0047	0.0757	29	−0.0032	0.0403
	(2.82)	(2.79)		(−1.74)	(2.70)		(−1.38)	(0.87)
6	0.0091	0.0510	18	−0.0056	0.0701	30	−0.0030	0.0373
	(2.94)	(2.92)		(−2.19)	(2.68)		(−1.31)	(0.77)
7	0.0134	0.0644	19	−0.0026	0.0675	31	−0.0001	0.0372
	(4.98)	(3.32)		(−1.14)	(2.75)		(−0.06)	(0.74)
8	0.0115	0.0759	20	−0.0032	0.0642	32	0.0008	0.0380
	(4.16)	(3.60)		(−1.35)	(2.73)		(0.41)	(0.73)
9	0.0085	0.0844	21	−0.0032	0.0611	33	0.0013	0.0394
	(3.07)	(3.73)		(−1.32)	(2.55)		(0.62)	(0.73)
10	0.0048	0.0892	22	−0.0034	0.0577	34	0.0008	0.0402
	(1.69)	(3.74)		(−1.39)	(2.21)		(0.36)	(0.71)
11	0.0045	0.0938	23	−0.0011	0.0566	35	0.0010	0.0412
	(1.55)	(3.77)		(−0.45)	(1.93)		(0.45)	(0.71)
12	0.0013	0.0951	24	−0.0010	0.0556	36	−0.0005	0.0406
	(0.43)	(3.67)		(−0.40)	(1.69)		(−0.24)	(0.67)

One possible explanation of the inverted U shape in the cumulative returns is that the risk of the strategy changes over event time. Perhaps, the strategy picks stocks that are initially very risky and the risk then diminishes with time. To assess this possibility we estimate the betas in each event month with respect to the value-weighted index and the equally weighted index. The beta of the zero-cost portfolio with respect to the value-weighted (equally weighted) index is initially −0.20 (−0.41) and then it steadily increases to 0.02 (−0.08). Although these results indicate that the risk of the zero-cost portfolio does change over time, the direction of change in risk goes counter to what would be required to explain the change in average returns.

VII. Back-Testing the Strategy

This section examines the extent to which the relative strength profits reported in the previous sections existed prior to 1965. Specifically, we replicate the test in Table VII, which tracks the performance of the 6-month relative strength portfolio in event time for both the 1927 to 1940 time period and the 1941 to 1964 time period. As Fama and French (1988) and others have noted, the market was extremely volatile and experienced a significant degree of mean reversion in the 1927 to 1940 period. In contrast, the market's volatility in the 1941 to 1964 period was similar to the volatility in the 1965 to 1989 period and the market index did not exhibit mean reversion in the post-1940 period.

Table VIII (Panel A) reports the returns of the 6-month relative strength strategy in the 36 event months over the 1927 to 1940 time period. The returns in this time period are significantly lower than the returns in the 1965 to 1989 period, but the patterns of returns across event months is somewhat similar. The month 1 returns are strongly negative on average (about −5%). The returns in months 2 through 10 are statistically insignificant, but the returns in the later months are substantially lower. The cumulative excess return equals −40.81% in month 36.

These negative cumulative returns are likely to be due to two factors: First, because of the greater volatility in this period, many of the firms in the loser's decile were close to bankruptcy and thus had very high betas over the holding periods. The beta of the zero-cost 6-month/6-month strategy is about −0.5 in this period and it is substantially higher following periods of market declines. The second factor relates to the market's mean reversion in this time period. As the decomposition in Subsection III.*A* and the regression results in Subsection III.*B* indicate, negative serial correlation in the market and large market movements will reduce the profits from relative strength strategies. This is because the relative strength strategy tends to select high- (low-) beta stocks following a market increase (decrease) and hence tends to perform poorly during market reversals. For example, following a 40% decline in the equally weighted index over the previous 6 months, the index rebounded with a 43% increase in July 1932. In this month the 6-month/6-month relative strength portfolio experienced a negative 40% return. In the following month the equally weighted index increased an additional 66% and the 6-month/6-month strategy lost 68%. In the 1930s there were four other months in which the 6-month/6-month strategy lost over 40%. Each occurred when the market increased substantially.

Panel B of Table VIII reports the returns in the 36 event months for the 1941 to 1964 period. The relative strength strategy returns over this time period are very similar to the returns in the more recent time period reported earlier. As in the 1965 to 1989 time period, the average return is slightly negative in month 1, significantly positive in month 2 through month 8, and negative in month 12 and beyond. In contrast to the findings for the 1965 to

1989 period, the positive cumulative return over the first 12 months dissipates almost entirely by month 24.

VIII. Stock Returns Around Earnings Announcement Dates

This section examines the returns of past winners and losers around their quarterly earnings announcement dates. By analyzing stock returns within a short window around the dissemination of important firm-specific information we have a sharp test that directly assesses the potential biases in market expectations. Consider, for example, the possibility that stock prices system-

Table VIII

Back-Testing the Strategy: Performance of Relative Strength Portfolios Prior to 1965

The relative strength portfolios are formed based on 6-month lagged returns. The stocks are ranked in ascending order on the basis of 6-month lagged returns. The equally weighted portfolio of stocks in the lowest past return decile is the *sell* portfolio and the equally weighted portfolio of stocks in the highest past return decile is the *buy* portfolio. This table reports the average returns of the zero-cost, buy minus sell, portfolio in each month following the formation period. *t* is the month after portfolio formation. Autocorrelation consistent estimates of standard errors are used to compute the *t*-statistics for cumulative returns.

Panel A: 1927–1940

t	Monthly Return	Cumulative Return	*t*	Monthly Return	Cumulative Return	*t*	Monthly Return	Cumulative Return
1	−0.0495	−0.0495	13	−0.0245	−0.1257	25	−0.0118	−0.3359
	(−3.72)	(−3.72)		(−2.60)	(−1.50)		(−1.41)	(−2.48)
2	−0.0143	−0.0639	14	−0.0166	−0.1423	26	−0.0067	−0.3427
	(−1.32)	(−2.21)		(−2.08)	(−1.69)		(−1.01)	(−2.53)
3	−0.0088	−0.0726	15	−0.0164	−0.1587	27	−0.0135	−0.3562
	(−0.87)	(−1.78)		(−1.87)	(−1.83)		(−1.82)	(−2.52)
4	−0.0048	−0.0775	16	−0.0200	−0.1787	28	−0.0082	−0.3644
	(−0.45)	(−1.60)		(−2.20)	(−2.01)		(−1.06)	(−2.47)
5	0.0061	−0.0713	17	−0.0131	−0.1919	29	−0.0125	−0.3769
	(0.60)	(−1.40)		(−1.80)	(−2.12)		(−1.37)	(−2.39)
6	0.0057	−0.0656	18	−0.0166	−0.2085	30	−0.0107	−0.3876
	(0.55)	(−1.22)		(−2.11)	(−2.07)		(−1.20)	(−2.29)
7	0.0092	−0.0564	19	−0.0161	−0.2245	31	−0.0018	−0.3894
	(0.83)	(−1.05)		(−1.90)	(−2.01)		(−0.20)	(−2.18)
8	0.0054	−0.0511	20	−0.0224	−0.2469	32	−0.0022	−0.3916
	(0.52)	(−0.92)		(−2.28)	(−2.03)		(−0.26)	(−2.07)
9	−0.0029	−0.0539	21	−0.0178	−0.2647	33	0.0008	−0.3908
	(−0.34)	(−0.94)		(−1.92)	(−2.04)		(0.11)	(−1.99)
10	−0.0065	−0.0604	22	−0.0213	−0.2860	34	−0.0025	−0.3933
	(−0.68)	(−0.90)		(−2.08)	(−2.14)		(−0.41)	(−1.97)
11	−0.0183	−0.0787	23	−0.0183	−0.3043	35	−0.0050	−0.3983
	(−1.74)	(−1.04)		(−1.74)	(−2.23)		(−0.89)	(−1.97)
12	−0.0225	−0.1012	24	−0.0198	−0.3241	36	−0.0098	−0.4081
	(−2.35)	(−1.27)		(−1.94)	(−2.41)		(−1.47)	(−2.01)

Table VIII—*Continued*

Panel B: 1941–1964

t	Monthly Return	Cumulative Return	*t*	Monthly Return	Cumulative Return	*t*	Monthly Return	Cumulative Return
1	−0.0035	−0.0035	13	−0.0068	0.0515	25	−0.0035	0.0014
	(−1.04)	(−1.04)		(−2.14)	(2.57)		(−1.32)	(0.04)
2	0.0069	0.0034	14	−0.0085	0.0429	26	−0.0027	−0.0013
	(2.32)	(0.59)		(−3.07)	(1.90)		(−1.08)	(−0.03)
3	0.0109	0.0143	15	−0.0059	0.0371	27	−0.0015	−0.0028
	(4.15)	(2.20)		(−2.40)	(1.54)		(−0.69)	(−0.07)
4	0.0098	0.0241	16	−0.0063	0.0308	28	−0.0003	−0.0030
	(3.81)	(3.15)		(−2.80)	(1.21)		(−0.14)	(−0.08)
5	0.0075	0.0316	17	−0.0080	0.0228	29	−0.0009	−0.0039
	(3.09)	(3.40)		(−3.70)	(0.86)		(−0.51)	(−0.11)
6	0.0049	0.0365	18	−0.0074	0.0153	30	−0.0001	−0.0040
	(1.97)	(3.42)		(−3.63)	(0.56)		(−0.03)	(−0.12)
7	0.0079	0.0444	19	−0.0033	0.0120	31	0.0017	−0.0023
	(3.24)	(3.82)		(−1.61)	(0.43)		(0.98)	(−0.08)
8	0.0062	0.0507	20	−0.0012	0.0108	32	0.0011	−0.0012
	(2.52)	(4.00)		(−0.61)	(0.38)		(0.69)	(−0.05)
9	0.0039	0.0546	21	−0.0016	0.0092	33	−0.0005	−0.0017
	(1.63)	(3.91)		(−0.81)	(0.31)		(−0.32)	(−0.10)
10	0.0022	0.0568	22	−0.0021	0.0071	34	−0.0006	−0.0023
	(0.96)	(3.73)		(−1.04)	(0.22)		(−0.37)	(−0.17)
11	0.0024	0.0592	23	−0.0008	0.0063	35	−0.0004	−0.0027
	(1.00)	(3.70)		(−0.35)	(0.19)		(−0.24)	(−0.20)
12	−0.0009	0.0583	24	−0.0014	0.0050	36	−0.0004	−0.0030
	(−0.34)	(3.40)		(−0.60)	(0.14)		(−0.28)	(−0.20)

atically underreact to information about future earnings. In this case, the stock returns for past winners, which presumably had favorable information revealed in the past, should realize positive returns around the time when their earnings are actually announced. Similarly, past losers should realize negative returns around the time their earnings are announced.[18] The quarterly earnings announcement dates used in this analysis are obtained from the COMPUSTAT quarterly industrial database. The sample period for this part of the study is 1980 to 1989, the period covered by the 1990 COMPUSTAT quarterly file. On average, there are 429.2 available quarterly earnings announcements per month with matched stock return data.

Our tests again separate firms into deciles based on their prior 6-month returns. The 3-day returns (days −2 to 0) of the individual stocks in these groups are then calculated around each of their quarterly earnings announcements that occur within 36 months of the date at which the stocks are ranked according to their past returns. Table IX reports the differences between the

[18] Chopra, Lakonishok, and Ritter (1992) use a similar approach to evaluate the evidence of long horizon overreaction documented by De Bondt and Thaler (1985). See also Bernard and Thomas (1990).

Table IX

Quarterly Earnings Announcement Date Returns

The stocks are ranked in ascending order on the basis of 6-month lagged returns. The stocks in the lowest past return decile are called the *losers* group and the stocks in the highest past return decile is called the *winners* group. The differences between the 3-day returns (returns on days −2 to 0) around quarterly earnings announcements for stocks in the winners group and the losers group are reported here ($r_t^w - r_t^l$). t is the month after the ranking date. The sample period is January 1980 to December 1989.

t	$r_t^w - r_t^l$	t	$r_t^w - r_t^l$	t	$r_t^w - r_t^l$
1	0.0055	13	−0.0055	25	−0.0002
	(2.75)		(−2.56)		(−0.11)
2	0.0082	14	−0.0080	26	−0.0021
	(4.41)		(−3.89)		(−1.02)
3	0.0082	15	−0.0071	27	−0.0032
	(4.36)		(−4.04)		(−1.68)
4	0.0090	16	−0.0097	28	−0.0028
	(4.88)		(−5.75)		(−1.31)
5	0.0059	17	−0.0062	29	−0.0015
	(3.16)		(−2.90)		(−0.62)
6	0.0058	18	−0.0060	30	−0.0021
	(3.14)		(−2.96)		(−1.10)
7	0.0013	19	−0.0031	31	−0.0027
	(0.62)		(−1.63)		(−1.52)
8	0.0000	20	−0.0017	32	−0.0021
	(−0.02)		(−0.82)		(−1.13)
9	−0.0020	21	0.0006	33	−0.0020
	(−1.07)		(0.27)		(−1.05)
10	−0.0031	22	−0.0005	34	−0.0017
	(−1.60)		(−0.29)		(−0.91)
11	−0.0039	23	−0.0001	35	−0.0022
	(−2.23)		(−0.05)		(−1.29)
12	−0.0053	24	0.0012	36	−0.0059
	(−2.75)		(0.63)		(−2.91)

average announcement period returns for the winners and losers deciles in each of the 36 months following the ranking date. The pattern of announcement date returns presented in this table is consistent with the pattern of the zero-cost portfolio returns reported in Table VII. For the first 6 months the announcement date returns of the past winners exceed the announcement date returns of the past losers by over 0.7% on average, and is statistically significant in each of these 6 months. Since there are on average 2 quarterly earnings announcements per firm within a 6-month period, the returns around the earnings announcements represents about 25% of the zero-cost portfolio returns over this holding period.

The negative announcement period returns in later months are consistent with the negative relative strength portfolio returns beyond month 12 documented earlier (see Table VII). From months 8 through 20 the differences in announcement date returns are negative and are generally statistically significant. The announcement period returns are especially significant in months 11 through 18 where they average about −0.7%. In the later months the differences between the announcement period returns of the winners and losers are generally negative but are close to zero.

The predictability of stock returns around quarterly earnings announcements documented in Table IX is similar to the recent findings of Bernard and Thomas (1990). Bernard and Thomas find that average returns around quarterly earnings announcement dates are significantly positive following a favorable earnings surprise in the previous quarter. This is consistent with the positive announcement returns we see in the first 7 months in Table IX. Bernard and Thomas also find that the average return around earnings announcement dates is significantly negative 4 quarters after a positive earnings surprise. The significant negative returns around earnings announcement dates in months 11 through 18 are consistent with this finding.

IX. Conclusions

Trading strategies that buy past winners and sell past losers realize significant abnormal returns over the 1965 to 1989 period. For example, the strategy we examine in most detail, which selects stocks based on their past 6-month returns and holds them for 6 months, realizes a compounded excess return of 12.01% per year on average. Additional evidence indicates that the profitability of the relative strength strategies are not due to their systematic risk. The results of our tests also indicate that the relative strength profits cannot be attributed to lead-lag effects that result from delayed stock price reactions to common factors. The evidence is, however, consistent with delayed price reactions to firm-specific information.

The returns of the zero-cost winners minus losers portfolio were examined in each of the 36 months following the portfolio formation date. With the exception of the first month, this portfolio realizes positive returns in each of the 12 months after the formation date. However, the longer-term performances of these past winners and losers reveal that half of their excess returns in the year following the portfolio formation date dissipate within the following 2 years.

The returns of the stocks in the winners and losers portfolios around their earnings announcements in the 36 months following the formation period were also examined and a similar pattern was found. Specifically, stocks in the winners portfolio realize significantly higher returns than the stocks in the losers portfolio around the quarterly earnings announcements that are made in the first few months following the formation date. However, the announcement date returns in the 8 to 20 months following the formation date are significantly higher for the stocks in the losers portfolio than for the stocks in the winners portfolio.

The evidence of initial positive and later negative relative strength returns suggests that common interpretations of return reversals as evidence of overreaction and return persistence (i.e., past winners achieving positive returns in the future) as evidence of underreaction are probably overly simplistic. A more sophisticated model of investor behavior is needed to explain the observed pattern of returns. One interpretation of our results is that transactions by investors who buy past winners and sell past losers move prices away from their long-run values temporarily and thereby cause prices to overreact. This interpretation is consistent with the analysis of DeLong, Shleifer, Summers, and Waldman (1990) who explore the implications of what they call "positive feedback traders" on market price. Alternatively, it is possible that the market underreacts to information about the short-term prospects of firms but overreacts to information about their long-term prospects. This is plausible given that the nature of the information available about a firm's short-term prospects, such as earnings forecasts, is different from the nature of the more ambiguous information that is used by investors to assess a firm's longer-term prospects.

The evidence in this paper does not allow us to distinguish between these two hypotheses about investor behavior. In addition, there are probably other explanations for these results. Given that our results suggest that investor expectations are systematically biased, further research that attempts to identify explanations for these empirical regularities would be of interest.

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THE COSTS OF RAISING CAPITAL

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Abstract

We report the average costs of raising external debt and equity capital for U.S. corporations from 1990 to 1994. For initial public offerings (IPOs) of equity, the direct costs average 11.0 percent of the proceeds. For seasoned equity offerings (SEOs), the direct costs average 7.1 percent. For convertible bonds, the direct costs average 3.8 percent. For straight debt issues, the direct costs average 2.2 percent, although they are strongly related to the credit rating of the issue. All classes of securities exhibit economies of scale, although they are less pronounced for straight debt issues. IPOs also incur a substantial indirect cost due to short-run underpricing. Most large equity offers include an international tranche, although debt issues do not.

I. Introduction

In this article we present the average costs of raising external capital for U.S. corporations from 1990 to 1994. Specifically, we report the average spreads on public equity offerings and debt offerings, along with the other direct costs of raising capital, as a percentage of the proceeds. We find substantial economies of scale for initial public offerings (IPOs) of equity and seasoned equity offerings (SEOs). We also find substantial economies of scale for both straight bond offerings and convertible bond offerings. Spreads on bond offerings are highly sensitive to the credit rating of the offering. This article is descriptive in nature; no theories are tested. Its purpose is to provide benchmark numbers for use by issuers of securities. We do not address why firms issue the securities they do. This much broader corporate finance question would have to address taxes, corporate control, debt capacity, long-run performance patterns, investment-financing interactions, etc.

We would like to thank Charles Calomiris and Tim Loughran for useful comments on an earlier draft.

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II. Data and Terminology

Securities Data Company's (SDC) New Issues database is the primary source of information. After downloading SDC's data, we identified outliers and checked suspicious numbers in other publicly available sources. The New Issues database includes publicly placed firm commitment offerings only. In all of our tables, we exclude ADRs and unit offerings.[1] We restrict our sample to securities offered by domestic operating companies, and so exclude closed-end fund and real estate investment trust (REIT) offerings. We also exclude rights offerings and shelf registrations.[2]

We use security offerings from January 1990 to December 1994, a five-year period of relatively low inflation. Consequently, we do not make any inflation adjustments; all proceeds are the nominal proceeds. Proceeds reflect the gross proceeds raised in the U.S. and do not include money raised from the exercise of overallotment options or an international tranche, if any. In the case of equity offerings, the proceeds include the amount raised from both primary and secondary components. Primary shares are those being sold by the company, thereby increasing the number of shares outstanding. Secondary shares are those being sold by existing shareholders (managers, venture capitalists, etc.), which neither increase the number of shares outstanding nor provide capital for the company. Many IPOs include both primary and secondary components, with the fraction that is primary generally higher for younger companies. A few IPOs, sometimes involving spin-offs from parent companies, are pure secondaries. All of our SEOs involve primary shares; we exclude "registered secondaries," in which the entire issue is composed of shares being sold by existing shareholders, from our SEO sample.

For our sample of bond offerings, we exclude issues with a maturity date of one year or less. Our sample includes both zero-coupon, original-issue discount bonds, and coupon bonds. We include serial, floating-rate, and reset bonds, as

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[1] ADRs are American Depository Receipts (also called American Depository Shares) that are traded in the United States for foreign issuers. Unit offerings are bundles of securities (frequently, a share plus a warrant to buy a share at some exercise price), commonly issued in small IPOs by young, speculative companies taken public by less-prestigious investment bankers.

[2] Rights offerings give existing shareholders the right to buy the securities offered. While they are common in many countries, rights offerings have been rare in the United States during the last twenty years. See Smith (1977), Hansen and Pinkerton (1982), and Hansen (1988) for a discussion of rights offerings. Shelf registrations are offerings whereby a company meeting certain qualifications is permitted to issue securities without issuing a prospectus (taking the securities "off the shelf" and selling them). In our sample period, shelf equity offerings are practically nonexistent, although there are many bond offerings (typically smaller issues) using shelf registrations that we exclude.

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well as traditional coupon bonds.[3] We exclude mortgage-backed bonds. For zero-coupon and original-issue discount bonds that are sold for less than their par value, our percentage spreads and costs are based upon the offer price, and not the face value. Our convertible bond sample includes only issues that are convertible into shares of the issuing company. Exchangeable bonds, where the bond is convertible into shares of a different company, are not in our sample. None of our convertible bonds has a maturity date of less than five years.

We refer to new equity issues by publicly traded companies as seasoned equity offerings, reserving the use of "secondary" to identify the source of shares. Among practitioners, the term "secondary offering" is frequently used to refer to an SEO. Seasoning refers to whether the security being offered is already publicly traded; IPOs are unseasoned new issues. For that matter, the term "new issues" is sometimes used to refer to any security offering, and sometimes used to refer to equity IPOs alone. Although a new bond issue is an unseasoned new issue, and therefore a debt initial public offering, we use the term IPO to refer to unseasoned equity offerings exclusively.

Gross spreads are the commissions paid to investment bankers when securities are issued. Since buyers do not pay commissions on new security issues, these spreads implicitly reflect both the buyer and seller commissions. Other direct costs include the legal, auditing, and printing costs associated with putting together a prospectus.

III. Evidence

Average Spreads and Total Direct Costs

In Table 1 we report the average investment banker commissions (gross spreads) and other direct expenses for four classes of securities: IPOs, SEOs, convertible bonds, and straight bonds. In addition to reporting the average direct costs for each class, we also classify issues by proceeds categories. By going across a row, a reader can see how the expenses vary by security type, holding proceeds constant. By going down a column, a reader can see the magnitude of the economies of scale for a given type of security. Also reported is the number of observations in each category.

In Table 1 the median IPO is $24.4 million, the median SEO is $33.8 million, the median convertible bond is $75 million, and the median straight

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[3] Serial bonds have the individual bonds maturing on different dates, with the coupons varying depending upon the maturity date. Reset and floating-rate bonds have the interest rate changing periodically, with the new interest rate determined either by an auction (reset) or a formula (floaters).

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TABLE 1. Direct Costs as a Percentage of Gross Proceeds for Equity (IPOs and SEOs) and Straight and Convertible Bonds Offered by Domestic Operating Companies, 1990–94.

	Equity								Bonds							
	IPOs				SEOs				Convertible Bonds				Straight Bonds			
Proceeds[a] ($ millions)	N[b]	GS[c]	E[d]	TDC[e]	N	GS	E	TDC	N	GS	E	TDC	N	GS	E	TDC
2–9.99	337	9.05	7.91	16.96	167	7.72	5.56	13.28	4	6.07	2.68	8.75	32	2.07	2.32	4.39
10–19.99	389	7.24	4.39	11.63	310	6.23	2.49	8.72	14	5.48	3.18	8.66	78	1.36	1.40	2.76
20–39.99	533	7.01	2.69	9.70	425	5.60	1.33	6.93	18	4.16	1.95	6.11	89	1.54	0.88	2.42
40–59.99	215	6.96	1.76	8.72	261	5.05	0.82	5.87	28	3.26	1.04	4.30	90	0.72	0.60	1.32
60–79.99	79	6.74	1.46	8.20	143	4.57	0.61	5.18	47	2.64	0.59	3.23	92	1.76	0.58	2.34
80–99.99	51	6.47	1.44	7.91	71	4.25	0.48	4.73	13	2.43	0.61	3.04	112	1.55	0.61	2.16
100–199.99	106	6.03	1.03	7.06	152	3.85	0.37	4.22	57	2.34	0.42	2.76	409	1.77	0.54	2.31
200–499.99	47	5.67	0.86	6.53	55	3.26	0.21	3.47	27	1.99	0.19	2.18	170	1.79	0.40	2.19
500–up	10	5.21	0.51	5.72	9	3.03	0.12	3.15	3	2.00	0.09	2.09	20	1.39	0.25	1.64
Total	1767	7.31	3.69	11.00	1593	5.44	1.67	7.11	211	2.92	0.87	3.79	1092	1.62	0.62	2.24

Notes: Closed-end funds (SIC 6726), REITs (SIC 6798), ADRs, and unit offerings are excluded from the sample. Rights offerings for SEOs are also excluded. Bond offerings do not include securities backed by mortgages and issues by Federal agencies (SIC 6011, 6019, 6111, and 999B). Only firm commitment offerings and nonshelf-registered offerings are included. Standard Industrial Classification (SIC) codes are from Securities Data Co. (SDC).

[a] Total proceeds raised in the United States, excluding proceeds from the exercise of overallotment options (SDC variable: PROCDS).

[b] Number of issues.

[c] Gross spreads as a percentage of total proceeds (including management fee, underwriting fee, and selling concession) (SDC variable: GPCTP).

[d] Other direct expenses as a percentage of total proceeds (including registration fee and printing, legal, and auditing costs) (SDC variables: EXPTH/(PROCDS)*10).

[e] Total direct costs as a percentage of total proceeds (total direct costs are the sum of gross spreads and other direct expenses).

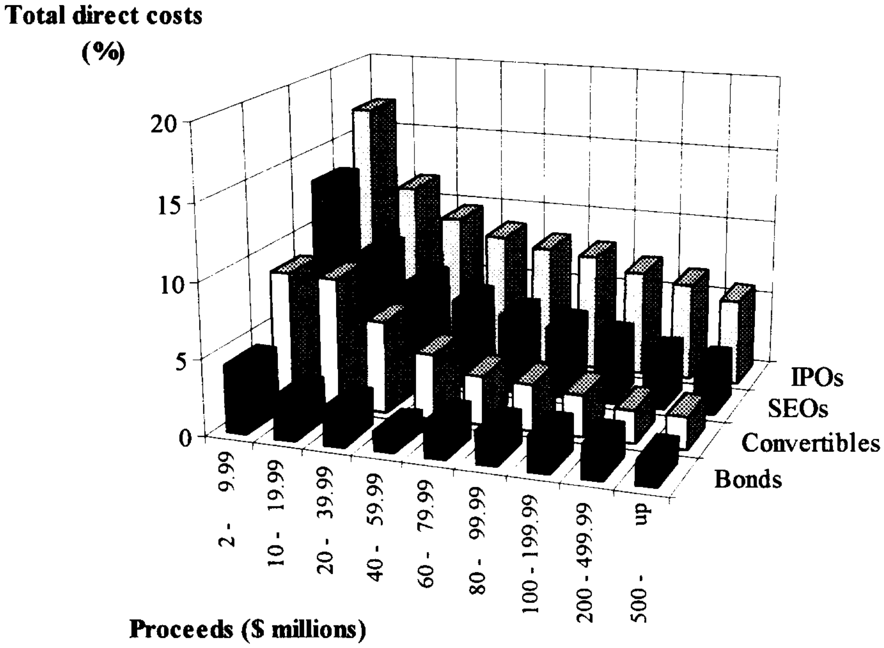

Figure I. Total Direct Costs as a Percentage of Gross Proceeds. The total direct costs for initial public offerings (IPOs), seasoned equity offerings (SEOs), convertible bonds, and straight bonds are composed of underwriter spreads and other direct expenses. Closed-end funds (SIC 6726), REITs (SIC 6798), ADRs, and unit offerings are excluded. Rights offerings for SEOs are also excluded. Bond offerings do not include securities backed by mortgages and issues by federal agencies (SIC 6011, 6019, 6111, and 999B). Only firm commitment offerings and nonshelf-registered offerings are included. The numbers plotted are reported in Table 1 for issues from 1990 to 1994.

bond is $100 million. For both IPOs and SEOs, substantial economies of scale exist in both the gross spreads and the other expenses.

For SEOs, the lack of any diseconomies, even for offerings over $500 million, is inconsistent with the findings of Hansen and Torregrosa (1992), who report diseconomies of scale for offers over $100 million. Hansen and Torregrosa use a sample of SEOs from 1978–86, in contrast to our 1990–94 sample period. Our conjecture is that while diseconomies of scale may have existed for very large issues before the mid 1980s, a structural change has probably occurred since then, possibly because of the market's greater experience with absorbing large numbers of big offerings. While they are not in our sample, the large number of multibillion dollar privatizations that have occurred around the world in the last decade have made megaofferings routine events.

In all of our tables, we report the averages based upon the number of observations for which we have data. For the gross spreads, SDC reports numbers for our entire sample. For the other direct expenses, however, many observations are missing. Consequently, the averages for the expenses are based upon a

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TABLE 2. Direct Costs of Raising Capital, 1990–94: Utility versus Nonutility Companies.

	Equity						Bonds					
	IPOs			SEOs			Convertible			Straight		
Proceeds[a] ($ millions)	N[b]	GS[c]	TDC[d]	N	GS	TDC	N	GS	TDC	N	GS	TDC
Panel A. Nonutility Offerings Only												
2–9.99	332	9.04	16.97	154	7.91	13.76	4	6.07	8.75	29	2.07	4.53
10–19.99	388	7.24	11.64	278	6.42	9.01	12	5.54	8.65	47	1.70	3.28
20–39.99	528	7.01	9.70	399	5.70	7.07	16	4.20	6.23	63	1.59	2.52
40–59.99	214	6.96	8.71	240	5.17	6.02	28	3.26	4.30	76	0.73	1.37
60–79.99	78	6.74	8.21	131	4.68	5.31	47	2.64	3.23	84	1.84	2.44
80–99.99	47	6.46	7.88	60	4.35	4.84	12	2.54	3.19	104	1.61	2.25
100–199.99	101	6.01	7.01	137	3.97	4.36	55	2.34	2.77	381	1.83	2.38
200–499.99	44	5.65	6.49	50	3.27	3.48	26	1.97	2.16	154	1.87	2.27
500–up	10	5.21	5.72	8	3.12	3.25	3	2.00	2.09	19	1.28	1.53
Total	1742	7.31	11.01	1457	5.57	7.32	203	2.90	3.75	957	1.70	2.34
Panel B. Utility Offerings Only												
2–9.99	5	9.40	16.54	13	5.41	7.68	0	—	—	3	2.00	3.28
10–19.99	1	7.00	8.77	32	4.59	6.21	2	5.13	8.72	31	0.86	1.35
20–39.99	5	7.00	9.86	26	4.17	4.96	2	3.88	5.18	26	1.40	2.06
40–59.99	1	6.98	11.55	21	3.69	4.12	0	—	—	14	0.63	1.10
60–79.99	1	6.50	7.55	12	3.39	3.72	0	—	—	8	0.87	1.13
80–99.99	4	6.57	8.24	11	3.68	4.11	1	1.13	1.34	8	0.71	0.98
100–199.99	5	6.45	7.96	15	2.83	2.98	2	2.50	2.74	28	1.06	1.42
200–499.99	3	5.88	7.00	5	3.19	3.48	1	2.50	2.65	16	1.00	1.40
500–up	0	—	—	1	2.25	2.31	0	—	—	1	3.50	na[e]
Total	25	7.15	10.14	136	4.01	4.92	8	3.33	4.66	135	1.04	1.47

Notes: Closed-end funds (SIC 6726), REITs (SIC 6798), ADRs, and unit offerings are excluded from the sample. Rights offerings for SEOs are also excluded. Bond offerings do not include securities backed by mortgages and issues by Federal agencies (SIC 6011, 6019, 6111, and 999B). Only firm commitment offerings and nonshelf-registered offerings are included. Standard Industrial Classification (SIC) codes are from Securities Data Co. (SDC).

[a] Total proceeds raised in the United States, excluding proceeds from the exercise of overallotment options (SDC variable: PROCDS).
[b] Number of issues.
[c] Gross spreads as a percentage of total proceeds (including management fee, underwriting fee, and selling concession) (SDC variable: GPCTP).
[d] Other direct expenses as a percentage of total proceeds (including registration fee and printing, legal, and auditing costs) (SDC variables: EXPTH/(PROCDS)*10).
[e] Not available because of missing data on other direct expenses.

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more limited number of observations.[4] For computing the average total direct costs in Table 1 (and other tables), we add the average gross spread and the average other expenses. In Figure I we show the average total direct costs for the four classes of securities, categorized by their gross proceeds.

The Appendix table reports the interquartile ranges for both the gross spreads and the total direct costs. (We report the interquartile range of the offerings for which we have complete data.) The largest variability of spreads occurs for bonds. As we document below, this can largely be explained based on differences in the credit quality of the issues.

Utility versus Nonutility Offerings

In Table 2 we report the direct costs of raising capital after categorizing offerings into utility and nonutility offerings. During the early 1990s, utilities were relatively minor issuers, representing roughly 10 percent of SEOs and straight bond offerings, and less than 5 percent of IPOs and convertibles. Spreads and direct costs are lower for utilities than for nonutilities. This pattern, previously documented by Bhagat and Frost (1986), may be partly due to the use of competitive bidding, rather than negotiated deals, for choosing an investment banker. Alternatively, it may be partly due to the relative noncomplexity of typical utility offerings.

Debt Offerings and Credit Quality

In Table 3 we report the costs of raising debt capital after categorizing issues by whether they are investment grade or noninvestment grade.[5] Following industry practice, we classify offerings as investment grade issues if they have a Standard & Poor's credit rating of BBB- or higher.[6]

Inspection of Table 3 discloses that for both convertibles and straight bonds, spreads are lower for investment-grade issues. For straight bonds, this difference is especially pronounced. Note that for issues raising less than $60

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[4] If the offerings with missing expense information have systematically higher or lower expenses than those for which SDC reports information, our procedure would result in biased estimates of average expenses. To check this, for a sample of bond offerings in 1994 that are missing expense information, we used the Securities and Exchange Commission's Edgar electronic database (http://www.sec.gov/cgi-bin/srch-edgar) to find the expense information. The expenses for these issues are representative of those for which SDC reports information, suggesting our numbers do not have important biases.

[5] Following the practice of SDC, we report as separate offerings two bond issues by the same company on the same day if they have different maturity dates, provided they are not explicitly serial bonds. For example, on September 22, 1994, Southern Pacific Transport issued two bonds, one with proceeds of $8.1 million with a coupon rate of 7.61 percent, and the other with proceeds of $8.8 million and a coupon rate of 7.77 percent. We treat these as two distinct offerings.

[6] The highest credit rating is AAA, followed by AA, A, BBB, BB, B, C, and D, in order of their perceived default probabilities. These ratings are further partitioned by pluses and minuses.

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TABLE 3. Average Gross Spreads and Total Direct Costs for Domestic Debt Issues, 1990–94.

	Convertible Bonds						Straight Bonds					
	Investment Grade[a]			Noninvestment Grade[b]			Investment Grade			Noninvestment Grade		
Proceeds[c] ($ millions)	N[d]	GS[e]	TDC[f]	N	GS	TDC	N	GS	TDC	N	GS	TDC
2–9.99	0	—	—	0	—	—	14	0.58	2.19	0	—	—
10–19.99	0	—	—	1	4.00	5.67	56	0.50	1.19	2	5.13	7.41
20–39.99	1	1.75	2.75	9	3.29	4.92	64	0.86	1.48	9	3.11	4.42
40–59.99	3	1.92	2.43	19	3.37	4.58	78	0.47	0.94	9	2.48	3.35
60–79.99	4	1.31	1.76	41	2.76	3.37	49	0.61	0.98	43	3.07	3.84
80–99.99	2	1.07	1.34	10	2.83	3.48	65	0.66	0.94	47	2.78	3.75
100–199.99	20	2.03	2.33	37	2.51	3.00	181	0.57	0.81	222	2.75	3.44
200–499.99	17	1.71	1.87	10	2.46	2.70	60	0.50	0.93	105	2.56	2.96
500–up	3	2.00	2.09	0	—	—	11	0.39	0.57	9	2.60	2.90
Total	50	1.81	2.09	127	2.81	3.53	578	0.58	0.94	446	2.75	3.42

Notes: Closed-end funds (SIC 6726), REITs (SIC 6798), ADRs, and unit offerings are excluded from the sample. Bond offerings do not include securities backed by mortgages and issues by Federal agencies (SIC 6011, 6019, 6111, and 999B). Only nonshelf-registered offerings are included. Standard Industrial Classification (SIC) codes are from Securities Data Co. (SDC).

[a] Firms with a BBB- or higher Standard & Poor's credit rating.

[b] Firms with a BB+ or lower Standard & Poor's credit rating.

[c] Total proceeds raised in the United States, excluding proceeds from the exercise of overallotment options (SDC variable: PROCDS).

[d] Number of issues.

[e] Gross spreads as a percentage of total proceeds (including management fee, underwriting fee, and selling concession) (SDC variable: GPCTP).

[f] Other direct expenses as a percentage of total proceeds (including registration fee and printing, legal, and auditing costs) (SDC variables: EXPTH/(PROCDS)*10).

million, very few noninvestment-grade issues exist. This reflects that smaller issues with lower credit quality are commonly placed privately, and thus do not appear in our sample.

This correlation of credit quality and issue size also explains why in Tables 1 and 2 straight bond issues do not appear to display large economies of scale: as the issue size increases, the credit quality of public issuers decreases, masking some of the economies of scale. Still, in Table 3, where we hold credit quality constant, the economies of scale for debt issues are more modest than those for equity issues in Tables 1 and 2. The correlation between issue size and credit quality also explains why the average spread is so low for bonds with \$40-\$59.9 million in proceeds. The average spread of only seventy-two basis points in Table 1 reflects that for this issue size, economies of scale are largely realized, while, at the same time, very few noninvestment-grade issuers exist. For smaller offerings, the lack of economies of scale keeps the average spread high. For larger offerings, the high proportion of noninvestment-grade issues pushes

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TABLE 4. Direct and Indirect Costs, in Percent, of Equity IPOs, 1990–94.

Proceeds[a] ($ millions)	Gross Spreads[b]	Other Expenses[c]	Total Direct Costs[d]	Average Initial Return[e]	Average Direct and Indirect Costs[f]
2–9.99	9.05	7.91	16.96	16.36	25.16
10–19.99	7.24	4.39	11.63	9.65	18.15
20–39.99	7.01	2.69	9.70	12.48	18.18
40–59.99	6.96	1.76	8.72	13.65	17.95
60–79.99	6.74	1.46	8.20	11.31	16.35
80–99.99	6.47	1.44	7.91	8.91	14.14
100–199.99	6.03	1.03	7.06	7.16	12.78
200–499.99	5.67	0.86	6.53	5.70	11.10
500–up	5.21	0.51	5.72	7.53	10.36
Total	7.31	3.69	11.00	12.05	18.69

Notes: There are 1,767 domestic operating company IPOs in the sample. The first four columns express costs as a percentage of the offer price, and the last column expresses costs as a percentage of the market price.

[a] Total proceeds raised in the United States, excluding proceeds from the exercise of overallotment options (SDC variable: PROCDS).

[b] Gross spreads as a percentage of total proceeds (including management fee, underwriting fee, and selling concession) (SDC variable: GPCTP).

[c] Other direct expenses as a percentage of total proceeds (including registration fee and printing, legal, and auditing costs) (SDC variables: EXPTH/(PROCDS)*10).

[d] Total direct costs as a percentage of total proceeds (the average total direct costs are the sum of average gross spreads and average other direct expenses).

[e] Initial return = 100*{[closing price one day after the offering date (SDC variable: PR1DAY)/offering price (SDC variable: P)] − 1}. If PR1DAY is missing, PR2DAY is used.

[f] Total direct and indirect costs = (d + e)/(1 + e/100), computed for each issue individually (excluding firms with other expenses or initial returns missing), and then averaged, where *d* is the percentage of total direct costs, and *e* is the percentage initial return.

the average spread up. In other words, the average spread of only seventy-two basis points for this category is not a typographical error.

Although not reported in any table, the average maturity of bond offerings is about ten years for all of the proceeds categories and investment grades.

Initial Public Offerings

In Table 4 we report not only the direct costs for IPOs, but also the indirect costs of short-run underpricing.[7] Inspection of the table reveals that, consistent with previous findings, IPOs are underpriced on average. With average direct costs of 11.0 percent and average initial returns of 12.0 percent, a typical issuer with an offer price of $10.00 receives net proceeds of $8.90 on a share that trades at $11.20. Taking the difference between the market price and the amount realized of $8.90, the total direct and indirect costs amount to $2.30, which is 20.5 percent of the market value of $11.20. In Table 4 the average direct and indirect cost as a percentage of market value is 18.7 percent, since the average that is reported is the average of this percentage for each firm. (The average ratio of costs to market value is different from the ratio of the averages.) This number is less than the 21.2 percent that Ritter (1987) reports for firm commitment offerings from 1977 to 1982 for several reasons. First, our 1990–94 sample period reveals less underpricing than in 1977-1982. Second, we exclude offerings of less than $2 million, whereas he includes them. Third, spreads have experienced some downward movement the past fifteen years.[8] Still, the direct and indirect costs of going public are substantial.[9]

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[7] We compute the average initial return only for those offerings for which SDC reports the market price at the end of the first day of trading or, if this is missing, at the end of the second day of trading. In computing the average direct and indirect cost, we compute this number for each individual firm for which we have the gross spread, other expenses, and the initial return, and then compute the average.

Note that we may be understating the extent of the economies of scale. This is because we are not including the value of any warrants granted to underwriters as part of their compensation. These warrants are common among small, speculative offerings underwritten by less-prestigious underwriters. Their inclusion would boost the average costs of the smallest offerings, but not the larger offerings. For evidence on the quantitative effect of this omission, see Barry, Muscarella, and Vetsuypens (1991) and Dunbar (1995).

While the average gross spread on IPOs is 7.31 percent, we find a large "bunching" at exactly 7.00 percent. Most issues with proceeds of $20–$60 million have a spread of exactly 7 percent, as shown in the Appendix table.

For IPOs, we include the indirect cost of underpricing in Table 4, but we do not include this as a cost for other security offerings. This is because of the lack of economically important underpricing effects for other offerings. Smith (1977) documents underpricing of 0.5 percent for SEOs. We suspect that much of this represents the practice of pricing the offering at the bid price, rather than the mean of the bid and the ask price, and the tendency to round down to the nearest eighth or integer. For example, if a stock traded at $30.125 bid and $30.375 ask, it would be common to set a $30.00 offer price. Depending upon which price had been the most recent transaction price, this would be measured as underpricing of either 0.4 percent or 1.2 percent. Barclay and Litzenberger (1988) report excess returns of 1.5 percent for SEOs during the month after issuing. Since companies typically issue after a large stock price run-up, it is not clear how much of this 1.5 percent is due to momentum effects, and how

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[8] Calomiris and Raff (1995) report that for convertible bonds, the average spread in 1963–65 was 3.7 percent and in 1971–72 it was 3.2 percent. Our 1990–94 sample has an average spread of 2.9 percent.

[9] Beatty and Welch (1996) report the average direct and indirect costs for a sample of 980 IPOs from 1992 to 1994. Whereas we aggregate auditing, legal, printing, and other direct expenses, they report audit expenses and legal expenses separately. For all proceeds classes, legal expenses are slightly higher than auditor expenses.

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TABLE 5. Number of Issues Containing an International Tranche for Domestic Operating Companies That Are Issuing, 1990–94.

	Equity				Bonds			
	IPOs Int'l Tranche?[a]		SEOs Int'l Tranche?		Convertible Int'l Tranche?		Straight Int'l Tranche?	
Proceeds ($ millions)	Yes	No	Yes	No	Yes	No	Yes	No
2–9.99	2	335	4	163	0	4	1	31
10–19.99	12	377	12	298	1	13	0	78
20–39.99	45	488	36	389	3	15	0	89
40–59.99	40	175	42	219	0	28	4	86
60–79.99	33	46	45	98	1	46	8	84
80–99.99	25	26	30	41	9	4	2	110
100–199.99	81	25	72	80	22	35	14	395
200–499.99	39	8	48	7	14	13	13	157
500–up	10	0	8	1	2	1	2	18
Total	287	1480	297	1296	52	159	44	1048

Notes: Closed-end funds (SIC 6726), REITs (SIC 6798), ADRs, and unit offerings are excluded from the sample. Rights offerings for SEOs are also excluded. Bond offerings do not include securities backed by mortgages and issues by Federal agencies (SIC 6011, 6019, 6111, and 999B). Only firm commitment offerings and nonshelf-registered offerings are included. Standard Industrial Classification (SIC) codes are from Securities Data Co. (SDC).

[a] If (TOTDOLAMT/PROCDS) > 1.05, the issue is treated as having an international tranche. TOTDOLAMT is the total proceeds raised globally, and PROCDS is the total proceeds raised in the United States.

much is due to issue effects. Kang and Lee (1996) document that convertible bonds are underpriced by about 1 percent on average. Straight bonds, especially those with high credit ratings, seem to be underpriced very little.

International Tranches

In Table 5 we report the frequency with which domestic operating companies include an international tranche in their offerings. Recall that we are excluding Eurobonds from our debt offerings and ADRs from our equity offerings. Inspection of the table reveals that equity offerings and convertibles that raise less than $60 million in domestic trading rarely include an international tranche. Straight debt offerings, no matter what their size, rarely include an international tranche. Now, foreign investors can always participate in a domestic offering regardless of whether it is explicitly marketed overseas. Thus, the existence/nonexistence of an international tranche largely reflects the degree to which

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the selling efforts are expanded to find international buyers. Domestic operating companies issuing debt with foreign buyers in mind frequently issue Eurobonds.[10]

Overallotment Options

The Rules of Fair Practice of the National Association of Security Dealers (NASD) permit firm commitment offerings to include an overallotment option, where more securities can be sold if demand is strong.[11] Since August 1983, the size of this overallotment option has been limited to 15 percent of the issue size. Investment bankers typically have thirty days to exercise this option. In practice, investment bankers typically presell at least 115 percent of the offering, and then stand ready to buy back the incremental 15 percent if demand is weak when some of the buyers immediately sell their securities (a practice known as "flipping").[12]

The NASD Rules of Fair Practice require that investment bankers sell securities at or below the stated offer price. Normally, all of the securities are sold at the offer price, but occasionally, if demand is weak, the investment banker winds up selling some of the securities below the offer price. In this arrangement the underwriter writes a put option to the issuing firm, with the value of this put included in the gross spread. The overallotment option can be viewed as a call option that the issuing firm has written, where investors hold this call.

On securities sold through the exercise of overallotment options, investment bankers collect the same gross spread as on the rest of the issue. However, since the direct expenses do not change, these fixed costs are spread over a larger issue size. Thus, the total direct cost numbers that we report would be lower if overallotment options were included in the gross proceeds. On the other hand, since overallotment options are generally exercised only if the issue is underpriced, the value of this call option is a cost to the issuing firm that we do not include in our total cost calculations.

In Table 6 we report the frequency with which overallotment options are used and the frequency with which they are exercised. Inspection of the table reveals that in recent years, essentially all IPOs have included an overallotment option. The vast majority of SEOs and convertibles include an overallotment option, but straight bond issues rarely do.

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[10] The relative yields on Eurobonds versus domestic bonds also play a role in the decision of what to issue (see Kim and Stulz (1988)).

[11] Overallotment options are sometimes called Green Shoe options. The Green Shoe Company was apparently the first company to use one.

[12] See Schultz and Zaman (1994) for evidence on the exercise of overallotment options on IPOs. With IPOs, if the underwriter expects aftermarket demand to be weak, 135 percent of the issue may be presold, with the underwriter's taking a naked short position equal to the amount exceeding 115 percent of the offering. This allows the underwriter to support, or stabilize, the price by buying back the increment in open market purchases. These shares are then treated as if they were never issued. If the underwriter expects the price to jump, typically only 115 percent of the issue size will be presold, to avoid losing money on a naked short position.

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[redacted]

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The frequency with which overallotment options are exercised varies across security type. In Table 6 we use the SDC classification where an overallotment option is considered to be exercised as long as at least part of it is exercised. In practice, most overallotment options are for 15 percent of the issue size. Most commonly, either all or none of the additional shares are sold, but sometimes only part of the overallotment option is exercised. On securities sold as part of an overallotment option, the spread is the same as on the rest of the issue.

IV. Conclusions

Firms have many choices for financing their activities: internal versus external, private versus public, and debt versus equity. This article focuses on public external financing and documents the cost of this financing from 1990 to 1994. We report the direct costs of raising capital for IPOs, SEOs, convertible bonds, and straight bonds. These are, respectively, 11.0 percent, 7.1 percent, 3.8 percent, and 2.2 percent of the proceeds. We find substantial economies of scale for all types of securities, although for straight bond offerings, these are largely exhausted for proceeds over $40 million. Spreads on bonds are sensitive to credit quality, with gross spreads more than 200 basis points higher on noninvestment-grade issues. Except for bonds, most large issues include an international tranche.

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THE EFFECT OF PERSONAL TAXES AND DIVIDENDS ON CAPITAL ASSET PRICES

Theory and Empirical Evidence

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This paper derives an after tax version of the Capital Asset Pricing Model. The model accounts for a progressive tax scheme and for wealth and income related constraints on borrowing. The equilibrium relationship indicates that before-tax expected rates of return are linearly related to systematic risk and to dividend yield. The sample estimates of the variances of observed betas are used to arrive at maximum likelihood estimators of the coefficients. The results indicate that, unlike prior studies, there is a strong positive relationship between dividend yield and expected return for NYSE stocks. Evidence is also presented for a clientele effect.

1. Introduction

The effect of dividend policy on the prices of equity securities has been an issue of interest in financial theory. The traditional view was that investors prefer a current, certain return in the form of dividends to the uncertain prospect of future dividends. Consequently, they bid up the price of high yield securities relative to low yield securities [see Cottle, Dodd and Graham (1962) and Gordon (1963)]. In their now classic paper Miller and Modigliani (1961) argued that in a world without taxes and transactions costs the dividend policy of a corporation, given its investment policy, has no effect on the price of its shares. In a world where capital gains receive preferential treatment relative to dividends, the Miller-Modigliani 'irrelevance proposition' would seem to break down. They argue, however, that since tax rates vary across investors each corporation would attract to itself a clientele of investors that most desired its dividend policy. Black and Scholes (1974) assert that corporations would adjust their payout policies until in equilibrium the spectrum of policies offered would be such that any one firm is unable to affect the price of its shares by (marginal) changes in its payout policy.

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In the absence of taxes, capital asset pricing theory suggests that individuals choose mean-variance efficient portfolios. Under personal income taxes, individuals would be expected to choose portfolios that are mean-variance efficient in after-tax rates of return. However, the tax laws in the United States are such that some economic units (for example, corporations) would seem to prefer dividends relative to capital gains. Other units (for example, non-profit organizations) pay no taxes and would be indifferent to the level of yield for a given level of expected return. The resulting effect of dividend yield on common stock prices seems to be an empirical issue.

Brennan (1973) first proposed an extended form of the single period Capital Asset Pricing Model that accounted for the taxation of dividends. Under the assumption of proportional individual tax rates (not a function of income), certain dividends, and unlimited borrowing at the riskless rate of interest (among others) he derived the following equilibrium relationship:

$$E(\tilde{R}_i)-r_f=b\beta_i+\tau(d_i-r_f), \tag{1}$$

where $\tilde{R}_i$ is the before tax total return to security i, β_i is its systematic risk, $b = [E(R_m)-r_f-\tau(d_m-r_f)]$ is the after-tax excess rate of return on the market portfolio, r_f is the return on a riskless asset, d_i is the dividend yield on security i; and the subscript m denotes the market portfolio. τ is a positive coefficient that accounts for the taxation of dividends and interest as ordinary income and taxation of capital gains at a preferential rate.

In empirical tests [of the form (1)] to date, the evidence has been inconsistent. Black and Scholes (1974, p. 1) conclude that

> '...it is not possible to demonstrate that the expected returns on high yield common stocks differ from the expected returns on low yield common stocks either before or after taxes.'

Alternatively, stated in terms of the Brennan model, their tests were not sufficiently powerful either to reject the hypothesis that $\tau=0$ or to reject the hypothesis that $\tau=0.5$. Rosenberg and Marathe (1978) attribute the lack of power in the Black–Scholes tests to (a) the loss in efficiency from grouping stocks into portfolios and (b) the inefficiency of their estimating procedures, which are equivalent to Ordinary Least Squares. Using an instrumental variables approach to the problem of errors in variables and a more complete specification of the variance covariance matrix (of disturbances in the regression), Rosenberg and Marathe find that the dividend term is statistically significant. Both the Rosenberg and Marathe and the Black and Scholes studies use an average dividend yield from the prior twelve month

period as a surrogate for the expected dividend yield. Since most dividends are paid quarterly, their proxy understates the expected dividend yield in ex-dividend months and overstates it in those months that a stock does not go ex-dividend, thereby reducing the efficiency of the estimated coefficient on the dividend yield term. Both studies (Rosenberg and Marathe in using instrumental variables, and Black–Scholes in grouping) sacrifice efficiency to achieve consistency.

The present paper derives an after-tax version of the Capital Asset Pricing Model that accounts for a progressive tax scheme and both wealth and income related constraints on borrowing. Alternative econometric procedures are used to test the implications of this model. Unlike prior tests of the CAPM, the tests here use the variance of the observed betas to arrive at maximum likelihood estimators of the coefficients. Consistent estimators are obtained without loss of efficiency. Also, for ex-dividend months the expected dividend yield based on prior information is used, and for other months the expected dividend yield is set equal to zero. While the estimate of the coefficient of dividend yield is of the same order of magnitude as that found in Black and Scholes, and lower than that found by Rosenberg and Marathe, the t-value is substantially larger, indicating a substantial increase in efficiency. Furthermore, the tests are consistent with the existence of a clientele effect, indicating that the aversion for dividends relative to capital gains is lower for high yield stocks and higher for low yield stocks. This is consistent with the Elton and Gruber (1970) empirical results on the ex-dividend behavior of common stocks.

2. Theory

This section derives a version of the Capital Asset Pricing Model that accounts for the tax treatment of dividend and interest income under a progressive taxation scheme. Two types of constraints on individual borrowing are imposed. The first constrains the maximum interest on riskless borrowing to be equal to the individual's dividend income, and the second is a margin requirement that restricts the fraction of security holdings that may be financed through borrowing. In previous published work, Brennan (1973) derives an after-tax version of the Capital Asset Pricing Model with unlimited borrowing and with constant tax rates which may vary across individuals.[1] Under his model when interest on borrowing exceeds dividend income the investor would pay a negative tax. The theoretical model developed here may be viewed as an extension of the Brennan analysis to account for constraints on borrowing along with a progressive tax scheme. Special cases of the model are examined, where the income related constraint and/or the margin constraint on individual borrowing are removed.

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[1] Brennan (1970) also derives a model with a progressive tax scheme. However, he neither considers constraints on borrowing nor the limiting of interest deduction on margin borrowing to dividend income. Consideration of the limit on the interest tax deduction to dividend income combined with a positive capital gains tax would result in a preference for dividends by those individuals whose interest payments exceed their dividend income.

The following assumptions are made:

(A.1) Individuals' Von Neumann–Morgenstern utility functions are monotone increasing strictly concave functions of after-tax end of period wealth.
(A.2) Security rates of return have a multivariate normal distribution.
(A.3) There are no transactions costs, and no restrictions on the short sale of securities, and individuals are price takers.
(A.4) Individuals have homogeneous expectations.
(A.5) All assets are marketable.
(A.6) A riskless asset, paying a constant rate r_f, exists.
(A.7) Dividends on securities are paid at the end of the period and are known with certainty at the beginning of the period.
(A.8) Income taxes are progressive and the marginal tax rate is a continuous function of taxable income.
(A.9) There are no taxes on capital gains.
(A.10) Constraints on individuals' borrowing are of the form:
  (i) A constraint that the interest on borrowing cannot exceed dividend income, called the income constraint on borrowing, and/or
  (ii) a margin constraint that the individual's net worth be at least a given fraction of the market value of his holdings of risky securities.

Assumptions (A.1) through (A.6) are standard assumptions of the Capital Asset Pricing Model. Assumptions (A.1) and (A.2) taken together imply that preferences can be described over the mean and the variance of after-tax end of period wealth. Under these conditions individuals prefer more mean return and are averse to the variance of return. The individual's marginal rate of substitution between the mean and variance of after-tax end of period wealth, at the optimum, can be written as the ratio of his global risk tolerance to his initial period wealth. That is, if $u_k(W_1^k)$ is the kth individual's utility function in terms of after-tax end of period wealth, $f^k(\mu_k, \sigma_k^2)$ is his objective function in terms of the mean and variance of the after-tax portfolio return, and W^k is his initial wealth,

$$f_1^k / -2f_2^k = \theta^k / W^k, \tag{2}$$

where $\theta^k \equiv -E(u') E(u'')$ is the individual's global risk tolerance at the optimum [see Gonzalez-Gaverra (1973) and Rubinstein (1973)]. (A.7) implies that dividends are announced at the beginning of the period and paid at its end. Since firms display relatively stable dividend policies this may be a reasonable approximation for a monthly holding period.

Assumption (A.8) closely resembles the tax treatment of ordinary dividends in the U.S. The $100 dividend exclusion is ignored, since the small magnitude of the exclusion implies that for the majority of stockholders the marginal tax rate applicable to ordinary income is the same as that applied to dividends. Assumption (A.9) abstracts from the effects of capital gains taxes. Since capital gains are taxed only upon realization, their treatment in a single period model is not possible. It is, however, straightforward to model a capital gains tax on an accrual basis [see Brennan (1973)]. Since most capital gains go unrealized for long periods, this would tend to overstate the effect of the actual tax. Noting that the ratio of realizations to accruals is small, and that capital gains are exempt from tax when transferred by inheritance, Bailey (1969) has argued that the effective tax is rather small.

Under assumption (A.8), the kth individual's average tax rate, t^k, is a non-decreasing function of his taxable end of period income Y_1^k,

$$\begin{aligned} t^k &= g(Y_1^k), \\ g(0) &= 0, \qquad g'(Y_1^k) = 0 \quad \text{for} \quad Y_1^k \leqq 0, \\ &\qquad\qquad\qquad\;\; > 0 \quad \text{for} \quad Y_1^k > 0. \end{aligned} \tag{3}$$

The kth individual's marginal tax rate, written T^k, is the first derivative of taxes paid with respect to taxable income. This is equal to the average tax rate plus the product of taxable income and the derivative of the average tax rate,

$$T^k \equiv d(t^k Y_1^k)/dY_1^k = t^k + Y_1^k g'(Y_1^k). \tag{4}$$

The margin constraint in assumption (A.10-ii) resembles institutional margin restrictions. By (A.10-i), borrowing is constrained up to a point where interest paid equal dividends received. This constraint incorporates the casual empirical observation that loan applications require information on income (which this constraint accounts for) in addition to information on wealth (which the margin constraint accounts for). One or both of the constraints may be binding, for a given individual. This formulation allows the analysis of an equilibrium with both constraints, with only one of them imposed or with no borrowing constraints.

The following notation is employed:

R_i = the total before tax rate of return on security i, equal to the ratio of the value of the security at the end of the period plus dividends over its current value, less one,

d_i = the dividend yield on security i, equal to the dollar dividend divided by the current price,
X_i^k = the fraction of the kth individual's wealth invested in the ith risky asset, $i=1,2,\ldots,N$ (a negative value is a short sale),
X_f^k = the fraction of the kth individual's wealth invested in the safe asset (a negative value indicates borrowing),
$\tilde{R}_p^k$ = the before-tax rate of return on the kth individual's portfolio,
W^k = the kth individual's initial wealth, and
$f^k(\mu_k, \sigma_k^2)$ = the kth individual's expected utility function defined over the mean and variance of after-tax portfolio return, μ_k and σ_k^2, respectively.

The kth individual's ordinary income is then

$$Y_1^k = W^k\left(\sum_i X_i^k d_i + X_f^k r_f\right). \tag{5}$$

The mean after-tax return on the individual's portfolio is

$$\mu_k = \sum X_i^k E(\tilde{R}_i) + X_f^k r_f - t^k\left(\sum_i X_i^k d_i + X_f^k r_f\right). \tag{6}$$

and under assumption (A.7) the variance of after-tax return is

$$\begin{aligned}\sigma_k^2 &= \sum_j \sum_i X_i^k X_j^k \operatorname{cov}(\tilde{R}_i - d_i t^k, \tilde{R}_j - d_j t^k)\\ &= \sum_j \sum_i X_i^k X_j^k \operatorname{cov}(\tilde{R}_i, \tilde{R}_j).\end{aligned} \tag{7}$$

By assumption (A.10-i) the income constraint on borrowing is

$$W^k\left\{\sum_i X_i^k d_i + X_f^k r_f\right\} \geqq 0, \tag{8}$$

and the margin constraint on borrowing is

$$W^k\left\{(1-\alpha)\sum X_i^k + X_f^k\right\} \geqq 0, \tag{9}$$

where α; $0<\alpha<1$, is the margin requirement on the individual. As pointed out earlier, one or both of these constraints may be binding.

The kth individual's optimization problem is stated in terms of the

following Lagrangian:

$$\begin{aligned}\mathcal{L}^k \equiv f^k(\mu_k, \sigma_k^2) &+ \lambda_1^k\left[1 - \sum_i X_i^k - X_f^k\right]\\ &+ \lambda_2^k\left[\sum_i X_i^k d_i + X_f^k r_f - S_2^k\right] + \lambda_3^k\left[(1-\alpha)\sum_i X_i^k + X_f^k - S_3^k\right],\end{aligned} \tag{10}$$

where

λ_1^k = the Lagrange multiplier on the kth individual's budget,
λ_2^k, S_2^k = the Lagrange multiplier and non-negative slack variable for the income related constraint on the kth individual's borrowing, respectively (when the constraint is binding $\lambda_2^k > 0$ and $S_2^k = 0$, and when it is not binding $\lambda_2^k = 0$ and $S_2^k \geqq 0$), and
λ_3^k, S_3^k = the Lagrange multipler and non-negative slack variables for the margin constraint on the kth individual's borrowing, respectively; again if the constraint is binding (not binding), $\lambda_3^k > (=)\ 0$ and $S_3^k = (\geqq)\ 0$.

The stationary points satisfy the following first order conditions:

$$\begin{aligned}\frac{\partial \mathcal{L}^k}{\partial X_i^k} = f_1^k\{E(\tilde{R}_i) - [t^k + Y_1^k g'(Y_1^k)]d_i\} - \lambda_1^k + \lambda_2^k d_i&\\ + \lambda_3^k(1-\alpha) + 2f_2^k \sum_j X_j^k \operatorname{cov}(\tilde{R}_i, \tilde{R}_j) = 0,& \qquad i = 1,2,\ldots,N,\end{aligned} \tag{11}$$

$$\frac{\partial \mathcal{L}^k}{\partial X_f^k} = f_1^k\{r_f - [t^k + Y_1^k g'(Y_1^k)]r_f\} - \lambda_1^k + \lambda_2^k r_f + \lambda_3^k = 0, \tag{12}$$

where $f_1^k \equiv \partial f^k(\mu_k, \sigma_k^2)/\partial \mu_k$, $f_2^k \equiv \partial f^k(\mu_k, \sigma_k^2)/\partial \sigma_k^2$. The other first order conditions are the constraints and specify the signs of the Lagrangian multipliers and are omitted here. The progressive nature of the tax scheme [assumption (A.8)] ensures that the mean variance efficient frontier in after-tax terms is concave, and this together with risk aversion from assumption (A.5) is sufficient to guarantee the second order conditions for a maximum.

Recall the following relationships: (i) the marginal tax rate, $T^k = [t^k + Y_1^k g'(\cdot)]$, (ii) the covariance $\sum_j X_j^k \operatorname{cov}(\tilde{R}_i, \tilde{R}_j) = \operatorname{cov}(\tilde{R}_i, \tilde{R}_p^k)$, and (iii) the global risk tolerance $\theta^k = W^k(f_1^k / -2f_2^k)$. Subtracting relation (12) from relation (11) and re-arranging terms yields

$$\begin{aligned}\{E(\tilde{R}_i) - r_f] = \alpha(\lambda_3^k / f_1^k) &+ (W^k/\theta^k)\operatorname{cov}(\tilde{R}_i, \tilde{R}_p^k)\\ &+ [T^k - (\lambda_2^k / f_1^k)](d_i - r_f).\end{aligned} \tag{13}$$

Relation (13) must be satisfied for the individual's portfolio optimum.

Market equilibrium requires that relation (13) holds for all individuals, and that markets clear. For markets to clear all assets have to be held which implies the conservation relation (14) that requires the value weighted average of all individuals' portfolios be equal to the market portfolio,

$$\sum_k (W^k/W^m)\tilde{R}_p^k = \tilde{R}_m, \tag{14}$$

or

$$\sum_k W^k \tilde{R}_p^k = W^m \tilde{R}_m,$$

where

$$\sum_k W^k \equiv W^m.$$

Multiplying both sides of relation (13) by θ^k, summing over all individuals, using the conservation relation (14) and re-arranging terms yields

$$E(\tilde{R}_i) - r_f = a + b\beta_i + c(d_i - r_f), \tag{15}$$

where

$$\beta_i \equiv \operatorname{cov}(\tilde{R}_i, \tilde{R}_m)/\operatorname{var}(\tilde{R}_m),$$

$$a \equiv \alpha \sum_k (\theta^k/\theta^m)(\lambda_3^k/f_1^k),$$

$$b \equiv \operatorname{var}(\tilde{R}_m)(W^m/\theta^m),$$

$$c \equiv \sum_k (\theta^k/\theta^m)[T^k - (\lambda_2^k/f_1^k)],$$

$$\theta^m \equiv \sum_k \theta^k.$$

The term 'a', the intercept of the implied security market plane, is the fractional margin requirement α times the weighted average of the ratios of individual shadow prices on the margin constraint and the expected marginal utility of mean return. The weights, (θ^k/θ^m), are proportional to individuals' global risk tolerances. When $\alpha > 0$ and the constraint is binding for some individuals, $\lambda_3^k > 0$ for some k, a is positive. In the absence of margin requirements ($\alpha = 0$) or when the margin constraint is not binding for all individuals, ($\lambda_3^k = 0$ for all k), $a = 0$.

Interpreting eq. (15), 'a' is the excess return on a zero beta portfolio (relative to the market) whose dividend yield is equal to the riskless rate, i.e., $a = E(\tilde{R}_z) - r_f$. The term 'b', the coefficient on beta is equal to the product of the variance of the rate of return on the market portfolio and global market relative risk aversion, i.e., $b = \operatorname{var}(\tilde{R}_m)(W^m/\theta^m)$. Since relation (15) also holds for the market portfolio, b may be alternatively expressed as $b = [E(\tilde{R}_m) - r_f - c(d_m - r_f) - a]$. If '$c$' is interpreted as a tax rate, b may be viewed as the expected after-tax rate of return on a hedge portfolio which is long the market portfolio and short a portfolio having a zero beta and a dividend yield equal to the riskless rate of interest; i.e., $b = [E(\tilde{R}_m) - E(\tilde{R}_z) - c(d_m - d_z)]$. The term '$c$' is a weighted average of individual's marginal tax rates $(\sum_k (\theta^k/\theta^m)T^k)$, less the weighted average of the individual's ratios of the shadow price on the income related borrowing constraint and the expected marginal utility of mean portfolio return $\sum_k (\theta^k/\theta^m)(\lambda_2^k/f_1^k)$. For the cases where the income related margin constraint is either non-existent or non-binding for all individuals, c is simply the weighted average of marginal tax rates, and is positive. Otherwise, the sign of 'c' depends on the magnitudes of these two terms. Define B as the set of indices of those individuals k for whom the income related constraint is binding: and define N (*not* B) as the set of indices for which the constraint is non-binding. Now for $k \in B$, $\lambda_2^k > 0$, $Y_1^k = 0$ and $T^k = t^k = 0$. And for $k \in N$, $\lambda_2^k = 0$, $Y_1^k \geqq 0$ and $T^k \geqq t^k \geqq 0$. Hence

$$c = \sum_{k \in N} \frac{\theta^k}{\theta^m} T^k - \sum_{k \in B} \frac{\theta^k}{\theta^m} \frac{\lambda_2^k}{f_1^k}. \tag{16}$$

The individuals in N may be viewed as a clientele that prefers capital gains to dividends. The individuals in B may be viewed as a clientele that shows a preference for dividends: in the context of this model, these individuals wish to borrow more than the income related constraint allows them, and increased dividends serve to increase their debt capacity without additional tax obligations. To this point corporate dividend policies have been treated as exogenous in this model.

Now consider supply adjustments by value maximizing firms. If $c > 0$ ($c < 0$) firms could increase their market values by decreasing (increasing) cash dividends and increasing (decreasing) share repurchases or decreasing (increasing) external equity flotations. Value maximizing firms (in absence of any restrictions the IRS may impose) would adjust the supply of dividends until an equilibrium was obtained where

$$\sum_{k \in N} (\theta^k/\theta^m)T^k = \sum_{k \in B} (\theta^k/\theta^m)(\lambda_2^k/f_1^k). \tag{17}$$

When condition (17) is satisfied an individual firm's dividend decision does not affect its market value, $c=0$ and dividend yield has no effect on the before tax rate of return on any security.[2]

Under unrestricted supply effects, $c=0$ and the equilibrium relationship (15) reduces to the before tax zero beta version of the Capital Asset Pricing Model:

$$E(\tilde{R}_i)=(a+r_f)(1-\beta_i)+E(\tilde{R}_m)\beta_i. \tag{18}$$

Note that this obtains in the presence of taxes. Long (1975) has studied conditions under which the before tax and after-tax mean variance efficient frontiers are identical for any individual. He does not, however, study the equilibrium as is done here: for even though the before tax and after-tax individual mean variance frontiers are not identical, (18) demonstrates that prices are found as if there is no tax effect.

In the case where there are no margin constraints, $a=0$, and relation (18) reduces to the before tax traditional Sharpe–Lintner version of the Capital Asset Pricing Model,

$$E(\tilde{R}_i)=r_f+[E(\tilde{R}_m)-r_f]\beta_i. \tag{19}$$

Return now to the case where the income related borrowing constraint is absent. Then, in (16), $c=\sum_k T^k(\theta^k/\theta^m)\equiv T^m$, the 'market' marginal tax bracket: and the relation reduces to an after-tax version of the Black (1972), Lintner (1965), Vasicek (1971) zero beta model,

$$E(\tilde{R}_i)-T^m d_i=[r_f(1-T^m)+a](1-\beta_i)+(E(\tilde{R}_m)-T^m d_m)\beta_i. \tag{20}$$

When there is no margin constraint or when it is non-binding for all individuals, $a=0$, and relation (20) reduced to an after-tax version of the Sharpe (1964), Lintner (1965) model,

$$E(\tilde{R}_i)-T^m d_i=[r_f(1-T^m)]+[E(\tilde{R}_m)-T^m d^m-r_f(1-T^m)]\beta_i. \tag{21}$$

However, in none of these cases is T^m a weighted average of individual

average tax rates. It is only when taxes are simply proportional to income that $T^k=t^k$, and relation (21) is identical to the equilibrium implied by Brennan (1973), who assumes a constant tax rate that may differ across investors.

3. Empirical tests

From the theory, the equilibrium specification to be tested is

$$E(\tilde{R}_i)-r_f=a+b\beta_i+c(d_i-r_f). \tag{22}$$

The hypotheses are $a>0$, $b>0$ and in the absence of the income related constraint on borrowing $c>0$.

In obtaining econometric estimates of a, b and c, two problems arise. The first is that expectations are not directly observed. The usual procedure is to assume that expectations are rational and that the parameters a, b and c are constant over time; the realized returns are used on the left-hand side

$$\tilde{R}_{it}-r_{ft}=\gamma_0+\gamma_1\beta_{it}+\gamma_2(d_{it}-r_{ft})+\tilde{\varepsilon}_{it}, \qquad \begin{array}{l} i=1,2,\ldots,N_t,\\ t=1,2,\ldots,T, \end{array} \tag{23}$$

where $\tilde{R}_{it}$ is the return of security i in period t, β_{it} and d_{it} are the systematic risk and the dividend yield of security i in period t respectively. The disturbance term $\tilde{\varepsilon}_{it}$ is $\tilde{R}_{it}-E(\tilde{R}_{it})$, the deviation of the realized return from its expected value. The coefficients γ_0, γ_1 and γ_2 correspond to a, b and c. The variance of the column vector of disturbance terms, $\tilde{\varepsilon}\equiv\{\tilde{\varepsilon}_{it}: i=1,2,\ldots,N_t, t=1,\ldots,T\}$, is not proportional to the identity matrix, since contemporaneous covariances between security returns are non-zero and return variances differ across securities. (Note that in order to conserve space '$\{\cdot\}$' is used to denote a column vector.) This means that ordinary least squares (OLS) estimators are inefficient, for either a cross-sectional regression in month t, or a pooled time series and cross-sectional regression. The computed variance of the OLS estimator (based on the assumption that the variance of $\tilde{\varepsilon}$ is proportional to the identity matrix) is not equal to the true variance of the estimator.

The second problem is that the true population β_{it}'s are unobservable. The usual procedure uses an estimate from past data, and this estimate has an associated measurement error. This means that the OLS estimates will be biased and inconsistent. The method used in tackling these problems is discussed in this section.

To fix matters, assume that data exist for rates of return, true betas and for dividend yields in periods i, $i=1,2,\ldots,N_t$, securities in each period t, $t=1,\ldots,T$. Define the vector of realized excess returns as

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[2] Note, however, that this equilibrium, where dividends do not affect before tax returns, may not exist. For example, the income constraint may be binding for no one even when dividends are zero. If all individuals had the same endowments and had the same utility functions this constraint would be non-binding for all individuals.

This argument is in the spirit of the 'supply effect' alluded to in Black and Scholes (1974). Unlike the recent argument in Miller and Scholes (1977) for a zero dividend effect, the present argument does not depend on an artificial segmentation of accumulators and non-accumulators, and the existence of tax-sheltered lending opportunities with zero administrative costs. The major problem with the argument here is that with the existence of two distinct clienteles, one preferring higher dividends and the other preferring lower dividends, shareholders would not agree on the direction in which firms should change their dividend. Thus the assertion of value maximizing behavior by firms does not have a strong theoretical basis.

$$\tilde{R} \equiv \{\tilde{R}_1 \tilde{R}_2, \ldots, \tilde{R}_t, \ldots, \tilde{R}_T\},$$

where

$$\tilde{R}_t \equiv \{(\tilde{R}_{1t} - r_{ft})(\tilde{R}_{2t} - r_{ft})(\tilde{R}_{it} - r_{ft}), \ldots, (\tilde{R}_{N_t} - r_{ft})\},$$

and the matrices X of explanatory variables as

$$X \equiv \{X_1 X_2, \ldots, X_t, \ldots, X_T\},$$

where

$$X_t \equiv \begin{bmatrix} 1 & \beta_{1t} & (d_{1t} - r_{ft}) \\ 1 & \beta_{2t} & (d_{2t} - r_{ft}) \\ \vdots & \vdots & \vdots \\ 1 & \beta_{N_t} & (d_{N_t} - r_{ft}) \end{bmatrix}.$$

By defining the vector of regression coefficients as $\Gamma = \{\gamma_0 \gamma_1 \gamma_2\}$ one can write the pooled time series and cross-sectional regression as

$$\tilde{R} = X\Gamma + \tilde{\varepsilon}, \qquad (24)$$

where

$$\tilde{\varepsilon} \equiv \{\tilde{\varepsilon}_1 \tilde{\varepsilon}_2, \ldots, \tilde{\varepsilon}_t, \ldots, \tilde{\varepsilon}_T\},$$

and

$$\tilde{\varepsilon}_t \equiv \{\tilde{\varepsilon}_{1t} \tilde{\varepsilon}_{2t}, \ldots, \tilde{\varepsilon}_{it}, \ldots, \tilde{\varepsilon}_{N_t}\}.$$

It is assumed that

$$E(\tilde{\varepsilon}) = 0,$$

and that

$$E(\tilde{\varepsilon}_t \tilde{\varepsilon}_t') = V_t,$$

some symmetric positive definite matrix of order $(N_t \times N_t)$. It is also assumed that security returns are serially uncorrelated, so that

$$E(\tilde{\varepsilon}_{it} \tilde{\varepsilon}_{js}) = 0 \quad \text{for} \quad t \neq s.$$

This means that the variance–covariance matrix $V \equiv E(\tilde{\varepsilon}\tilde{\varepsilon}')$ is block diagonal, with the off-diagonal blocks being zero. The matrices V_t appears along the diagonal of V.

It is well known that the estimator for Γ which is linear in $\tilde{R}$, unbiased and has minimum variance is unique, and is given by the Aitken or Generalized Least Squares estimator (GLS),

$$\hat{\Gamma} = (X'V^{-1}X)^{-1} X'V^{-1}\tilde{R}. \qquad (25)$$

From the block diagonal nature of V, it follows that V^{-1} is also block diagonal. The matrices V_t^{-1}, $t = 1, 2, \ldots, T$, appear along the diagonal of V^{-1}, with the off-diagonal blocks being zero. Assuming that Γ is an intertemporal constant, Γ can be estimated by efficiently pooling T independent GLS estimates of Γ, namely $\hat{\Gamma}_1, \hat{\Gamma}_2, \ldots, \hat{\Gamma}_t, \ldots, \hat{\Gamma}_T$, obtained by using cross-sectional data in periods $1, 2, \ldots, t, \ldots, T$,

$$\hat{\Gamma}_t = (X_t' V_t^{-1} X_t)^{-1} X_t' V_t^{-1} \tilde{R}_t, \qquad t = 1, 2, \ldots, T. \qquad (26)$$

That is, the monthly estimators $\hat{\gamma}_{kt}$ for γ_k, $k = 0$, 1 or 2, are serially uncorrelated, and the pooled GLS estimator $\hat{\gamma}_k$ is found as the weighted mean of the monthly estimates, where the weights are inversely proportional to the variances of these estimates,

$$\hat{\gamma}_k = \sum_{t=1}^{T} Z_{kt} \hat{\gamma}_{kt}, \qquad (27)$$

$$\operatorname{var}(\hat{\gamma}_k) = \sum_{t=1}^{T} Z_{kt}^2 \operatorname{var}(\hat{\gamma}_{kt}), \qquad (28)$$

$$Z_{kt} = [\operatorname{var}(\hat{\gamma}_{kt})]^{-1} \Big/ \sum_t [\operatorname{var}(\hat{\gamma}_{kt})]^{-1}. \qquad (29)$$

For some of the results presented in section 4 each $\hat{\gamma}_{kt}$ is assumed to be drawn from a stationary distribution, and the estimates of $\hat{\gamma}_k$ and its variance are

$$\hat{\gamma}_k = \sum_{t=1}^{T} (\hat{\gamma}_{kt}/T), \qquad (30)$$

$$\hat{\sigma}^2(\hat{\gamma}_k) = \left[\sum_{t=1}^{T} (\hat{\gamma}_{kt} - \hat{\gamma}_k)^2 / T(T-1)\right], \qquad k = 0, 1, 2. \qquad (31)$$

A useful portfolio interpretation can be given to each of the GLS estimators $\hat{\Gamma}_t$ in (26). Choose any matrix numbers of order $N_t \times N_t$, say W_t^{-1}, such that $(X_t' W_t^{-1} X_t)^{-1}$ exists. Construct an estimator, using cross-sectional data in period t, as

$$(X_t' W_t^{-1} X_t)^{-1} X_t' W_t^{-1} \tilde{R}_t. \tag{32}$$

This estimator is linear in $\tilde{R}_t$ and unbiased for Γ. This estimator is a linear combination of realized security excess returns in period t. From the fact that

$$(X_t' W_t^{-1} X_t)^{-1} X_t' W_t^{-1} X_t = I, \tag{33}$$

where I is the identity matrix, it follows that the estimator for γ_0 in (32) is the realized excess return on a zero beta portfolio having a dividend yield equal to the riskless rate. Similarly, the estimator for γ_1 is the realized excess return on a hedge portfolio that has a beta of one and dividend yield equal to zero; and that for γ_2 is the realized excess return on a hedge portfolio having a zero beta and a dividend yield equal to unity. This interpretation[3] can be given to any estimator of the form (32). When W_t^{-1} (or, equivalently, the portfolio weights discussed above) is chosen so as to minimize the variance of the portfolio return, the resulting estimator is the GLS estimator. This is because portfolio estimates as in (32) are linear and unbiased by construction, and by the Gauss–Markov theorem the GLS estimator is the unique minimum variance estimator among linear unbiased estimators [see Amemiya (1972)].

It is not possible to specify the elements of the variance–covariance matrix V_t a priori. The task of estimating these elements is greatly simplified by assuming that the Sharpe single index model is a correct description of the return generating process. The process that generates returns at the beginning of period t is assumed to be as follows:

$$\tilde{R}_{it} = \alpha_{it} + \beta_{it}\tilde{R}_{mt} + \tilde{\varepsilon}_{it}, \qquad i = 1, 2, \ldots, N_t, \tag{34}$$

$$\begin{aligned} \operatorname{cov}(\tilde{\varepsilon}_{it}, \tilde{\varepsilon}_{jt}) &= 0, \qquad i \neq j, \\ &= s_{ii}, \qquad i = j, \end{aligned} \tag{35}$$

$$\alpha_{it} = E(\tilde{R}_{it} \mid R_{mt} = 0).$$

With this specification the element in the ith row and the jth column of V_t, written as $V_t(i,j)$, is given by

$$\begin{aligned} V_t(i,j) &= \beta_{it}\beta_{jt}\sigma_{mm}, \qquad i \neq j, \\ &= \beta_{it}^2\sigma_{mm} + s_{ii}, \qquad i = j, \end{aligned} \qquad i, j = 1, 2, \ldots, N_t, \tag{36}$$

where

$$\sigma_{mm} \equiv \operatorname{var}(\tilde{R}_{mt}).$$

Under these conditions the GLS estimator of Γ obtained by using data in period t reduces to

$$\hat{\Gamma}_t = (X_t' \Omega_t^{-1} X_t)^{-1} X_t' \Omega_t^{-1} R_t, \tag{37}$$

where Ω_t is a diagonal matrix of order $(N_t \times N_t)$, whose element in the ith row and jth column is given by

$$\begin{aligned} \Omega_t(i,j) &= 0, \qquad i \neq j, \\ &= s_{ii}, \qquad i = j, \end{aligned} \qquad i, j = 1, 2, \ldots, N_t. \tag{38}$$

In appendix A it is shown that this estimator is the GLS estimator for Γ. That is, under the assumptions of the single index model, the estimator minimizes the 'residual risk' of three portfolio returns, subject to the constraint that the expected returns on these portfolios are γ_0, γ_1 and γ_2 respectively. This estimator can be constructed as a heteroscedastic transformation on $\tilde{R}_t$ and X_t. Define the matrix P_t of order $(N_t \times N_t)$ whose elements are given by

$$\begin{aligned} P_t(i,j) &= \phi/s_i \equiv \phi/\sqrt{s_{ii}}, \qquad i = j \\ &= 0, \qquad i \neq j, \end{aligned} \tag{39}$$

where ϕ is a positive scalar. Then $\hat{\Gamma}_t$ can also be arrived at from the OLS regression on the transformed variables,

$$\tilde{R}_t^* = X_t^* \Gamma + \tilde{\varepsilon}_t^*, \tag{40}$$

where

$$\tilde{R}_t^* = P\tilde{R}_t \quad \text{and} \quad X_t^* = PX_t.$$

This is equivalent to deflating the variables in the ith rows of $\tilde{R}_t$ and X_t by a factor proportional to the residual standard error s_i. Note that Black and Scholes (1974), who used the portfolio approach, assumed in addition to the single index model that the 'residual' risks of all securities were equal; that is, they assumed that $s_{ii} = s^2$ for all i. Therefore, the Black–Scholes estimator reduces to OLS on the untransformed variables.

Errors in variables. Since true population β_{it} variables are unobserved, estimates of this variable, $\tilde{\beta}_{it}$ are obtained from historical data. The estimated beta is assumed equal to the true beta plus a measurement error $\tilde{v}_{it}$,

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[3] For a similar interpretation, see Rosenberg and Marathe (1978).

$$\tilde{\beta}_{it} = \beta_{it} + \tilde{v}_{it}. \tag{41}$$

The presence of measurement error causes a misspecification in OLS and GLS estimators, and the resulting estimates of Γ are biased and inconsistent [see, for example, Johnston (1972), for a discussion of the bias in the coefficients of a variable without error, here dividend yield, see Fisher (1977)]. The estimates $\tilde{\beta}_{it}$ are obtained from a regression of $\tilde{R}_{it}$ on the return of the market portfolio $\tilde{R}_{m\tau}$ from data prior to period t,

$$\tilde{R}_{i\tau} = \alpha_{it} + \beta_{it}\tilde{R}_{m\tau} + \tilde{e}_{i\tau}, \qquad \tau = t-60,\, t-59, \ldots, t-1. \tag{42}$$

Since the single index model is assumed, $\operatorname{cov}(\tilde{e}_{i\tau}, \tilde{e}_{j\tau}) = 0$ and hence $\operatorname{cov}(\tilde{v}_{it}, \tilde{v}_{jt}) = 0$. If the joint probability distribution between security rates of return and market return is stationary, the variance of the measurement error $\operatorname{var}(\tilde{v}_{it})$ is proportional to the variance of the residual risk term $\operatorname{var}(\tilde{e}_{i\tau})$, for each i. Since month t is not used in this time series regression, $\operatorname{cov}(\tilde{e}_{it}, \tilde{v}_{it}) = 0$. Note that this time series regression yields a measured beta, $\tilde{\beta}_{it}$, its variance $\operatorname{var}(\tilde{v}_{it})$ and the variance of the residual risk term $\operatorname{var}(\tilde{e}_{it}) = s_{ii}$.

Consistent with prior empirical studies, the assumption $E(\tilde{e}_{it}) \doteq 0$ has been made. However, it is recognized that if the 'market return' used in (42) is not the true market return, then the estimate of β_{it} may be biased, as has been observed by Sharpe (1977), Mayers (1972) and Roll (1977).

Because of errors in variables, most previous empirical tests have grouped stocks into portfolios. Since errors in measurement in betas for different securities are less than perfectly correlated, grouping risky assets into portfolios would reduce the asymptotic bias in OLS estimators. However, grouping results in a reduction of efficiency caused by the loss of information. The efficiency of the OLS estimator of the coefficient of a single independent variable is proportional to the cross sectional variation in that independent variable (beta). For the two independent variables case (dividend yield and beta), Stehle (1976) has shown that the efficiency of the OLS estimator of the coefficient of a given independent variable, using grouped data, is proportional to the cross-sectional variation in that variable unexplained by the variation in the other independent variable. Since the within group variation in dividend yield unexplained by beta is eliminated, the efficiency of the estimate of the dividend yield coefficient using grouped data is lower than that using all the data.[4] For this reason the present study

does not use the grouping approach to errors in variables. Instead, use is made of the measurement error in beta to arrive at a consistent estimator for Γ.

In constructing the GLS estimator $\hat{\Gamma}_t$ in (37), each variable has been deflated by a factor proportional to the residual standard deviation. The factor of proportionality was an arbitrary positive scalar. The structure of our problem is such that the standard error of measurement in $\tilde{\beta}_{it}$, $\sigma_i = (\operatorname{var}(\tilde{v}_{it}))^{\frac{1}{2}}$, is proportional to the standard deviation of residual risk, $s_i = (\operatorname{var}(\tilde{e}_{it}))^{\frac{1}{2}}$. That is, if the time series regression model satisfies the OLS assumptions,

$$\sigma_i = s_i \bigg/ \left(\sum_{\tau=t-60}^{t-1} (\tilde{R}_{m\tau} - \bar{R}_m)^2 \right)^{\frac{1}{2}}, \tag{43}$$

where $\bar{R}_m$ is the sample mean of the market return in the prior 60 month period.[5] Assume that σ_i is known and let

$$\phi = s_i/\sigma_i, \tag{44}$$

in the definition of P in (39). Thus each variable in the rows of $\tilde{R}_t$ and X_t is now deflated by the standard deviation of the measurement error in β_{it}. If $\tilde{\beta}_{it}$ is used in place of β_{it} (unobserved), the measurement error in the deflated independent variable, $\tilde{\beta}^* = \tilde{\beta}_{it}/\sigma_i$ will now have unit variance.

Call the matrix of regressors used $\tilde{X}_t^*$, which is simply X_t^* with $\tilde{\beta}_{it}$ replacing β_{it}. Then

$$\tilde{X}_t^* = X_t^* + \begin{bmatrix} 0 & \tilde{v}_{1t}/\sigma_1 & 0 \\ 0 & \tilde{v}_{2t}/\sigma_2 & 0 \\ \vdots & \vdots & \vdots \\ 0 & \tilde{v}_{N_t t}/\sigma_{N_t} & 0 \end{bmatrix}, \tag{45}$$

where $\operatorname{var}(\tilde{v}_{it}/\sigma_i) = 1$. Then the computed overall estimator

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[4] The variance of the OLS estimator of the second independent variable (dividend yield) is equal to the variance of the error term divided by the portion of its variation that is unexplained by the first independent variable (beta). Therefore, unless the independent variables are uncorrelated sequential grouping procedures as used by Black and Scholes (1974) are inefficient relative to grouping procedures that maximize the between group variation in dividend yield that is unexplained by the between group variation in beta.

[5] In the actual estimation, risk premiums were used. That is, $\tilde{R}_{it} - r_{ft}$ was regressed on $\tilde{R}_{mt} - r_{ft}$ to estimate β_{it} as explained in section 4 below. Thus in the computation in (43), $(\tilde{R}_{m\tau} - r_{f\tau} - \overline{R_m - r_f})^2$ is used in place of $(R_{m\tau} - \bar{R}_m)^2$.

$$\hat{\Gamma} = \sum_{t=1}^{T} (\hat{\Gamma}_t / T), \tag{46}$$

where

$$\hat{\Gamma}_t = (\tilde{X}_t^{*\prime} \tilde{X}_t^{*})^{-1} \tilde{X}_t^{*\prime} \tilde{R}_t^{*} \tag{47}$$

is inconsistent. This is because

$$\operatorname*{plim}_{N_t} \hat{\Gamma}_t = \left(\Sigma_{X_t^* X_t^*} + \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix} \right)^{-1} \frac{X_t^{*\prime} \tilde{R}_t}{N_t}, \tag{48}$$

where

$$\Sigma_{X_t^* X_t^*} = \operatorname*{plim}_{N_t} \frac{X_t^{*\prime} X_t^{*}}{N_t}.$$

This says that each cross sectional estimator is biased even in large samples. Hence the overall estimator, being an arithmetic mean of the cross-sectional estimators, is inconsistent.

Consider the following estimator in each cross sectional month:

$$\hat{\Gamma}_t = \left(\frac{\tilde{X}_t^{*\prime} \tilde{X}_t^{*}}{N_t} - \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix} \right)^{-1} \frac{\tilde{X}_t^{*\prime} R_t^{*}}{N_t}. \tag{49}$$

Then

$$\operatorname*{plim}_{N_t} \hat{\Gamma} = \frac{X_t^{*\prime} \tilde{R}_t}{X_t^{*\prime} X_t^{*}}, \tag{50}$$

and

$$E\left(\operatorname*{plim}_{N_t} \hat{\Gamma}_t \right) = \frac{X_t^{*\prime} E(\tilde{R}_t^{*})}{X_t^{*\prime} X_t^{*}} = \Gamma. \tag{51}$$

Thus each cross-sectional estimator is unbiased, in large samples, for Γ.

Note that a portfolio interpretation can also be given to (47). Since

$$\operatorname*{plim}_{N_t} \left(\frac{\tilde{X}_t^{*\prime} \tilde{X}_t^{*}}{N_t} - \begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix} \right)^{-1} \frac{\tilde{X}_t^{*\prime} X_t^{*}}{N_t} = I, \tag{52}$$

it follows that the estimator for γ_0 in (47) is the realized excess return on a normal portfolio that has, in probability limit, a zero beta and a dividend yield equal to the riskless rate. Similarly the estimator for γ_1 (or γ_2) is the realized excess return on a hedge portfolio that has, in probability limit, a beta of one (or zero) and a dividend yield equal to zero (or unity).

The overall estimator,

$$\hat{\hat{\Gamma}} = \sum_{t=1}^{T} (\hat{\hat{\Gamma}}_t / T), \tag{53}$$

combines T independent estimates, and is consistent,

$$\operatorname*{plim}_{T} \left[\operatorname*{plim}_{N_t} \sum_{t=1}^{T} (\hat{\hat{\Gamma}}_t / T) \right] = \Gamma. \tag{54}$$

It is shown in appendix B that, if $\tilde{v}_{it}$ and $\tilde{\varepsilon}_{it}$ are jointly normal and independent, then $\hat{\Gamma}_t$ is the maximum likelihood estimator (MLE) for Γ, using data in period t.

4. Data and results

Data on security rates of return (R_{it}) were obtained from the monthly return tapes supplied by the Center for Research in Security Prices (CRSP) at the University of Chicago. The same service provides the monthly return on a value weighted index of all the securities on the tape, and this index was used as the market return (R_{mt}) for the time series regressions. From January 1931 until December 1951, the monthly return on high grade commercial paper was used as the return on the riskless asset (r_{ft}); from January 1952 until December 1977 the return on a Treasury Bill (with one month to maturity) was used for r_{ft}. Estimates of each security's beta, $\hat{\beta}_{it}$, and its associated standard error were obtained from regressions of the security excess return on the market excess return for 60 months prior to t,

$$\tilde{R}_{i\tau} - r_{f\tau} = \alpha_{it} + \beta_{it}(\tilde{R}_{m\tau} - r_{f\tau}) + \tilde{\varepsilon}_{i\tau}, \quad \tau = t-60, t-59, \ldots, t-1. \tag{55}$$

This was repeated for all securities on the CRSP tapes from $t=1$ (January 1936) to $t=T=504$ (December 1977). January 1936 was chosen as the initial month for (subsequent) cross-sectional regressions because that was when dividends first became taxable.

To conduct the cross-sectional regression, the dividend yield variable (d_{it}) was computed from the CRSP monthly master file. This is

$$d_{it}=0,$$

if in month t, security i did not go ex-dividend; or if it did, it was a non-recurring dividend not announced prior to month t;

$$d_{it}=D_{it}/P_{it-1},$$

if in month t, security i went ex-dividend, and the dollar taxable dividend D_{it} per share was announced prior to month t; and

$$d_{it}=\hat{D}_{it}/P_{it-1},$$

if in month t security i went ex-dividend and this was a recurring dividend not previously announced. Here $\hat{D}_{it}$ was the previous (going back at most 12 months), recurring, taxable dividend per share, adjusted for any changes in the number of shares outstanding in the interim; where P_{it-1} is the closing price in month $t-1$.

This construction assumes that the investor knows at the end of each month whether or not the subsequent month is an ex-dividend month for a recurring dividend. However, the surrogate for the dividend is based only on information that would have been available ex ante to the investor.

The cross-sectional regressions in each month provide a sequence of estimates $\{(\hat{\gamma}_{0t},\hat{\gamma}_{1t},\hat{\gamma}_{2t}),\ t=1,2,\dots,504\}$. Three such sequences are available: the first uses OLS, the second uses GLS and the third uses maximum likelihood estimation. The econometric procedures developed in section 3 apply equally well to the single variable regression, excess returns on beta alone. This corresponds to a test of the two factor Capital Asset Pricing Model, as in Black, Jensen and Scholes (1972) and Fama and MacBeth (1973),

$$\tilde{R}_{it}-r_{ft}=\gamma'_0+\gamma'_1\beta_{it}+\tilde{u}_{it}, \qquad i=1,2,\dots,N_t, \quad t=1,2,\dots,504, \tag{56}$$

where $\tilde{u}_{it}$ is the deviation of $\tilde{R}_{it}$ from its expected value. These cross sectional regressions provide three sequences $\{(\hat{\gamma}'_{0t},\hat{\gamma}'_{1t}),\ t=1,2,\dots,504\}$, the first using OLS, the second using GLS and the third using maximum likelihood estimation.

The estimated coefficients were shown to be realized excess rates of return on portfolios (with certain characteristics)[6] in month t. It is assumed that the excess rates of return on these portfolios are stationary and serially uncorrelated. Under these conditions the most efficient estimators of the expected excess return on these portfolios would be the unweighted means of the monthly realized excess returns. The sample variance of the mean is computed as the time series sample variance of the respective portfolio returns divided by the number of months,

$$\hat{\gamma}_k=\sum_{t=1}^{504}\hat{\gamma}_{kt}\Big/504, \qquad k=0,1,2, \tag{57}$$

$$\operatorname{var}(\hat{\gamma}_k)=\sum_{t=1}^{504}(\hat{\gamma}_{kt}-\hat{\gamma}_k)^2/(504\cdot 503). \tag{58}$$

A similar computation is made for $\hat{\gamma}'_0$ and $\hat{\gamma}'_1$.

The three sets of estimators of γ_0, γ_1 and γ_2 (and of γ'_0 and γ'_1) and their respective t-statistics for the overall period January 1936 to December 1977 are provided in Panel A (Panel B) of table 1.

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[6] See section 3, and also appendix A.

Table 1

Pooled time series and cross section estimates of the after-tax and the before-tax CAPM: 1936–1977.[a]

	Panel A: After-tax model			Panel B: Before-tax model	
Procedure	$\hat{\gamma}_0$	$\hat{\gamma}_1$	$\hat{\gamma}_2$	$\hat{\gamma}'_0$	$\hat{\gamma}'_1$
OLS	0.00616 (4.37)	0.00268 (1.51)	0.227 (6.33)	0.00681 (4.84)	0.00228 (1.26)
GLS	0.00446 (3.53)	0.00344 (1.87)	0.234 (8.24)	0.00516 (4.09)	0.00302 (1.63)
MLE	0.00363 (2.63)	0.00421 (1.86)	0.236 (5.62)	0.00443 (3.22)	0.00369 (1.62)

[a] *Notes*: The after-tax version corresponds to the regression

$$\tilde{R}_{it}-r_{ft}=\gamma_0+\gamma_1\beta_{it}+\gamma_2(d_{it}-r_{ft})+\tilde{\varepsilon}_{it}, \quad i=1,2,\dots,N_t,\ t=1,2,\dots,T.$$

The before-tax version corresponds to the regression

$$\tilde{R}_{it}-r_{ft}=\gamma'_0+\gamma'_1\beta_{it}+\tilde{\mu}_{it}, \quad i=1,2,\dots,N_t,\ t=1,2,\dots,T.$$

Each regression above is performed across securities in a given month. This gives estimates $\{\hat{\gamma}_{0t},\hat{\gamma}_{1t},\hat{\gamma}_{2t};\ t=1,2,\dots,T\}$ and $\{\hat{\gamma}'_{0t},\hat{\gamma}'_{1t};\ t=1,2,\dots,T\}$. The reported coefficients are arithmetic averages of this time series: for example,

$$\hat{\gamma}_1=\sum_{t=1}^{T}\frac{\hat{\gamma}_{1t}}{T},$$

where $T=504$, t-statistics are in parentheses under each coefficient, and they refer to $t(\hat{\gamma}_j)$, where $j=1,2,3$.

The OLS and GLS estimators are biased and inconsistent due to measurement error in beta. The maximum likelihood estimators are consistent: consistency is a large sample property and for this study the monthly cross sectional regressions have between 600 and 1200 firms, and there were 504 months.[7] In Panel A, table 1, the MLE estimator of γ_1 is about 60 percent greater than the corresponding GLS estimator. Consistent with prior studies, the MLE estimator of γ_1 is significantly positive, indicating that investors are risk averse. Also consistent with prior studies, the MLE estimator of γ_0 is significantly positive. In Panel B, tests of the two factor model are presented. Note that in both panels, the GLS procedure results in an increase in the efficiency of the estimator of γ_1, which is $\hat{\gamma}_1$ ($\hat{\gamma}_1'$) in Panel A (Panel B). Consistent with prior tests of the traditional version of the Capital Asset Pricing Model, the null hypothesis that $\gamma_0'=0$ is rejected. Consistent with investor risk aversion $\hat{\gamma}_1'$ is significantly positive at the 0.1 level. Explanations for a positive intercept ($\gamma_0>0$) include, in addition to margin constraints on borrowing, misspecification of the market porfolio [see Mayers (1972), Sharpe (1977) and Roll (1977)], or beta serving as a surrogate for systematic skewness [see Kraus and Litzenberger (1976)].

The coefficient of the excess dividend yield variable, $\hat{\gamma}_2$, (Panel A) is highly significant under all the estimating procedures. The standard errors of the GLS and maximum likelihood estimators of γ_2 are about 25 percent smaller than that of the OLS estimator. The magnitude of the coefficient indicates that for every dollar of taxable return investors require between 23 and 24 cents of additional before tax return.

While the finding of a significant dividend coefficient contrasts with the Black-Scholes (1974) finding of an insignificant dividend effect, the magnitude of the coefficient in table 1 is consistent with their study. The dividend yield (independent) variable they used was $(d_i-d_m)/d_m$, where d_m was the average dividend yield on stocks. Since the coefficient they found was 0.0009, and the average annual yield in their period of study (1936–1966) was 0.048, their estimate of γ_2 can be approximated by 0.0009/(0.048/12), or 0.225.

It has been assumed that the variance of the estimator of Γ is constant over time. If, due to the quarterly patterns in the incidence of dividend payments, the variances of the estimators are not constant, the equally weighted estimators in (50) are inefficient relative to an estimator that accounts for any seasonal pattern in the variance. Since dividends are usually paid once every quarter, it is possible to compute three independent estimates of Γ by averaging the coefficients obtained in only the first, only the second and only the third month of each quarter. These three estimates of Γ may be weighted by the inverse of their variances to obtain a more efficient estimator. This is provided in table 2. As can be seen from this table, the overall estimator for γ_2 is very close to the MLE estimate in table 1. The estimate of the standard error of $\hat{\gamma}_2$ is approximately the same for the first two months, but about 30 percent less for the third month.

Table 2

Pooled time series and cross section estimates of the after-tax CAPM: 1936–1977 (based on quarterly dividend patterns).[a]

Month of quarter	$\hat{\gamma}_0$	$\hat{\gamma}_1$	$\hat{\gamma}_2$
First	0.00748 (0.00234)	0.00770 (0.00379)	0.28932 (0.05418)
Second	0.00212 (0.00232)	0.00071 (0.00335)	0.23531 (0.05034)
Third	0.00134 (0.00248)	0.00399 (0.00453)	0.18940 (0.03534)
Overall estimate	0.00373 (0.00137)	0.00383 (0.00219)	0.22335 (0.02552)

[a] *Notes:* The after-tax version corresponds to the regression

$$\tilde{R}_{it}-r_{ft}=\gamma_0+\gamma_1\beta_{it}+\gamma_2(d_{it}-r_{ft}), \quad i=1,2,\ldots,N_t.$$

This regression is performed across securities in a given month t. Maximum likelihood estimation is used. The reported coefficients are arithmetic averages of the coefficients obtained over time (see note to table 1). The first three rows use the estimates from only the first, only the second and only the third months of each quarter. There are 168 months' estimates in each row. Standard errors are in parentheses under each coefficient. The 'overall estimates' use the estimates in each row above, weighted inversely by their variances.

It may be inappropriate to treat γ_2 as an intertemporal constant: in the absence of income related constraints on borrowing, γ_2 is a weighted average of individuals' marginal tax rates, which may have changed over time. Assume that investors have utility functions that display decreasing absolute risk aversion and non-decreasing relative risk aversion. Assume in addition that the distribution of wealth is independent of individual utility functions. Under these conditions the weight of the marginal tax rates of individuals in the higher tax brackets would be greater than that of individuals in lower tax brackets. Holland (1962) has shown that from 1936 to 1960 there was no pronounced upward trend in the marginal tax rates of individuals with taxable income in excess of $25,000. To examine empirically whether there is evidence of an upward trend in γ_2 over time, the maximum likelihood results are presented for six subperiods in table 3. The estimators of γ_2 for the subperiods were consistently positive and, except for the 1/1955 to 12/1961 period, significantly different from zero. There does not appear to be a trend to the estimate.

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[7] Consistency here is with respect to the overall estimator so one takes probability limits with respect to t and with respect to N_t. See section 3.

Table 3

Pooled time series and cross section estimates of the after-tax CAPM (for 6 subperiods).[a]

Period	$\hat\gamma_0$	$\hat\gamma_1$	$\hat\gamma_2$
1/36–12/40	−0.00287 (−0.52)	0.00728 (0.65)	0.335 (2.64)
1/41–12/47	0.00454 (1.44)	0.00703 (1.59)	0.408 (7.35)
1/48–12/54	0.00528 (2.77)	0.00617 (1.45)	0.158 (4.37)
1/55–12/61	0.01355 (5.62)	−0.00316 (−0.78)	0.018 (0.32)
1/62–12/68	−0.00164 (−0.47)	0.01063 (1.95)	0.171 (2.33)
1/69–12/77	0.00166 (0.47)	−0.00045 (−0.09)	0.329 (6.00)

[a] *Notes*: The after-tax version corresponds to the regression

$$\tilde R_{it} - r_{ft} = \gamma_0 + \gamma_1 \hat\beta_{it} + \gamma_2 (d_{it} - r_{ft}) + \tilde\varepsilon_{it}, \quad i = 1, 2, \ldots, N_t, \; t = 1, 2, \ldots, T.$$

Maximum likelihood estimation is used for the cross sectional regression. The reported coefficients are arithmetic averages of the coefficients estimated in the months in the period (see note to table 1). t-statistics are in parentheses under each coefficient.

It is possible that the positive coefficient on dividend yield is not a tax effect and that in non-ex-dividend months the effect completely reverses itself. If dividends are paid quarterly there would be twice as many non-ex-dividend months as ex-dividend months. Thus, a complete reversal would require a negative effect on returns in each non-ex-dividend month that is half the absolute size of the effect in an ex-dividend month. It is also possible that a stock's dividend yield is a proxy for the covariance of its return with classes of assets not included in the value weighted index of NYSE stocks used to calculate betas in the present study. If the coefficient on dividend yield is entirely due to the effects of omitted assets, the effect in non-ex-dividend months should be positive and the same size as the effect in ex-dividend months.

In order to test whether there is a reversal effect or a re-inforcing effect in non-ex-dividend months the following cross-sectional regression was estimated:

$$\tilde R_{it} - r_{ft} = \gamma_0 + \gamma_1 \hat\beta_{it} + \gamma_2 \{\delta_{it} d^0_{it} - r_{ft}\} + \gamma_3 \{(1 - \delta_{it}) d^0_{it}\} + \tilde\varepsilon_{it}, \qquad i = 1, 2, \ldots, N_t \tag{59}$$

where

$$d^0_{it} = D_{it}/P_{it-1},$$

if a dividend was announced prior to month t, to go ex-dividend in month t;

$$d^0_{it} = \hat D_{it}/P_{it-1}$$

otherwise; and

$$\delta_{it} = 1,$$

if month t was an ex-dividend month for a recurring dividend;

$$\delta_{it} = 0,$$

otherwise.

The variable $(1-\delta_{it})d^0_{it}$ is intended to pick up the effect of a dividend payment in subsequent, non-ex-dividend months. The variable $\delta_{it} d^0_{it}$ is identical to d_{it}, the variable used earlier. If dividends are paid quarterly, and γ_3 is negative and has an absolute value half the size of γ_2, then one can conclude that there is a complete reversal over the course of the quarter so that there is no net tax effect. On the other hand, if there is no reversal, γ_3 should not be significantly negative.

The MLE estimates of the coefficients in (52) are presented in table 4. The estimated value of $\hat\gamma_3$ is positive and significantly different from zero: this rejects the hypothesis that there is complete reversal.

The significant positive γ_3 is evidence of a re-inforcing effect in non-ex-dividend months. If the coefficient on dividend yield is entirely attributable

Table 4

Pooled time series and cross section test of the reversal effect of dividend yield: 1936–1977.[a]

$\hat\gamma_0$	$\hat\gamma_1$	$\hat\gamma_2$	$\hat\gamma_3$
0.00184 (1.29)	0.00493 (2.17)	0.32784 (7.31)	0.10321 (2.87)

[a] *Notes*: The regression performed in each month is

$$\tilde R_{it} - r_{ft} = \gamma_0 \gamma_1 \hat\beta_{it} + \gamma_2 \{\delta_{it} d^0_{it} - r_{ft}\} + \gamma_3 (1 - \delta_{it}) d^0_{it} + \tilde\varepsilon_{it}, \qquad i = 1, 2, \ldots, N_t, \; t = 1, 2, \ldots, T.$$

Maximum likelihood estimation is used for the cross-sectional regression. The reported coefficients are arithemetic averages of the coefficients in each month (see note to table 1). t-statistics are in parentheses under each coefficient.

to the effect of omitted assets γ_3 should be the same order of magnitude as γ_2. If the effect in ex-dividend months exceeds the combined effect in the subsequent two non-ex-dividend months γ_2 should be more than twice as large as γ_3. $\hat{\gamma}_2 - 2\hat{\gamma}_3$ is 0.1214 and has a t-value of 2.79. Thus, the effect in an ex-dividend month is more than twice the size of the effect in a non-ex-dividend month. This evidence suggests that the coefficient on dividend yield in ex-dividend months is not solely attributable to the effects of missing assets and that the effect in an ex-dividend month exceeds the combined effect in the subsequent two non-ex-dividend months. If the effect in non-ex-dividend months is asserted to be entirely due to the effect of missing assets, the difference $\hat{\gamma}_2 - \hat{\gamma}_3 = 0.225$ is an estimate of the tax effect. However, further theoretical work on the combined effects of transaction costs and personal taxes in a multi-period valuation framework is required to be able to understand the cause of a significant yield effect in non-ex-dividend months. For the present it seems reasonable to conclude that 0.225 is a lower bound estimate of the tax effect.[8]

The empirical evidence presented by Elton and Gruber (1970) on the ex-dividend behavior of common stocks suggests that the coefficient on the excess dividend yield term may be a decreasing function of yield. The theoretical rationale for this effect is that investors in low (high) tax brackets invest in high (low) dividend yield stocks: a possible explanation is that institutional restrictions on short sales results in a segmentation of security holdings according to investors' tax brackets. To provide a simple test of this 'clientele' effect, the coefficient c in (22) is hypothesized to be a linear decreasing function of the ith security's dividend yield. That is c, which is now dependent on i, is written c_i and given by

$$c_i = k - hd_i, \tag{60}$$

where $k, h > 0$, and the hypothesized relationship is

$$E(\tilde{R}_i) - r_f = a + b\beta_i + (k - hd_i)(d_i - r_f). \tag{61}$$

The econometric model is

$$\begin{aligned} \tilde{R}_{it} - r_{ft} = {} & \gamma_0 + \gamma_1\beta_{it} + \gamma_2(d_{it} - r_{ft}) \\ & + \gamma_4 d_{it}(d_{it} - r_{ft}) + \tilde{\varepsilon}_{it}, \qquad i = 1, 2, \ldots, N_t, \end{aligned} \tag{62}$$

where the estimate of k is γ_2 and that for $-h$ is γ_4. The maximum likelihood approach is used in each cross sectional regression, and the pooled estimates presented in table 5.

Table 5

Pooled time series and cross section test of the clientele effect: 1936–1977.[a]

$\hat{\gamma}_0$	$\hat{\gamma}_1$	$\hat{\gamma}_2$	$\hat{\gamma}_4$
0.00365 (2.65)	0.00425 (1.88)	0.336 (6.60)	−6.92 (−1.70)

[a] *Notes*: This corresponds to the following cross-sectional regression in each month:

$$\tilde{R}_{it} - r_{ft} = \gamma_0 + \gamma_1\beta_{it} + \gamma_2(d_{it} - r_{ft}) + \gamma_4 d_{it}(d_{it} - r_{ft}) + \tilde{\varepsilon}_{it}, \qquad \begin{aligned} i &= 1, 2, \ldots, N_t, \\ t &= 1, 2, \ldots, T. \end{aligned}$$

Maximum likelihood estimation is used for the cross-sectional regression. The reported coefficients are arithmetic averages of the coefficients in each month (see note in table 1). t-statistics are in parentheses under each coefficient.

Consistent with the existence of a clientele effect, the maximum likelihood estimate of γ_2 is significantly positive and that of γ_4 is significantly negative, both at the 0.05 level. The magnitude of $\hat{\gamma}_4$ suggests that for every percentage point in yield the implied tax rate for ex-dividend months declines by 0.069. For example, if the annual yield was 4 percent, the implied tax rate would be approximately 0.336–6.92 (0.04/4) = 0.268, assuming quarterly payments. The empirical evidence supporting a clientele effect suggests the need for further research that rigorously derives an equilibrium model that incorporates institutional restrictions on short sales, along with personal taxes.

5. Conclusion

In this paper, an after-tax version of the Capital Asset Pricing Model is derived. The model extends the Brennan after-tax version of the CAPM to incorporate wealth and income related constraints on borrowing along with a progressive tax scheme. The wealth related constraint on borrowing causes the expected return on a zero-beta portfolio (having a dividend yield equal to the riskless rate) to exceed the riskless rate of interest. The income related constraint tends to offset the effect that personal taxes have on the

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[8] It might be argued that the persistent dividend effect is due to the fact that the dividend variable used incorporates knowledge of the ex-dividend month, which the investor may not have. To test whether this introduces spurious correlations between yields and returns the variable (d^*_{it}/3) was used in the cross-sectional regression (23). The variable does not incorporate knowledge of the ex-dividend month except when it was announced. It is divided by 3 so as to distribute the yield over the three months of every quarter. The overall estimate (1936–1977) of γ_2 is 0.39, with a t-value of 3.57; one cannot attribute the earlier results due to knowledge of ex-dividend months. This is consistent with the Rosenberg and Marathe (1978) study. Note that this estimate is lower than the total effect in table 4, which is $\hat{\gamma}_2 + 2\hat{\gamma}_3 = 0.52$. The lower estimate is attributable to constraining the coefficient on yield to be the same in non-ex-dividend months and ex-dividend months.

equilibrium structure of share prices. The equilibrium relationship indicates that the before tax expected return on a security is linearly related to its systematic risk and to its dividend yield. Unrestricted supply adjustments in corporate dividends would result in the before tax version of the CAPM, in a world where dividends and interest are taxed as ordinary income. If income related constraints are non-binding and/or corporate supply adjustments are restricted, the before tax return on a security would be an increasing linear function of its dividend yield.

Unlike prior tests of the CAPM that used grouping or instrumental variables to correct for measurement error in beta, this paper uses the sample estimate of the variance of observed betas to arrive at maximum likelihood estimates of the coefficients in the relations tested. Unlike prior studies of the effect of dividend yields on asset prices, which used average monthly yields as a surrogate for the expected yield in both ex-dividend and non-ex-dividend months, the expected dividend yield based on prior information is used for ex-dividend months and is set to zero for other months.

The results indicate that there is a strong positive relationship between before tax expected returns and dividend yields of common stocks. The coefficient of the dividend yield variable was positive, less than unity, and significantly different from zero. The data indicates that for every dollar increase in return in the form of dividends, investors require an additional 23 cents in before tax return. There was no noticeable trend in the coefficient over time. A test was constructed to determine whether the effect of dividend yield reverses itself in non-ex-dividend months, and this hypothesis was rejected. Indeed, the data indicates that the effect of a dividend payment on before tax expected returns is positive in both the ex-dividend month and in the subsequent non-ex-dividend months. However, the combined effect in the subsequent non-ex-dividend months is significantly less than the effect in the ex-dividend month.

Evidence is also presented for a clientele effect: that is, that stockholders in higher tax brackets choose stocks with low yields, and vice versa. Further work is needed to derive a model that implies the existence of such clienteles and to test its implications.

Appendix A

In this appendix it is shown that the estimator for Γ, given by

$$\hat{\Gamma}_t=(X_t'\Omega_t^{-1}X_t)^{-1}X_t'\Omega_t^{-1}\tilde{R}_t,$$

using data in period t, is the Generalized Least Squares (GLS) estimator for Γ under the assumption of the single index model. It was shown in section 3 of the paper that each estimated coefficient corresponds to the realized excess return of a specific portfolio. Suppose portfolio weights $\{h_{it}, i=1,2,\ldots,N_t\}$ are chosen in each period, for investment in assets $i=1,2,\ldots,N_t$. Using eq. (23) from the text the excess return on such a portfolio is given by

$$\sum_i h_{it}(\tilde{R}_{it}-r_{ft})=\gamma_0\Big(\sum_i h_{it}\Big)+\gamma_1\Big(\sum_i h_{it}\hat{\beta}_{it}\Big)$$
$$+\gamma_2\Big[\sum_i h_{it}(d_{it}-r_{ft})\Big]+\sum_i h_{it}\tilde{\varepsilon}_{it}.$$

The expected excess return on this portfolio is

$$\begin{aligned}
&\gamma_0 \quad \text{if} \quad \sum_i h_{it}=1, \quad \sum_i h_{it}\beta_{it}=0, \quad \sum_i h_{it}(d_{it}-r_{ft})=0,\\
&\gamma_1 \quad \text{if} \quad \sum_i h_{it}=0, \quad \sum_i h_{it}\beta_{it}=1, \quad \sum_i h_{it}(d_{it}-r_{ft})=0,\\
&\gamma_2 \quad \text{if} \quad \sum_i h_{it}=0, \quad \sum_i h_{it}\beta_{it}=0, \quad \sum_i h_{it}(d_{it}-r_{ft})=1.
\end{aligned}$$

Under the assumption of the single index model, the variance of the return on such a portfolio is, from eq. (36) in the text,

$$\operatorname{var}\Big(\sum_i h_{it}(\tilde{R}_{it}-r_{ft})\Big)=\Big(\sum_i h_{it}\beta_{it}\Big)^2\sigma_{mt}+\sum_i h_{it}^2 s_{it}.$$

Suppose one wishes to minimize the variance of the excess return on such a portfolio subject to the condition that the expected excess return on the portfolio is, in turn, γ_0, γ_1 or γ_2. This condition enforces $\sum_i h_{it}\beta_{it}$ to be either zero or unity. Hence minimizing

$$\Big(\sum_i h_{it}\beta_{it}\Big)^2\sigma_{mm}+\sum_i h_{it}^2 s_{it},$$

subject to the unbiasedness condition, is equivalent to minimizing

$$\sum_i h_{it}^2 s_{it},$$

the 'residual risk' of the portfolio subject to the unbiasedness condition. Thus, one is using the residual risk of the portfolio as the minimand and enforcing the unbiasedness condition. By construction, Ω_t is the diagonal matrix of the residual variances s_{it}, and by construction, $\hat{\Gamma}_t$ is linear and unbiased for Γ. The variance of the estimator has been minimized under the single index model. But by the Gauss–Markov theorem, the GLS estimator [using the full matrix V_t in (36) as the variance–covariance matrix] is the unique minimum variance estimator among linear and unbiased estimators. Hence $\hat{\Gamma}_t$ is the GLS estimator for Γ, under the assumption of the single index model.

Appendix B

In this section, it is shown that under certain conditions, $\hat{\Gamma}_t$ in (49) is the maximum likelihood estimator for Γ in period t.

First, note that there are no errors in the measurement of β, then if security returns are multivariate normal, then the GLS estimator in (37) is also the maximum likelihood estimator [see Johnston (1972)].

Suppose now there are errors in the measurement of β. Then one can use the transformation P defined in (39), with $\phi = s_i/\sigma_j$, to write the model as

$$\tilde{R}^*_{it} = \gamma_0 p^*_{it} + \gamma_1 \beta^*_{it} + \gamma_2 d^*_{it} + \tilde{\varepsilon}^*_{it}, \tag{B.1}$$

and the observed beta as

$$\hat{\beta}^*_{it} = \beta^*_{it} + \tilde{v}^*_{it}, \tag{B.2}$$

where

$$\tilde{R}^*_{it} = (\tilde{R}_{it} - r_{ft})/s_i, \quad p^*_{it} = 1/s_i, \quad \beta^*_{it} = \beta_{it}/s_i,$$
$$\hat{\beta}^*_{it} = \hat{\beta}_{it}/s_i, \quad d^*_{it} = (d_{it} - r_{ft})/s_i, \quad \tilde{\varepsilon}^*_{it} = \tilde{\varepsilon}_{it}/s_i,$$

and

$$\tilde{v}^*_{it} = \tilde{v}_{it}/s_i.$$

Define the variable

$$m_{xy} = \sum_{i=1}^{N_t} x_{it}\, y_{it} \Big/ N_t, \tag{B.3}$$

as the raw co-moment for a given sequence $\{(x_{it}, y_{it}),\ i = 1, 2, \ldots, N_t\}$. Then from (B.1) and (B.2),

$$m_{R^*p^*} = \gamma_0 m_{p^*p^*} + \gamma_1 m_{\beta^*p^*} + \gamma_2 m_{d^*p^*} + m_{\varepsilon^*p^*}, \tag{B.4}$$

$$\begin{aligned} m_{R^*\hat{\beta}^*} = {} & \gamma_0[m_{p^*\beta^*} + m_{p^*v^*}] + \gamma_1[m_{\beta^*\beta^*} + m_{v^*\beta^*}] \\ & + \gamma_2[m_{d^*\beta^*} + m_{d^*v^*}] + m_{\varepsilon^*\beta^*} + m_{\varepsilon^*v^*}, \end{aligned} \tag{B.5}$$

$$m_{R^*d^*} = \gamma_0 m_{p^*d^*} + \gamma_1 m_{\beta^*d^*} + \gamma_2 m_{d^*d^*} + m_{\varepsilon^*d^*}, \tag{B.6}$$

$$m_{\hat{\beta}^*p^*} = m_{\beta^*p^*} + m_{v^*p^*}, \tag{B.7}$$

$$m_{\hat{\beta}^*\hat{\beta}^*} = m_{\beta^*\beta^*} + 2m_{\beta^*v^*} + m_{v^*v^*}, \tag{B.8}$$

$$m_{d^*\hat{\beta}^*} = m_{d^*\beta^*} + m_{d^*v^*}. \tag{B.9}$$

In these six equations, take expectations and use the fact that

$$\begin{aligned} & E(\tilde{v}^*_{it}) = E(\tilde{\varepsilon}^*_{it}) = 0, \\ & E(\tilde{v}^*_{it}\tilde{\varepsilon}^*_{it}) = 0, \\ & E(\tilde{v}^*_{it}\tilde{v}^*_{it}) = E[\tilde{v}^2_{it}/\sigma^2_i] = 1. \end{aligned} \tag{B.10}$$

The left-hand side of each of (B.4) through (B.9), after taking expectations, corresponds to the population co-moments of the subscripted variables.

If v_{it} and ε_{it} are independently normally distributed, then the corresponding sample moment is a maximum likelihood estimator of the population parameter. Replace these expected values by their maximum likelihood estimates. There are now six equations for the six unknown parameters γ_0, γ_1, γ_2, $m_{\beta^*\beta^*}$, $m_{\beta^*d^*}$, and $m_{\beta^*p^*}$. They can be solved for the coefficients of interest from the following 'normal' equations, which are in terms of observed sample estimates.

$$m_{R^*p^*} = \gamma_0 m_{p^*p^*} + \gamma_1 m_{\hat{\beta}^*p^*} + \gamma_2 m_{d^*p^*}, \tag{B.11}$$

$$m_{R^*\hat{\beta}^*} = \gamma_0 m_{p^*\hat{\beta}^*} + \gamma_1 (m_{\hat{\beta}^*\hat{\beta}^*} - 1) + \gamma_2 m_{d^*\hat{\beta}^*}, \tag{B.12}$$

$$m_{R^*d^*} = \gamma_0 m_{p^*d^*} + \gamma_1 m_{\hat{\beta}^*d^*} + \gamma_2 m_{d^*d^*}, \tag{B.13}$$

and are themselves maximum likelihood [see Mood et al. (1974, p. 285)].

The solution to this set gives estimates $\hat{\gamma}_{kt}$, $k = 0, 1, 2$, which are embodied in (49). They are functions of maximum likelihood estimates. Note that in addition to (B.4) through (B.9), one could write an equation for $m_{R^*R^*}$,

$$\begin{aligned} m_{R^*R^*} = {} & \gamma_0^2 m_{p^*p^*} + \gamma_1^2 m_{\beta^*\beta^*} + \gamma_2^2 m_{d^*d^*} + 2\gamma_0\gamma_1 m_{p^*\beta^*} \\ & + 2\gamma_0\gamma_2 m_{p^*d^*} + 2\gamma_1\gamma_2 m_{\beta^*d^*} + 2\gamma_0 m_{p^*\varepsilon^*} + 2\gamma_1 m_{\beta^*\varepsilon^*} \\ & + 2\gamma_2 m_{d^*\varepsilon^*} + m_{\varepsilon^*\varepsilon^*}. \end{aligned} \tag{B.14}$$

If we take expectations, using (B.10) and the fact that

$$E(m_{\varepsilon^*\varepsilon^*})=E\left(\sum_{i=1}^{N_t}\frac{\tilde{\varepsilon}_{it}^2}{s_i^2N_t}\right)$$

$$=\frac{1}{N_t}\sum_{i=1}^{N_t}\frac{E(\tilde{\varepsilon}_{it}^2)}{s_i^2}=\frac{1}{N_t}\cdot N_t\phi^2=\phi^2,$$

we have

$$E(m_{g^*g^*})=\gamma_0^2m_{r^*r^*}+\gamma_1^2m_{\beta^*\beta^*}+\gamma_2^2m_{d^*d^*}+2\gamma_0\gamma_1m_{r^*\beta^*}$$
$$+2\gamma_0\gamma_2m_{r^*d^*}+2\gamma_1\gamma_2m_{\beta^*d^*}+\phi^2, \tag{B.15}$$

where ϕ^2 is assumed known.

By writing down the likelihood function and maximizing it for an analogous case, Johnston (1963) demonstrates a maximum likelihood estimator over the parameter space (γ_0, γ_1, γ_2, β_{it} for $i=1,2,\dots,N_t,\phi$). This has the undesirable characteristic that the parameter space grows with the sample size.[9] It turns out in our problem that ϕ is assumed known. If this ϕ satisfies (B.15), when in (B.15) we use the sample co-moment estimates for the population parameters, then Johnston's M.L. procedure coincides with the solution to (B.11) through (B.13). Whereas our estimators are linear in the returns and can be interpreted as portfolios, the expanded parameter space estimator in Johnston is non-linear and has no such analog to theory. Thus conditional on ϕ^2 coinciding with the residual variation in the sample, using our estimates, the estimator in (49) is a maximum likelihood estimator over the parameter space (γ_0, γ_1, γ_2).

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[9] See Kendall and Stuart (1973, especially pp. 62 and 402).

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The Effects of New Equity Sales Upon Utility Share Prices

By RICHARD H. PETTWAY*

Public knowledge of a forthcoming sale of new equity by a utility company often precipitates a decline in the market price of that equity and continues to impact share prices after the sale has taken place. Such price changes are part of the real cost of selling the new issue. The market pressure costs of new equity capital have been the subject of much speculation in utility rate cases, but have received little detailed study. The author of this article has made such a study and here presents a quantitative analysis of price-return movements encountered by utility stocks in the market, after first defining market pressure as it applies particularly to the regulated utility environment. He concludes that investors clearly view a new sale of equity shares with disfavor and regulators, as well as company managements, should be concerned with the resultant decline in utility stock prices.

WHEN a public utility decides to sell a new issue of equity capital and publicly discloses this information, share prices are thought to decline. Often these selling firms ask for an adjustment to their costs of equity capital for the effects of this market pressure upon share prices. The subsequent argument and debate about the magnitude of an adjustment for market pressure at rate hearings is well known.

The electric utility industry has been one of the largest issuers of new equity shares during the past twenty-five years. Therefore, it is surprising that there has not been much more research to determine the magnitude of market pressure of these numerous new equity sales in this industry. The objective of this article is to report on the results of an analysis of 368 equity sales by 73 different electric utilities from January 1, 1973, through December 31, 1980. The analysis will measure two effects of new common equity sales upon share prices: market pressure and sales effect. Specifically, this article will determine the magnitude of market pressure defined as the effect of the sale upon share prices which reduces the funds received by the issuing company at the sale date, and will determine the size of the sales effect defined as the total effect of the sale upon share prices from before the announcement until after the sale.

There have been studies into the size of market pressure defined as a temporary price decline in share values when a large block of shares is said to be "overhanging" the market. However, most of this research concentrates upon the price effects of new issues of industrial companies sold in the primary markets or of large blocks of existing stock sold in the secondary market [1, 2, 4, 5, 6, 9].** This literature defines market pressure as the amount of recovery in market prices *after* the issue has been sold. A review of this literature indicates either no market pressure existing in large block trades of outstanding shares, or only a small amount of pressure associated with primary market sales of new issues.

Under utility regulation, the concern is with a different definition of market pressure. Market pressure in the public utility industry is generally defined as the decline in prices *while* the issue is still overhanging, *before* it is sold. The main question is how much did the utility's stock decline in the secondary market associated with the sales announcement to the date of sale. This decline is a real cost of selling the new issue as the firm will receive only the reduced price at the sales date. An

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**Numbers in brackets refer to the list of references at the end of the article.

article by Bowyer and Yawitz (BY) [3] measured the decline in share prices between the announcement date and the sales date of 278 new equity issues of public utilities from 1973 through 1976. But that research had some obvious problems which are corrected by this study.

The first problem with BY is their definition of the announcement date (AD). They defined this critical AD as the initial Securities and Exchange Commission filing date of the issue prospectus. This may not be the true AD as often public utilities make prior announcements of their new issues to state public service commissions, to investors in the *Irving Trust Calendar,* to underwriters, or to financial analysts much earlier than the SEC filing date. This study redefines the critical announcement date through a detailed questionnaire survey of electric utility companies. Further, an analysis of price changes prior to the established announcement date for each issue will be made to determine the actual impact of new equity sales upon share prices. It is very important to measure the complete decline in market prices associated with the information about the forthcoming sale of new equity shares.

Another problem with the BY study concerns its authors' use of the Dow-Jones utility index to measure differential declines in share prices and returns. The use of this index is flawed for at least four reasons. First, the number of companies included is small, 15 firms, and only 11 are electric companies; whereas four are gas transmission and distribution companies. The inclusion of the gas companies raises serious questions concerning the similarities of risks between electric utilities tested and the companies which make up their comparison index. Second, their index does not capture the dividend portion of the return and thus only measures the changes in prices without adjusting for dividends paid. In the electric power industry, the dividend yields tend to be a high portion of the total return and the omission of dividends could impart a bias to the index. Third, if there is evidence of market pressure in new sales of equity shares by utilities as BY found, then it is certain that this market pressure is contained also in share prices of Dow-Jones utility index firms when they sold new equity shares. The effect of using an index which contains market pressure to measure the size of market pressure of a particular firm which sold new equity naturally will understate the true amount of market pressure which is present. Fourth, if utilities are impacted differently from unregulated firms, there may be an additional "industrial effect" which will not be observed by looking only at other utilities rather than a broadly based comparison index of share prices and returns.

Finally, there are some technical problems with the way that BY measured the decline in stock returns or market pressure. These problems concern the use of average residual returns versus a more correct measure (geometric residual returns) and the way BY handled underwriting costs.

Data

A questionnaire survey was conducted of the 93 New York Stock Exchange-listed, investor-owned electric utilities from which 73 usable company replies were obtained for a response rate of over 78 per cent. Each company provided all identifiable costs and critical dates for each new equity capital sale made by the firm from January 1, 1973, through December 31, 1980. The survey results contain data on 368 actual equity sales over the eight-year survey period. The data represent more than five new equity sales per company on average over the study period. The size of these equity sales ranged from $4.7 million to $198 million with a mode sale value in a range between $30 and $49.9 million per issue. The frequency of the issues over the eight years of the survey shows that 1975 was the most popular year followed by 1976 and 1980. Yet, the individual year variation was not dramatic as the range over the eight years was from a low of 37 issues in 1974 to a high of 64 issues in 1975. Eighty-two per cent of the sales were through negotiated underwriting, 16 per cent through competitive bidding, and 2 per cent through rights offerings. See [7] for a thorough review of the data and details on the flotation costs of these issues.

Data on realized share returns including dividends for each company were obtained on a daily basis for a period which began sixty-five trading days before the announcement date and ended thirty trading days after the sale date (SD). Thus, company returns were obtained from a fixed period prior to the AD through a fixed period after the SD for each issue. It is best to think of these data sets as 368 separate arrays of returns. Because the interim time period between the AD and the subsequent SD varied for each issue, the number of return observations in each array is different. Each collected array of returns is unique to the particular announcement and issue dates and is not impacted by other equity sales of the same company.

Methodology

In order to control for risk, to adjust for movements in general prices and returns, and to reduce estimating bias, a two-stage regression process was used to measure the effects of new equity sales upon share returns and prices. First, during the estimating period, the market regression model (1) was applied to a firm's daily equity returns over a uniform estimating period which began sixty-five trading days prior to the AD and ended fifteen days before the AD for each issue. The market regression model asserts that:

$$\tilde{R}_{i,t} = \hat{a}_i + \hat{B}_i\tilde{R}_{m,t} + \tilde{e}_{i,t} \qquad (1)$$

where $\tilde{R}_{i,t}$ is the daily return including dividends of the issuing company for equity issue i — i.e., one to 368 — at time t; where daily returns of the issuing company concerning issue i are defined as $(P_{i,t} + D_{i,t} - P_{i,t-1}) / (P_{i,t-1})$; P is the price and D is the dividend per share; $\tilde{R}_{m,t}$ is the daily return at time t on a market portfolio for comparison; $\hat{a}_i$ and $\hat{B}_i$ are the estimated parameters of the market model; and $\tilde{e}_{i,t}$ is the error term of the model.

In order to make comparisons, an electric utility portfolio index of returns was created over the period January 1, 1973, through December 31, 1980, containing an equal investment in each of 73 electric companies which sold equity during the period. It is a daily returns index including dividends and provides the average return for each day on a portfolio consisting of an equal dollar investment in each of the 73 electric utilities.

Thus, the first stage uses an estimating period of fifty trading days, approximately two and one-half months, to determine the parameters of the market regression model. The second stage then applies these estimated parameters to the returns series during the subsequent test period after the estimating period in each array in order to calculate the expected returns for each company on each issue i using:

$$\hat{R}_{i,t} = \hat{a}_i + \hat{B}_i \hat{R}_{m,t} \qquad (2)$$

where $\hat{R}_{i,t}$ is the expected return for the issuing company associated with issue i at time t. Then residual returns during the test period are obtained by comparing the actual versus the predicted returns using:

$$\bar{R}_{i,t} - \hat{R}_{i,t} = \bar{u}_{i,t} \qquad (3)$$

where $\bar{u}_{i,t}$ is the daily residual return of the issuing company for issue i at time t.

In order to display these residual returns properly, a decision must be made of how to combine the individual company residuals centered on a common date during the test period. The method of combining residuals used by Bowyer and Yawitz is called cumulative average residual or CAR. This method would find the average residual return of all issues on a specific day relative to the common AD or SD and would accumulate these averages over the period in an additive way. A different way of combining residual returns, average geometric residual return (AGRR), was chosen for this study. It is a theoretically better measure of residual returns over time than CAR. AGRR does not use the average residual returns on a specific date but takes the individual issue residual ($\bar{u}_{i,t}$) from (3) and converts it into a price relative for each t and then forms a geometric return series by multiplying successive price relatives from fourteen days prior to AD to the end of the residual data for each company using formula (4). Thus, a geometric return series which precisely measures the change in investment worth for each individual issue is created. At any point in time relative to the common dates, AD and SD, the AGRR was determined as the numeric average of the geometric returns up to that point in time of all issues using formula (5).

$$GRR_{i,T} = \prod_{t=1}^{T} (1 + u_{i,t}) \qquad (4)$$

$$AGRR_T = \sum_{i=1}^{N} GRR_{i,T}/N \qquad (5)$$

where i is the issue number, t is time, T is the specific point in time (T=1, 2, 3, . . . total number of observations in the test period which was from fourteen days before the AD until thirty trading days after the SD), and N is the number of issues. For further details concerning the specifics of the methodology employed see [8].

In observing the pattern of these residuals over the test period, it is important to be able to use common definitions to describe their movements. "Market pressure" is defined as the decline of share prices and average geometric residual returns from fourteen days before the AD until the SD. "Sales effect" is defined as the change in share prices and AGRRs from fourteen days before the AD until thirty trading days after the SD. This sales effect would be the net change over the entire test period from before the announcement until well after the sale.

Price-Return Movements

Because the number of days between the AD and the SD are not identical for each issue, arrays of residual returns had to be centered on two separate common dates. The first common date is the AD and then data are centered on the common SD. To begin measuring any price effects of these new equity sales, the study first observed movements in residual returns when the data are centered on the common AD.

Common Announcement Date

Figure 1 illustrates the AGRRs derived from the use of the electric utility market index of returns for comparison.[†] The derived residuals are accumulated for 128 days starting fourteen days before the announcement date. All issues are centered on the AD. The trend of the AGRRs are clearly downward and below one during the entire span of 128 days. The downward trend is most noticeable immediately before and around the AD and is then followed by a period of relative stability. During this initial decline, share prices had fallen between one per cent and 1.4 per cent. The downward trend resumes again beginning about sixty-seven days after the AD. The latter downward trend may be associated with the SD, but since these data are centered on the AD, the SD did not occur at a common point in time in the data. Further, because SD is not a common point in the data, the amount of market pressure cannot be measured from the data in this format.

Panel 1 of the accompanying table contains statistical summaries of changes in AGRRs over the entire period shown in Figure 1. It is clear from the data that the change over the 128-day period centered on the AD was a negative 3.019 per cent, indicating a sales effect of this

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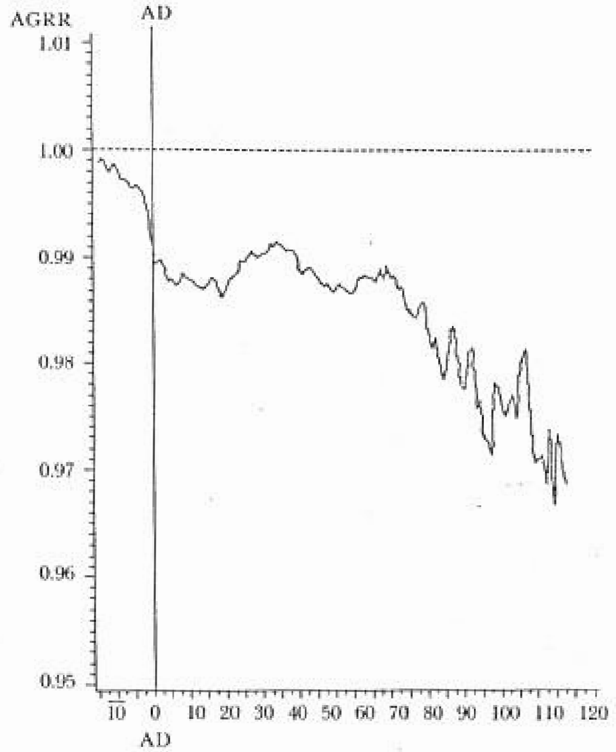
[†] If there were no effects of new equity sales upon electric utilities which sold new shares, then the AGRRs shown on Figure 1 would be very close to one over time. A detrimental effect and a relative decline in share prices would be represented as a decline in AGRRs below one. A favorable effect would be represented as an increase in AGRRs. Also notice that the x-axis displays time with negative numbers as days before the AD and positive numbers as days after the AD. The AD, or centering date, is designated as zero.

FIGURE 1
AGRR CENTERED ON ANNOUNCEMENT DATE
(UTILITY INDEX)



magnitude. Thus, comparing the returns over the same time period of an electric utility which sold new equity shares with returns of a portfolio of electric companies which also sold equity during the eight-year study period, there appears to have been a substantial and significant decline or sales effect of −3 per cent. There appear to be two periods of rapid declines, one just before and around the AD and another which appears to begin about sixty-seven days after the AD. Measuring the initial decline during a period from fourteen days before the AD to fourteen days after the AD, the specific decline was −1.2 per cent. This first major decline which begins before the AD suggests that the market was either anticipating the new equity sale or obtaining information about the new equity sale just prior to the public announcement.

EFFECTS OF NEW EQUITY SALES OF UTILITIES UPON SHARE PRICES
CHANGES IN THE AVERAGE GEOMETRIC RESIDUAL RETURNS

368 New Equity Issues of 73 Electric Utilities from
January 1, 1973, through December 31, 1980

Using the Utility Index

	Panel 1	*Panel 2*	*Panel 3*
Measurements	Centered on AD (Sales Effect)	Centered on SD (Sales Effect)	Centered and Ending on SD (Market Pressure)
Change over the Period	−3.019%	−2.041%	−1.893%
Length of Period (Days)	128	147	104
Change from −14 AD to +14 AD	−1.170%		
Length of Period (Days)	29		

Because of the decline in these residuals, it is clear that the market considered the potential new equity sale as detrimental to the future prospects of the current equity holders of the selling firm. Since the decline begins before the AD, this article measures more precisely the *total* decline in share prices than did the work of Bowyer and Yawitz.

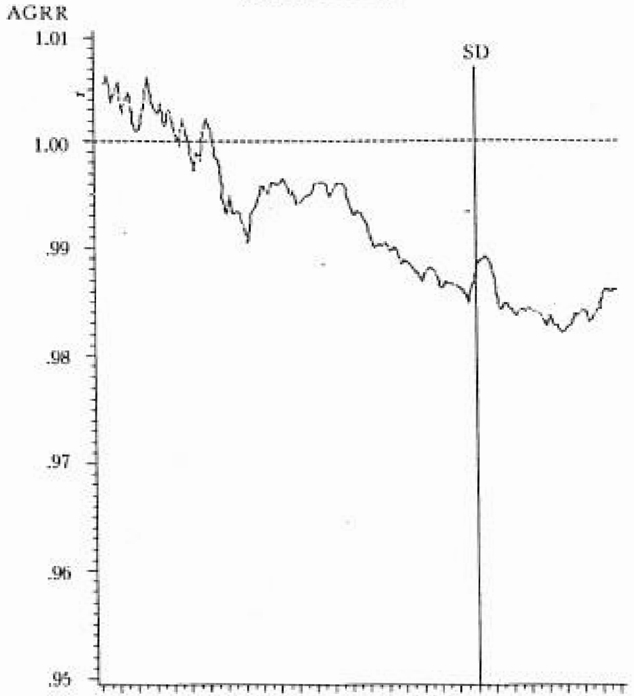
Common Sales Date

Figure 2 shows the AGRRs using the electric utility returns index for comparison with all issues centered on the SD. This plot is clearly one whose trend is also downward across the entire time period, although it appears not to begin its major decline until eighty-five to ninety days prior to the SD.

In Panel 2 of the table are found the summary statistics describing the magnitudes of the AGRRs shown on Figure 2. The changes or sales effect during the period from fourteen days before the AD to after the SD over 147 days was −2.041 per cent.

Panel 3 of the table contains the magnitudes of AGRRs shown on Figure 2 but stopping at the SD. This decline in relative share prices and returns, called market pressure, is caused by the equity sale and is the discount required to sell the new issue. These costs of new equity issues were 1.893 per cent on average. Thus, market prices of shares of electric utilities which sold new equity declined by about 1.9 per cent from before the AD until the SD over 104 days. This is the decline in price that the firm did not receive when it sold new equity shares at the SD and is the market pressure of the new equity issue.

FIGURE 2
AGRR CENTERED ON SALE DATE
(UTILITY INDEX)



Summary and Conclusions

When electric utilities sold new equity shares between January 1, 1973, and December 31, 1980, the share prices of these companies were depressed downward because of the sale. This downward movement or market pressure measured from before the announcement date to the sales date of the new issue was −1.9 per cent when compared with returns of other electric utilities which sold new equity regularly. Further, a sales effect ranging from −3 per cent to −2 per cent was found over the period from before the announcement date until after the sales date depending upon whether the data were centered on the AD or on the SD.

These averages are conservative and the minimum estimated average declines as they were derived from using a return index of comparison (electric utility) which itself contains the effects of market pressure. Further, the use of another index of return for comparison which was composed of regulated and unregulated firms would substantially raise these average costs. (In fact, if the comparison were to be made against the return of all equities listed on the New York and American stock exchanges over the same time period, the average estimate for market pressure would rise to −3 per cent and the average estimates for sales effect would rise to −4.4 per cent centered on the AD to −3.6 per cent centered on the SD. See [8] for details.)

The sizeable sales effect over the entire period from before the announcement date to after the sales date using the portfolio of electric companies for comparison provides direct evidence that share prices of electric utilities which sell new equity continue to decline after the sale has taken place. This condition may be explained as the impact of other factors than market pressure alone upon share prices. Perhaps some of these factors are due to the investors' perceptions of increased dilution problems caused by regulatory lag and regulatory risk associated with these public utilities not being allowed a rate of return on new equity equal to the investors' required rate of return over the eight-year survey period.

Even though the exact causes are not known precisely, it is definitely clear that investors view the new sale of equity shares with disfavor and that the new equity sale results in a substantial decline in equity prices. Public utility regulators should be concerned with these impacts of new equity sales upon share prices and returns and attempt to make proper adjustments in the allowed rate of return to offset or eliminate these effects in the future.

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Utilities Raise Their Capital Appropriations

The nation's investor-owned utilities appropriated $7.2 billion (seasonally adjusted) for new plant and equipment in the final quarter of 1983, up 25 per cent over the unusually low figure recorded in the third quarter, the Conference Board reported in April. Both the gas and electric utilities shared in this fourth-quarter gain. (Capital appropriations are authorizations to spend money in the future for new plant and equipment. Appropriations are the first step in the capital investment process, preceding the ordering of equipment, the letting of construction contracts, and finally the actual expenditures. Appropriations are considered to be a leading indicator for capital spending.)

Electric utility appropriations rose to $5.8 billion in the fourth quarter, their first quarterly increase since the third quarter of 1982. Cancellations of previously approved projects were widespread, however, amounting to $2.7 billion in the final quarter of 1983.

Gas utility appropriations climbed to $1.4 billion in the fourth quarter, a 68 per cent jump over the third quarter. It was the highest quarterly total recorded last year. For the full year, however, the gas utilities appropriated only $4.4 billion, down by a third from 1982, and canceled a record $1.3 billion worth of earlier-approved projects.

Actual capital spending by the investor-owned utilities fell to $8.3 billion in the fourth quarter, an 8 per cent dip from the third quarter. The electric utilities accounted for all of the fourth-quarter decline. For 1983 as a whole, the electric utilities spent a record $32.2 billion on new plant and equipment, up 3 per cent over 1982. Gas utility expenditures amounted to $3.5 billion in 1983, down 30 per cent from 1982.

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ALTERNATIVE METHODS FOR RAISING CAPITAL

Rights Versus Underwritten Offerings

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This paper provides an analysis of the choice of method for raising additional equity capital by listed firms Examination of expenses reported to the SEC indicates that rights offerings involve significantly lower costs, yet underwriters are employed in over 90 percent of the offerings The underwriting industry, finance textbooks, and corporate proxy statements offer several justifications for the use of underwriters However estimates of the magnitudes of these arguments indicate that they are insufficient to justify the additional costs of the use of underwriters The use of underwriters thus appears to be inconsistent with rational, wealth-maximizing behavior by the owners of the firm The paper concludes with an examination of alternate explanations of the observed choice of financing method

1. Introduction and summary

In this paper I examine an apparent paradox Based on a comparison of costs, simple finance theory suggests that listed firms should use rights offerings to raise additional equity capital, rather than employing underwriters Yet the majority of firms choose underwritten offerings, rather than rights offerings

In an underwritten offering, underwriters contract to purchase shares from the issuing firm at a price usually set within 24 hours of the offering, and then resell the shares to the public In a rights offering the shareholder receives a right from the firm giving him the option to purchase new shares for each share owned In section 2, I show that with the proper specification of the subscription price, the proceeds of a rights offering are identical to the proceeds of an underwritten offering

Not identical, however, are costs In section 3, I examine the out-of-pocket costs of underwritten and rights offerings reported to the Securities and Exchange

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Commission for issues registered under the Securities Act of 1933 between January 1971 and December 1975. Rights offerings are significantly less expensive. I also examine additional out-of-pocket expenses associated with both types of offerings. These include extras (options sold to underwriters), unreported expenses such as employee compensation, and the costs of rights offerings imposed directly on the owners of the firm. With these costs considered, I find rights offerings still are less expensive than underwritten offerings.

It has been suggested that selling efforts by underwriters raise stock prices while rights offerings lower them. In section 4 I study price behavior around the date of the offering. I find no empirical support for the hypothesis that abnormal positive returns are associated with underwritten offerings. Moreover, underwriters appear to set the offer price below the market value of the stock by at least 0.5 percent. While stock prices fall when rights are issued, the fall equals the market value of the rights received by the shareholder. Examination of the total rate of return to shareholders around the offer date indicates no abnormal returns; thus the wealth of the firm's owners is not reduced by a rights offering.

Section 5 provides an examination of other benefits presumed to accrue from the use of underwriters. Finance texts, corporate proxy statements, and the underwriting industry itself claim the existence of advantages in timing, insurance, distribution of ownership and from future consulting advice. My estimates of the magnitudes of the costs and benefits associated with these arguments are not sufficient to outweigh the lower costs of rights offerings as a means of raising capital. I can find no differential legal liability associated with the use of rights offerings which might explain the observed use of underwriters. Furthermore, there is no apparent difference in the sets of firms employing the alternative methods which could attribute the reported cost differences to selection bias.

In section 6, I offer a two-part hypothesis which is consistent with the observed frequency of employment of underwriters, with their higher costs, by the majority of listed firms. First, since managers' and directors' interests are different from those of shareholders in general, their financing decisions are not always in the best interests of the owners; benefits flow to management from the use of underwriters although not to shareholders. Second, I hypothesize that the cost to shareholders of monitoring their directors and managers is greater than the cost imposed by the choice of the more expensive financing method.

In section 7 I briefly present my conclusions.

A detailed description of the institutional arrangements for rights offerings and underwritten offerings is not easily available; I have provided one in Appendix 1. The reader unfamiliar with this institutional material will find it valuable to read this appendix before the body of the paper.

Appendix 2 presents a Black–Scholes (1973) option pricing analysis of rights issues and underwriting contracts, given here since general equilibrium analyses of these contracts have not been published.

2. Comparison of proceeds from rights and underwritten offerings

In a firm commitment underwritten offering, the underwriting syndicate purchases the new shares from the firm at an agreed upon price, and offers the shares for sale to the public at the offer price If the shares cannot be sold at the offer price, the underwriting syndicate breaks and the shares are sold for whatever price they will bring The underwriters bear the risk associated with adverse price movements, the proceeds to the firm are guaranteed Of course the difference between the offer price and the proceeds to the firm are expected to compensate the underwriter for bearing this risk

In a rights offering, each shareholder receives one right for each share owned This right is an option issued by the firm to purchase new shares The right states the relevant terms of the option, specifying the number of rights required to purchase each new share, the subscription price for each new share, and the expiration date of the option Since issuing rights is costly, it is in the firm's interest to insure the success of the offering A lower subscription price for the rights provides this insurance, a lower subscription price raises the market value of the right and reduces the probability that at the expiration date of the rights offering the stock price will be below the subscription price There is a corresponding fall in the market value of the stock, but this fall is like a stock split It does not affect the wealth of the owners of the firm [1]

If the shareholder does not exercise his rights, or does not sell his rights to someone who will exercise the rights, his wealth is reduced by the market value of the rights Thus the firm can make the probability of failure of the rights offering arbitrarily small by setting the subscription price low enough

Thus, since rights offerings and underwritten offerings can be specified so that the amount of capital raised by each is essentially equivalent, the decision as to which method to employ depends on the costs, the firm should employ that method which has lower net costs

3. Out-of-pocket expenses of rights and underwritten issues

> "Expenses involved in a preemptive common stock rights offering are significantly greater than expenses involved in a direct offering of common stock

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[1] The adjustment for the 'split effect' of a rights offering can be calculated as follows The ex-rights price of the shares, P_x, equals the with-rights price, P_w, minus the value of the right, R

$$P_x = P_w - R.$$

Ignoring the 'option value' of the right, the market value of a right is the difference between the ex-rights price and the subscription price, P_s, divided by the number of rights required to purchase one share, n

$$R = (P_x - P_s)/n$$

Substituting the second expression into the first and simplifying yields

$$P_x = (nP_w + P_s)/(n+1)$$

to the public due to additional printing and mailing costs, expenses associated with the handling of rights and the processing of subscriptions, higher underwriters' commissions and the longer time required for the consummation of financing."[2]

3.1. Reported out-of-pocket expenses

To examine the out-of-pocket expenses referred to in the quotation above (from Commonwealth Edison's 1976 proxy statement) I obtained a tape from the Securities and Exchange Commission covering the reported costs of all issues registered under the Securities Act of 1933 between January, 1971 and December, 1975. The tape contains data covering the following costs: (1) compensation received by investment bankers for underwriting services, (2) legal fees, (3) accounting fees, (4) engineering fees, (5) trustee's fees, (6) listing fees, (7) printing and engraving expenses, (8) Securities and Exchange Commission registration fees, (9) Federal Revenue Stamps, and (10) state taxes.

To restrict my analysis to equity issues by listed firms, I established the following criteria for inclusion: (1) the offering is of common stock and contains no other classes of securities; (2) the company's stock is listed on the New York Stock Exchange, American Stock Exchange, or a regional stock exchange prior to the offering; and (3) any associated secondary distribution is less than 10 percent of the gross proceeds of the issue. Table 1 is based on the issues meeting these criteria.

The data summarized in table 1 contradict Commonwealth Edison's Proxy Statement. My information, consistent with findings of previous SEC studies,[3] indicates that costs are *highest* for underwritten public offerings, and *lowest* for pure rights offerings. Furthermore, the difference in costs is striking. For a $15 million issue, the reported cost difference between an underwritten public offering and a pure rights offering is 4.83 percent, or $720,000; and for a $100 million issue the cost difference is 3.82 percent, or $3,820,000.[4] Yet underwriters were employed in over 93 percent of the issues examined.

3.2. Extras

Systematic understatement of the costs of underwriting presented in table 1 occurs because extras are omitted. Extras refer to the warrants which are associated with some underwritten issues and are used as partial payment to the underwriter. The warrants are options which are usually convertible into the

[2] Commonwealth Edison Proxy Statement, 1976.

[3] See SEC (1940, 1941, 1944, 1949, 1951, 1957, 1970, 1974).

[4] One empirical regularity in the data presented in table 1 should be noted. To a first approximation, the differences in costs among financing methods are explained by the differences in underwriter compensation. Compare 'Other Expenses' for Underwriting and Rights with Standby Underwriting with 'Total Costs' for Rights.

Table I

Costs of flotation as a percentage of proceeds for 578 common stock issues registered under the Securities Act of 1933 during 1971-1975 The issues are subdivided by size of issue and method of financing underwriting, rights with standby underwriting, and pure rights offering[a]

	Underwriting				Rights with standby underwriting				Rights	
Size of issue ($ millions)	Number	Compensation as a percent of proceeds	Other expenses as a percent of proceeds	Total cost as a percent of proceeds	Number	Compensation as a percent of proceeds	Other expenses as a percent of proceeds	Total cost as a percent of proceeds	Number	Total cost as a percent of proceeds
Under 0.50	0	–	–	–	0	–	–	–	3	8.99
0.50 to 0.99	6	6.96	6.78	13.74	2	3.43	4.80	8.24	2	4.59
1.00 to 1.99	18	10.40	4.89	15.29	5	6.36	4.15	10.51	5	4.90
2.00 to 4.99	61	6.59	2.87	9.47	9	5.20	2.85	8.06	7	2.85
5.00 to 9.99	66	5.50	1.53	7.03	4	3.92	2.18	6.10	6	1.39
10.00 to 19.99	91	4.84	0.71	5.55	10	4.14	1.21	5.35	3	0.72
20.00 to 49.99	156	4.30	0.37	4.67	12	3.84	0.90	4.74	1	0.52
50.00 to 99.99	70	3.97	0.21	4.18	9	3.96	0.74	4.70	2	0.21
100.00 to 500.00	16	3.81	0.14	3.95	5	3.50	0.50	4.00	9	0.13
Total/Average	484	5.02	1.15	6.17	56	4.32	1.73	6.05	38	2.45

[a] Issues are included only if the company's stock was listed on the NYSE, AMEX or regional exchanges prior to the offering, any associated secondary distribution represents less than ten percent of the total proceeds of the issue, and the offering contains no other types of securities The costs reported are (1) compensation received by investment bankers for underwriting services rendered, (2) legal fees, (3) accounting fees, (4) engineering fees, (5) trustees' fees, (6) listing fees (7) printing and engraving expenses (8) Securities and Exchange Commission registration fees (9) Federal Revenue Stamps, and (10) state taxes

stock of the firm at prices ranging from well below to considerably above the offering price When the underwriters acquire these warrants at a price below their market value, this represents a form of compensation to the underwriter, and it is not included in table 1

Although extras have historically been most often associated with new issues, their use in the compensation of underwriters of seasoned firms is not unusual For the years 1971–1972, the SEC (1974) reported that of the 1,599 issues which were underwritten, 530, or 33 1 percent, included extras However, since extras were included primarily with the smaller offerings, the total dollar volume of issues with extra compensation was only 7 percent of the gross proceeds from all underwritten offerings

The average exercise price of the warrants granted as a percentage of the offering price was 11 72 percent A lower bound on the value of the option is the difference between the subscription price of the offering and the exercise price of the extras, here that is 88 28 percent of the subscription price [5] Since these warrants are typically purchased by the managing investment banker at a minimal price, usually one to ten cents, the options appear to be significantly underpriced The SEC also found that the average ratio of shares granted the underwriters through extras to the number of shares offered in the underwriting was 7 99 percent To assess the impact on the figures reported in table 1, assume that the value of the warrant is 80 percent of the offering price, that the underwriter pays 5 percent of the offering price for the extras, and that the ratio of warrants received as extras to shares offered through the underwriting is 0 07, then the compensation represented by the extras would be 4 95 percent of the total proceeds These numbers suggest that for the issues employing extras, the figures in table 1 understate the underwriters' compensation on the order of 50 to 100 percent

3 3 Unreported out-of-pocket expenses

Such items as the opportunity cost of the time of the firm's employees and postage expenses[6] are not included in the summary of costs reported in table 1 However, unreported employee expenses are unlikely to explain the deviations reported in table 1 For a $15 million issue, the $720,000 difference would not be explained if 20 employees with an average salary of $30 thousand worked full time on a rights offering for a year For a $300 million issue the difference in reported costs of underwriting versus a rights issue exceeds $11 million, it would require over 350 man-years to explain this difference

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[5] This is a conservative estimate of the value Merton (1973) has demonstrated that the lower bound on the value of an option is the difference between the stock price and the discounted exercise price

[6] Although postage expenses are not reported to the SEC, estimates were obtained from summaries of expenses reported to the New York State Public Utilities Commission for a sample of firms For the sample, the maximum postage expense as a percentage of total proceeds was one-tenth of one percent Even if this were understated by a factor of ten, it would be of insufficient magnitude to explain even the smallest reported difference in costs Moreover, the marginal postage expense could be reduced to zero by mailing the rights with other required mailings, such as dividend checks or quarterly reports

It should be noted that expenses allocated to raising capital do *not* reduce the tax liability of the firm [7] These expenses are deducted from the capital account without affecting the income statement Thus, the use of internal resources can lower the tax liability of the firm if it is more expensive for the Internal Revenue Service to monitor the allocation of internal resources between capital raising activities and other activities In the above examples, if the firm's marginal tax rate is 50 percent, and if they were able to deduct all their wages for tax purposes, the required number of man-years to explain the reported cost differential would be doubled

There are strong reasons to believe that table 1 also omits significant unreported costs of the issuing firm's employees' time for underwritten offerings There are important parameters (e g , the offering price and the fee structure) which must be negotiated between the underwriter and the representatives of the firm, these parameters have wealth implications for the owners of the firm as well as the underwriter Such negotiation can be lengthy and usually directly involves top management These unreported costs of underwriting must be significantly greater than the costs of setting a subscription price for a rights issue, since the subscription price has no wealth implications for the owners of the firm as long as it is low enough to ensure that the rights will be exercised

Moreover, with an underwritten issue the firm has the same tax incentives to substitute internal for external resources if it is more expensive for the IRS to monitor the allocation of costs of internally acquired resources to capital raising activities than of those which are externally acquired Thus, it is not clear that rights offerings employ fewer unreported internal resources than do underwritten offerings

3 4 Costs imposed directly on shareholders

If a shareholder chooses to sell his rights, he incurs transactions costs and tax liabilities These costs, although not borne by the firm, are relevant because they affect the wealth of the owners [8]

[7] If the firm sells bonds rather than stock, the costs of selling the issue can be amortized over the life of the issue In no case, however, may these costs be expensed either for tax or reporting purposes

[8] There is a limited benefit from issuing rights to the owners of the firm under Regulation T, the Federal Reserve regulation restricting margin credit For an owner who wishes to borrow to acquire additional stock, Reg T provides for the establishment of a 'Special Subscription Account' which lowers the effective margin requirement by permitting a customer to purchase on an installment basis a margin security acquired through the exercise of subscription rights expiring within 90 days Under this provision, 75 percent of the market value of the acquired stock can be borrowed initially Quarterly installments are required over a 12 month period to bring the position up to proper margin

To determine the impact of the selling costs, let us assume generally extreme values for the relevant parameters For small dollar transactions (less than $1,000), the brokerage fee can be as much as 10 percent And for rights, the bid-ask spread can be as high as 10 percent, this represents another selling cost If half the bid-ask spread is taken as an implicit selling cost the total cost can be as much as 15 percent of the value of the rights To make the figures comparable to those in table 1, calculate transactions costs as a fraction of the proceeds of the offering to the firm The 15 percent must be multiplied by the ratio of the value of the rights to the total proceeds For the offerings in the sample, this ratio was approximately 10 percent If all individuals sold their rights, transactions costs would be 1 50 percent of the proceeds, a figure less than the difference in transactions costs for any reported issue size [9] But rights offerings are generally 50 percent subscribed by existing shareholders who do not bear these transactions costs [10] Therefore this cost appears to be less than one percent

Selling rights also has tax consequences for the shareholder For tax purposes, the cost basis of the stock must be allocated between the stock and the rights when the rights are received based on the market values of the rights and stock at that time [11] The acquisition date of the rights for tax purposes is the date on which the stock issuing the rights is acquired If the stock has risen in value since it was acquired, a relevant cost of employing a rights offering is the difference between the shareholder tax liability incurred now and the present value of the taxes which would have been paid had the rights issue not occurred [12]

To determine the impact of this cost again postulate generally extreme values for the relevant parameters Assume (1) that the marginal tax rate for the average shareholder is 50 percent (note this would be an unattainably high rate if the capital gain were long term), (2) that in the absence of the rights offering the taxes could have been postponed forever (3) that the allocated cash basis for the rights is 50 percent of the current rights price (4) that the ratio of the value of the rights to the proceeds of the issue is 10 percent, and (5) that only 20 percent of the current stockholders subscribe to the rights offering In this case, the cost would be 2 percent of the capital raised by the firm This is less than any reported cost differential in table 1 [15]

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[9] Note that since the expenses associated with raising equity capital are not tax deductible, these figures are comparable without further adjustment

[10] Estimates vary but ballpark figures on how investors react [to rights offerings] are as follows 50% exercise their rights 40% sell out for cash, and 10% do nothing [Vanishing Rights' (May 2, 1977) *Barron's* p 25]

[11] If the fair market value of the rights is less than fifteen percent of the fair market value of the stock, the shareholder can choose to set the basis of the rights at zero leaving unaffected the basis of the stock The shareholder might choose this alternative if the cost of the bookkeeping exceeded the present value of the tax saving or if he anticipated being in a higher tax bracket when his remaining holdings were sold

[12] See Bailey (1969) for a discussion of the effective rate of capital gains tax, discounted to reflect the liability deferral

One other argument involving shareholder-borne costs has been offered by Weston and Brigham (1975) They argue that in a rights offering some stockholders may neither exercise nor sell, and by allowing their rights to expire unexercised they incur a loss [16] However, if an oversubscription privilege is employed with the offering, current owners in the aggregate receive full market value for the shares sold Admittedly, the oversubscription privilege affects the distribution of wealth among the owners, but it does not impose costs on owners as a whole

4. Security price behavior associated with rights and underwritten offering

4 1 Rights offerings lower the stock price

> "A rights offering, under market conditions then existing, could well have a long-term depressing effect on the market price of the stock " [17]

Given the investment policy of the firm, a rights offering *will* lower the price of the stock in both the short run and in the long run as AT&T s Proxy Statement suggests But this is irrelevant to the choice of financing methods because the drop in price is *not* a reduction in the wealth of the owners and thus cannot be considered a cost of a rights issue

The fall in the stock price when rights are issued can be illustrated by the following argument Rights give the shareholders the option to purchase new shares at less than market prices Other things equal, the total market value of the firm after a rights offering, V, will then be the previous value, V' plus the subscription payments, S

$$V = V' + S \tag{1}$$

The per share price before the offering is V'/n, where n is the number of old shares If m new shares are sold, the per share price after the offering, $(V'+S)/(n+m)$ must be less than the price per share before the offering [18]

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[15] If taxes were important, firms would avoid rights offerings when share prices had risen However the evidence presented in table 2 shows that, on average, firms have had abnormal positive price changes during the 12 months before an offering

[16] Stockbrokers holding securities for safekeeping do not allow the warrants to expire unexercised If no instructions are received, the broker will sell the rights immediately before expiration

[17] American Telephone and Telegraph Co, Notice of 1976 Annual Meeting and Proxy Statement

[18] Also note that arbitrage profits must not be available When a stock trades ex rights, a right is issued for each share outstanding At the ex rights date, the expected change in the stock price must equal the expected value of the right, or profit opportunities would exist if the sum of the ex rights value of the stock plus the value of the right at the ex rights date were

The fall in the stock price on the ex rights day is similar to the expected fall in the stock price at the ex dividend date. The two cases differ only in what is distributed – in the latter instance cash, in the former rights. Thus, the fall in the stock price simply reflects the fact that the shareholders have been given a valuable asset, the right.

The argument that the fall in the stock price is a relevant cost of a rights offering also appears in two related forms: (1) if an underwriter is used, the firm can raise a greater amount of capital with the same number of shares; (2) a rights offering lowers the earnings per share of the firm.[19] Both statements are true but if the fall in the stock price equals the market value of the rights, then the impact of the additional shares issued through the rights offering is the same as that of a stock split and the wealth of the owners of the firm is unaffected.

To examine whether, after correcting for the expected normal fall in the stock price, there were also abnormal price changes,[20] I studied the 853 rights offerings on the CRSP master file between 1926 and 1975. Following Fama, Fisher, Jensen and Roll (1967), I estimated the regression,

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt}, \tag{2}$$

where R_{jt} is the return to security j in month t, adjusted for capital structure changes (including rights offerings) and R_{mt} is the return to the market portfolio in month t. I estimated (2) for each of the 853 offerings, using data from the CRSP monthly return file, excluding the 25 months around the date of the offering. Setting $t = 0$ for the month of the rights offering, I used the estimated α_j and β_j to calculate the ε_{jt} for each security for the 25 months around the offering. I then calculated the average residual over all firms for each month in the interval -12 to $+12$. The average residuals were then cumulated from month -12 to the event month. The results are presented in table 2 and figure 1.

In the months subsequent to 'event month minus two' the average residuals

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systematically different from the value of the stock immediately before the ex rights date, then profits could be made by taking an appropriate position in the stock upon the announcement of the rights issue.

[19] 'Thus, if the amendment [to remove the preemptive right from the corporate charter] is adopted, the company will be able to obtain the amount of capital needed through the issuance of fewer shares. Over a period of time this will result in slightly less dilution, higher equity value per share and better earnings per share.' [Commonwealth Edison Proxy Statement, 1976.]

[20] E.g., Commonwealth Edison suggests, 'Selling pressures often unduly depress both stock and rights values during the two or three week offering period which is a practical necessity when stock is sold with preemptive rights. Because the majority of stockholders do not exercise their rights but offer them for sale, the market value of the rights is driven far too low. Outsiders are then able to benefit by selling large amounts of stock during the offering period while buying rights for almost nothing and then exercising their rights to purchase stock at a discount to cover their sales. As a result, rights offerings tend to cost the company more than the rights themselves are worth to the stockholders who get them.'

are all insignificantly different from zero[21] and there is no significant sign pattern in the time series of average residuals. The cumulative average residuals in table 2 are also at approximately the same level three months before the offering, on the date of the offering and 12 months after the offering. The significant positive residuals prior to the offer date are to be expected because of selection bias; firms which raise capital tend to have been doing well.

Table 2

Summary of average residual and cumulative average residual analysis of 853 rights offerings between 1926 and 1975 for the 25 event months [−12 to +12] surrounding the offer date.

Event month	Average residual	Cumulative average
−12	0.00721	0.00721
−11	0.01004	0.01725
−10	0.00255	0.01980
− 9	0.00629	0.02609
− 8	0.00388	0.02997
− 7	0.01062[a]	0.04059
− 6	0.00750	0.04809
− 5	0.00622	0.05431
− 4	0.01334[a]	0.06765
− 3	0.00662	0.07427
− 2	0.01624[a]	0.09051
− 1	−0.00649	0.08401
0	−0.00739	0.07663
+ 1	0.00779	0.08441
+ 2	0.00412	0.08853
+ 3	0.00405	0.09258
+ 4	−0.00110	0.09149
+ 5	−0.00047	0.09102
+ 6	0.00053	0.09155
+ 7	−0.00338	0.08817
+ 8	−0.00387	0.08430
+ 9	0.00256	0.08686
+10	−0.00264	0.08422
+11	−0.00013	0.08408
+12	−0.00476	0.07933

[a] Greater than 2σ. (Computation of the standard deviation is described in footnote 21.)

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[21] As an estimate of the dispersion of an average residual, the approximation

$$\sigma^2 = (\sigma^2_M/r^2)(1-r^2)/N$$

was employed where σ^2_M is the variance of the market return, r^2 is the squared correlation coefficient between the return to an asset and the market return, and N is the number of securities in the sample. If σ_M is 0.089 [from Black Jensen Scholes (1972)], $r^2 = 0.25$, and $N = 853$ then $\sigma^2 = 0.000028$ and $\sigma = 0.00528$.

The results presented in table 2 are consistent with previous studies of this question Nelson (1965) examined all the rights offerings by firms listed on the New York Stock Exchange between January 1, 1946 and December 31, 1957. He found after the price series is adjusted for the 'split effect' in the rights offerings and general market movements are removed, prices six months after a rights offering are not significantly different from prices six months before the offering[22] Scholes (1972) found that the price of shares generally rose in value before the issue, fell 0 3 percent during the month of the issue, but experienced no abnormal gains or losses after the issue

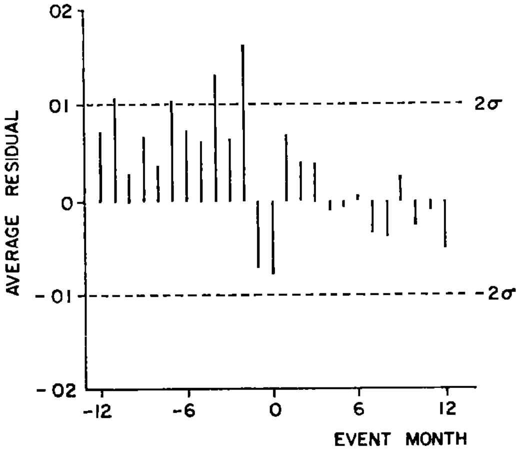

Fig 1 Plot of average residuals for 853 rights offerings between 1926 and 1975 for the 25 event months [−12 to +12] surrounding the offer date

4 2 *Underwriters increase the stock price*

Some argue that underwriters cause an increase in the stock price (1) by increasing 'public confidence' through external certification of the legal, accounting, and engineering analyses and (2) by the selling efforts of the underwriting syndicate.[23]

To examine the behavior of stock prices around the offer date of underwritten offerings and rights offerings, I obtained the returns for those securities which were included both in the sample of 578 firms covered in table 1 and on the CRSP daily return file There were 344 underwritten offerings and 52 rights offerings in this sample I set the offer date equal to day zero for all offerings and formed a portfolio of underwritten offerings and a portfolio of rights offerings I weighted securities in the portfolio of underwritten offerings so that the two portfolios had equal betas. Then I calculated the difference in the portfolio returns for the 130 days before and 130 days after the offerings. The difference in average returns between two portfolios with equal risk will measure abnormal returns from either underwritten offerings or rights offerings. Table 3 presents the results for the period 20 days before the offering to 20 days after the offering; and figure 2 graphically presents the results for the period 40 days before to 40 days after the offering.

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[22] The 'split effect' adjustment used by Nelson is derived in footnote 1

[23] See e g Brigham (1977, pp 473–474)

The average difference in returns to the two portfolios over the 260 days around the offer date is +0.00006, with a sample standard deviation of 0.00265. Therefore rights offerings have marginally higher returns during the 40 days around the offer date, but there is no obvious abnormal price behavior around the offer date for either underwritten offerings or rights offerings.

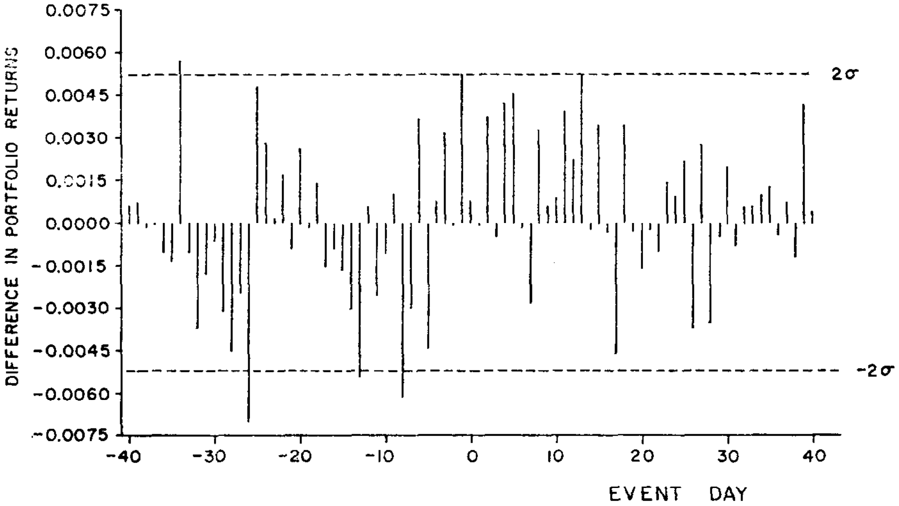

Fig. 2. Differences in daily returns between a portfolio of 52 rights offerings and a portfolio of 344 underwritten offerings for the 81 event days [−40 to +40] surrounding the offer date. (Portfolio weights are adjusted so that the two portfolios have the same beta.)

That underwriters are unable to generate abnormal positive price behavior should not be surprising. The firm always has the option of disclosing more information than is required by the Securities and Exchange Commission. The firm will expend resources on certification by external legal, accounting, and engineering firms until the net increase in the value of the firm is zero. Since the firm can contract for external certification of any disclosure, the benefit of whatever 'expert' valuation by the investment banker associated with an underwriting is limited to the difference in costs between certification through the underwriting process and independent certification.

But if underwriters are employed they influence the firm's decision about the

Table 3

Differences in daily returns between a portfolio of 52 rights offerings and a portfolio of 344 underwritten offerings between January 1971 and December 1975 for the 41 event days [−20 to +20] surrounding the offer date (Portfolio weights are adjusted so that the two portfolios have the same beta)

Event day	Rights average return	Underwritten average return	Difference (rights-und)	Cumulative difference
−20	−0 000361	−0 003007	0 002646	0 002646
−19	−0 001642	−0 001523	−0 000120	0 002526
−18	0 000072	−0 001361	0 001433	0 003959
−17	−0 001325	0 000175	−0 001500	0 002458
−16	−0 001134	−0 000231	−0 000902	0 001556
−15	−0 002865	−0 001229	−0 001636	−0 000080
−14	−0 002245	0 000732	−0 002977	−0 003057
−13	−0 004471	0 000949	−0 005420	−0 008477
−12	0 001722	0 001110	0 000611	−0 007866
−11	−0 002834	−0 000264	−0 002570	−0 010436
−10	−0 001226	−0 000125	−0 001102	−0 011538
− 9	0 001961	0 000960	0 001000	−0 010537
− 8	−0 004966	0 001151	−0 006117	−0 016654
− 7	0 001031	0 001327	−0 000296	−0 016950
− 6	0 002433	−0 001257	0 003690	−0 013260
−	−0 002373	0 002069	−0 004442	−0 017702
4	0 002180	0 001384	0 000797	−0 016905
− 3	0 001978	−0 001284	0 003262	−0 013642
− 2	−0 000570	−0 000557	−0 000013	−0 013656
− 1	0 004425	−0 000803	0 005228	−0 008428
0	0 001413	0 000583	0 000829	−0 007598
1	−0 000000	0 000054	−0 000054	−0 007653
2	0 003127	−0 000605	0 003732	−0 003921
3	−0 001182	−0 000700	−0 000482	−0 004403
4	0 003059	−0 001195	0 004254	−0 000149
5	0 005288	0 000710	0 004577	0 004428
6	0 000311	0 000477	−0 000166	0 004262
7	−0 002551	0 000206	−0 002757	0 001505
8	0 004396	0 001072	0 003324	0 004829
9	0 000851	0 000221	0 000630	0 005458
10	0 001601	0 000720	0 000881	0 006339
11	0 004703	0 000768	0 003934	0 010273
12	0 002369	0 000099	0 002271	0 012544
13	0 004764	−0 000502	0 005267	0 017811
14	−0 000734	−0 000495	−0 000239	0 017572
15	0 002944	−0 000527	0 003471	0 021043
16	−0 001089	−0 000790	−0 000299	0 020744
17	−0 001809	0 003065	−0 004874	0 015870
18	0 001228	−0 002196	0 003424	0 019294
19	0 000169	0 000458	−0 000289	0 019004
20	−0 000823	0 000711	−0 001534	0 017471

level of disclosure The underwriters will request that level of disclosure for which the marginal private costs and benefits to the underwriter are equal Given the legal liability of underwriters under the 1933 Act, the incentives of the firm and underwriter can differ Any divergence from the level of disclosure which maximizes the market value of the firm imposes a cost on the shareholders, and underwriters do ask for 'comfort letters' from accountants, frequently requiring expensive auditing procedures not produced without underwriters Thus, I conclude that the disclosure incentives of the underwriters lead to an over-investment in information production However, the costs of this over-investment should be reflected in the figures in table 1

4 3 Do underwriters underprice the securities?

In Ibbotson's (1975) study of unseasoned new issues he found that the offer price on average is set 11 4 percent below the market value of the shares If seasoned new issues are also underpriced, the difference between market value and offer price would represent another cost of employing underwriters

There are reasons to believe that underwriters underprice the seasoned new issues For a firm commitment underwriting agreement the Rules of Fair Practice of the National Association of Securities Dealers[24] require that once the offer price is set, the underwriter cannot sell the shares at a higher price. If the offer price is set above the market value of the shares excess supply results If the offer price presents a binding constraint to the underwriter, the limit order placed with the specialist by the managing underwriter results in the purchase of additional shares at the offer price If continued this purchasing would cause the underwriting syndicate to break Since very few underwriting syndicates break,[25] the implication must be either that the offer price is generally set below the market value of the shares, or that the offer price constraint can be circumvented

There are two ways in which the offer price could be circumvented First, for hot issues (i e , underpriced issues for which there is significant excess demand) the underwriters allocate the shares to preferred customers One way to achieve preferred customer status is to purchase issues for which there is an excess supply Second, underwriters employ 'swaps' In a swap, the underwriter buys another security from a customer while selling the underwritten security at the offer price Through this tie-in sale, the underwriter can shift the profit or loss These two tying arrangements allow the underwriter to minimize the impact of the regulation

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[24] Although the rules of fair practice were established by the NASD, and not Congress or the SEC, there is little difference in the impact These rules are a response to the SEC's self regulatory position If the SEC found them unsatisfactory the SEC could establish superseding regulation

[25] See *History of Corporate Finance for the Decade* (1972)

To see if seasoned new issues are underpriced I calculated the return from the closing price the day prior to the offer date to the offer price, and the return from the offer price to the close on the offer date. For the 328 firms with the requisite data, the average return from the close to the offer price is −0.0054 and the average return from the offer price to the close on the offer date is +0.0082. For the 260 days around the offer date the average daily return is 0.0005 with a sample standard deviation in the time series of average returns of 0.0013. Therefore, both figures, although much smaller than the 11.4 percent found by Ibbotson, are *significantly different from the average daily return*.[26] Thus the underpricing imposes an additional cost on the owners of the firm of between 0.5 and 0.8 percent of the proceeds of the issue, a cost which is not reflected in table 1.

5. Miscellaneous arguments favoring underwritten offerings

5.1. *Insurance*

It is frequently argued that employing an underwriter provides an 'insurance policy', reducing uncertainty of the offering's success.[27] In effect, the firm purchases an option to sell the shares to the underwriter at the offer price (See Appendix 2) Note four things about this option First, in an underwritten issue, the offer price is not set generally until within 24 hours of the offering when the final agreement is signed, and hence the net proceeds are not determined until that time Second, as shown in section 4 3, the offer price on average is set below the market value of the stock Thus, the firm purchases a one-day option to sell shares at a discount of ½ percent below their market value Third, subject to certain conditions specified in the letter of intent, the underwriter has the option of backing out of the tentative agreement until the date the final agreement is signed Thus, the 'insurance policy' is of limited value because its effective duration is short Fourth, as argued above, the subscription price for a rights offering can be set low enough so that the probability of failure of the rights offering becomes arbitrarily close to zero So an alternate source of 'self-insurance' is available through the rights offering For these reasons, the possible value of the 'insurance policy' associated with underwritten issues must be small

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[26] One difference between Ibbotson's unseasoned issues and the seasoned issues examined here is that the unseasoned shares trade on the OTC market. One hypothesis which has been suggested to explain the differences in the results is that the underpricing is a method of compensating the underwriter for maintaining a secondary market in the security. Although the argument can explain why underwriter's compensation (including underpricing costs) for unseasoned issues is higher than for seasoned issues it does not explain the differential underpricing.

[27] Another type of *'insurance' might be relevant. If material errors are found in the registration* statement of a public issue, parties who allege damage can bring suit. The suit typically names as co-defendants the firm, the board of directors of the firm, the firm's accountants, and the firm's underwriter. If the underwriter assumes a large share of the liability for the error, sheltering the firm from suit, then the underwriter will receive a normal compensation for bearing that risk.

Direct evidence on the hypothesis that underwriters reduce the firm's liability in case of a suit is expensive to obtain, economic studies of securities fraud suits have not been published. However indirect evidence suggests that this factor cannot be of a sufficiently large magnitude to make this an important factor in the choice of underwritten issues over rights issues. First, damage must be demonstrated – i.e. in addition to finding a material misstatement in the registration statement, the share price must have fallen after the offering. Second, the underwriters explicitly seek to limit their liability as much as is legally feasible. '[Issuer-Underwriter Indemnification] agreements are universally used in today's underwriting. ... These agreements, although varying in specific language provide essentially for indemnification of the 'passively' guilty party by the party whose omissions or misstatements were the source of the liability.' (See 'The Expanding Liability of Security Underwriters', *Duke Law Journal*, Dec. 1969, pp. 1191–1246.) Thus underwriters contracts seek to minimize their exposure in this area. Third, if the courts imposed a significant share of the responsibility for material errors on the underwriter, it would be expected that accounting firms would recognize this by offering lower rates for securities work to firms employing underwriters. This does not seem to be the case. At least when this issue was raised with several partners of eight big accounting firms, this effect was denied. The judicial procedure tends to make the liability of each of the groups of defendants in this type of suit virtually independent.

5 2 Timing

Commonwealth Edison claims that the proceeds of an underwritten issue are available to the firm sooner than in a rights issue [28] But timing benefits provided by underwriters must be small First, the settlement date for an underwritten issue is generally seven days after the offer date, while the settlement date for a rights offering is generally seven days after the expiration of the offering Since the offering generally lasts about 18 days, any reasonable estimate of the cost in terms of the lost interest which would be imposed on the firm by waiting that short period of time would have to be small Second, since it is not expected that the rights will be exercised prior to their expiration,[29] the owners of the firm have the use of the funds during the period of the offering Thus, the time period which entails an opportunity cost of the funds is reduced to a seven- to ten-day period both for rights and underwritten offerings Third, if the services provided by the underwriter and transfer agents are competitively supplied, the fees charged will reflect the opportunity cost of the funds at their disposal This would imply that the timing cost is impounded in the figures in table 1 And fourth, unless there is an unforeseen urgency associated with obtaining the funds, the firm can simply initiate the rights procedure at an earlier date

Moreover, under certain circumstances, the registration procedure with the SEC is simpler when a rights issue is employed It is my belief that with a rights offering, the SEC is more likely to presume a regular dialogue between the firm and its owners and thus impose less restrictive disclosure requirements Therefore, the time until the registration becomes effective can be expected to be shorter with a rights offering than with an underwritten offering. This shorter registration time reduces the total time from the point where the decision is made to raise additional capital to the receipt of the proceeds.

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[28] Commonwealth Edison Proxy Statement, 1976

[29] See Merton (1973) or Smith (1976)

5 3 *Distribution of ownership*

Weston and Brigham (1975) argue that underwriters provide a wider distribution of the securities sold, 'lessening any possible control problem' Since change in control may result in a change in management, this is likely to be a relevant issue for the current management. Yet it is not clear that possible control problems should be a concern of the owners I know of no reason to believe that one group of owners is any better (i e , will price the firm any higher) than another group

Furthermore, it is not obvious that underwriters will achieve a wider distribution of ownership than will a rights offering For most rights offerings of listed firms, the consensus among investment bankers is that the subscription rate of the current owners of the firm ranges from 20 to 50 percent It is difficult to estimate what percentage of an underwritten issue is purchased by the current owners of the firm, but there is no reason to believe it is zero Further, underwritten issues seem to attract more institutional interest, resulting in large block purchases and therefore more concentration of ownership

These factors preclude any general conclusions about the effect of financing method on ownership distribution With this uncertainty it is not clear that management, even if concerned with control issues, should prefer the use of an underwriter

5 4 *Consulting advice*

Van Horne (1974) suggests that 'advice from investment bankers may be of a continuing nature, with the company consulting a certain investment banker or group of bankers regularly' It is more expensive for the firm to compensate the investment banker for future consulting services by including in the underwriting fee a payment for the present value of the expected advice Costs incurred in raising capital are not tax deductible, they directly reduce the capital account and do not enter the income statement Thus, compared to separate billing for services rendered, paying for future consulting through a higher underwriting fee doubles its cost for a firm with a marginal tax rate of 50 percent

5 5 *Expected legal costs*

If there were a law, regulation, or merely an unresolved judicial principle which might impose additional liability on a firm using rights offerings, then the expected legal costs of using rights could explain the observed use of underwriters But I can find no differential legal liability associated with the use of rights offerings

5 6 Selection bias

If the firms which employ rights offerings were systematically different from the firms which employ underwritten offerings, then the observed cost differences could be attributable to selection bias It could be that if the firms which employed underwriters had used rights, their expenses would have been greater

There is a significant difference in the betas of the firms in the two groups I calculated the betas for those firms in the sample which were listed on the New York Stock Exchange and included on the daily CRSP tape The average beta for the 344 underwritten offerings is 0 731 with a standard deviation of 0 560, and the average beta for the 52 rights offerings is 0 493 with a standard deviation of 0 330 But I can find no other systematic difference between the two populations

Examination of the data shows similar distributions of firms across industries, 80 8 percent of the firms employing rights and 73 2 percent of the firms employing underwritten offerings were utilities (electric, gas, or telephone companies) I attempted to predict the choice of underwritten versus rights offering based on the following variables (1) the percentage of the firm which is sold through the offering, (2) the market value of the firm, and (3) the variance of the returns on the stock The r^2 for the regression is 0 016 None of the t statistics for the variables appears to be significant

Although differences exist between the two sets of firms, the nature and magnitude of the differences seem insufficient to account for the observed cost differences

6. A monitoring cost hypothesis

6 1 Why not monitor the choice of financing method?

My examination of alternative financing methods suggests that rights offerings are significantly less expensive than underwritten offerings Yet underwriters are employed in over 90 percent of the offerings studied One hypothesis consistent with the evidence is (1) managers and members of the board of directors receive benefits from the use of underwriters which do not accrue to the other owners of the firm, and (2) the expenses which would be imposed on the owners of the firm by monitoring the managers and directors in the choice of financing method are greater than the costs without monitoring

Managers or members of the board of directors may recommend that offerings be underwritten because their welfare increases as a by-product of the use of underwriters in several ways[30] First, firms frequently include an investment banker as a member of the board of directors It is in his interest to lobby for the use of underwriters, particularly the use of his investment banking firm as managing underwriter Second, there is the possibility of 'bribery' This may be simply consumption for the managers and directors through 'wining and dining' by the underwriters But there is a more important possibility In an underwritten issue, if the offer price is set below the market value of the shares, the issue will be oversubscribed To handle this excess demand, underwriters ration the shares In the rationing process the underwriters presumably favor their preferred customers, and preferred customer status could be given to key management people or members of the board of directors of firms employing the underwriter This form of payment would be virtually impossible to detect, since the shares the officer of Company A would favorably acquire are those of Company B and would therefore call for no disclosure[31]

Further possible benefits to managers include the reduction of possible control problems, if underwritten offerings produce a wider distribution of ownership than rights offerings Finally, managers whose compensation is a function of reported profits will prefer an underwriter's fee which includes a payment for future consulting advice, the manager's compensation will be higher because payment through underwriting does not affect reported profits while separate billing for consulting does

Jensen and Meckling (1976) show that the costs which the managers and directors can impose on the other owners of the firm are limited by the costs of monitoring their activities Thus the cost to shareholders of monitoring the method of raising capital must be greater than the costs imposed by the financing method chosen Given the dispersion of ownership in modern corporations, the benefit to any single shareholder from voting his shares is small Thus the costs that he would rationally incur in voting are small,[32] and the resources the shareholder would rationally devote to deciding whether a 'yes' or 'no' vote is more in his interest are few Moreover, voting procedures in most corporations ensure that management has a disproportionate voice in the outcome Management is often assigned votes by proxy, and in many firms management has the power to vote unreturned proxies They are also permitted to vote proxies on specific questions when the stockholder does not specify a choice These factors raise the cost of monitoring management

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[30] Certain management compensation plans, such as stock option plans, make managers' compensation a function of the price of the firm's shares If the compensation plan were not adjusted to reflect the effect of the rights offering on the share price, management could be expected to provide a strong lobby in favor of employing underwriters In fact, however, employee stock option plans have general clauses calling for adjustment of the terms of the plan to reflect relevant capital structure changes Furthermore, most plans include specific reference to rights issues Thus, agency costs resulting from compensation plans do not seem to offer an explanation of the observed behavior

[31] This argument is similar to that of Manne (1966), especially Chapter V

[32] See Downs (1957) Basically, if a person owns 100 shares in a firm, his vote only matters if the vote is tied or his 'side' would have lost by 100 votes or less The probability is low that out of 50 million votes, the issue will split that way Thus the expected benefit (benefit times probability) of voting is very small

6 2 *The preemptive right as a monitoring tool*

There appears to be a low cost method of monitoring the use of underwriters the preemptive right The preemptive right is a provision which can be included in a firm s charter requiring the firm to offer any new common stock first to its existing shareholders But the inclusion of the preemptive right does not solve the problem firms can still employ underwriters through a standby underwriting agreement Since the figures in table 1 suggest a negligible difference in costs between a firm commitment underwritten offering and a rights offering with a standby underwriting agreement what becomes important is not a requirement to use rights, but a prohibition against using underwriters

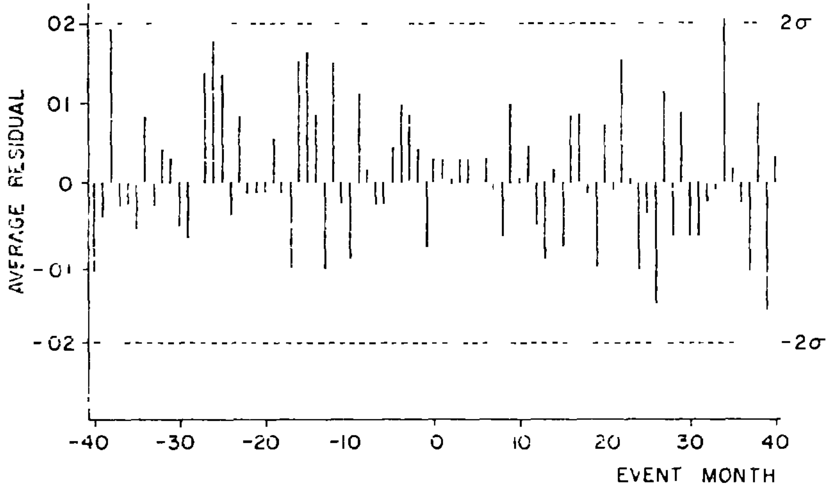

Fig 3 Plot of average residuals from 89 firms which removed the preemptive right from their corporate charter for the 81 event months [−40 to +40] surrounding the month of removal

To test the hypothesis that the impact of removing the preemptive right from the corporate charter is negligible, I collected a sample of 89 firms listed on the New York Stock Exchange which have removed the preemptive right The results of this study are presented in table 4 and figure 3 The average residual in the month of removal is 0 277 percent, and the mean average residual for the six prior months is 0 309 percent There is no apparent impact

I believe the results in table 4 provide a plausible explanation for why the intellectual level of the argument involving the preemptive right is so low on both sides of the question For example, the above quotes from Commonwealth

Table 4

Summary of residual analysis of 89 firms which removed the preemptive right from their corporate charter for the 81 event months [−40 to +40] surrounding the month of removal

Event month	Average residual	Cumulative average residual	Event month	Average residual	Cumulative average residual
−40	−0 00995	−0 00995	1	0 00363	0 11718
−39	−0 00382	−0 01376	2	0 00028	0 11745
−38	0 01999	0 00623	3	0 00293	0 12038
−37	−0 00258	0 00365	4	0 00276	0 12315
−36	−0 00160	0 00205	5	0 00101	0 12415
−35	−0 00414	−0 00209	6	0 00336	0 12751
−34	0 00842	0 00633	7	−0 00017	0 12734
−33	−0 00238	0 00395	8	−0 00537	0 12196
−32	0 00483	0 00878	9	0 00963	0 13159
−31	0 00375	0 01254	10	0 00002	0 13162
−30	−0 00419	0 00834	11	0 00406	0 13568
−29	−0 00632	0 00202	12	−0 00446	0 13122
−28	0 00082	0 00284	13	−0 00855	0 12266
−27	0 01337	0 01621	14	0 00210	0 12476
−26	0 01839	0 03460	15	−0 00696	0 11780
−25	0 01440	0 04900	16	0 00903	0 12683
−24	−0 00397	0 04503	17	0 00752	0 13435
−23	0 00800	0 05303	18	−0 00096	0 13339
−22	−0 00102	0 05201	19	−0 00942	0 12397
−21	−0 00007	0 05195	20	0 00701	0 13097
−20	−0 00072	0 05123	21	−0 00021	0 13077
−19	0 00602	0 05725	22	0 01591	0 14668
−18	−0 00067	0 05658	23	0 00090	0 14758
−17	−0 01032	0 04626	24	−0 01043	0 13715
−16	0 01575	0 06201	25	−0 00281	0 13434
−15	0 01608	0 07809	26	−0 01389	0 12046
−14	0 00828	0 08637	27	0 01069	0 13115
−13	−0 00943	0 07694	28	−0 00566	0 12548
−12	0 01496	0 09190	29	0 00901	0 13449
−11	−0 00183	0 09007	30	−0 00592	0 12857
−10	−0 00833	0 08174	31	−0 00624	0 12233
− 9	0 01103	0 09277	32	−0 00240	0 11993
− 8	0 00138	0 09415	33	−0 00071	0 11922
− 7	−0 00185	0 09230	34	0 02059	0 13981
− 6	−0 00170	0 09060	35	0 00183	0 14165
− 5	0 00508	0 09568	36	−0 00263	0 13901
− 4	0 00998	0 10566	37	−0 01103	0 12799
− 3	0 00816	0 11382	38	0 00971	0 13770
− 2	0 00477	0 11859	39	−0 01524	0 12246
− 1	−0 00782	0 11078	40	0 00300	0 12546
0	0 00277	0 11355			

Edison's Proxy Statement are demonstrably false, and the quote from AT&T's Proxy Statement is irrelevant The primary lobbying effort in favor of the preemptive right is from Lewis D Gilbert, John J Gilbert and Wilma Soss who regularly introduce proposals to reincorporate the preemptive right into the corporate charter of corporations which have removed it However, their reason for the use of rights is so that shareholders can maintain their proportionate interest in the firm For large firms this 'benefit' has negligible value [33]

6 3 Other considerations

It should be emphasized that the monitoring cost hypothesis is consistent with both observed institutional arrangements and rational, wealth-maximizing behavior by the stockholders Rational behavior implies that actions will be taken if the benefits exceed the costs I have pointed out certain costs associated with the voting mechanism within corporations inclusion of an investment banker on the board of directors, and certain management compensation plans These practices, while costly, would still be in the stockholders' best interests if there are offsetting benefits

Furthermore, the monitoring cost hypothesis does not imply that there are rents which accrue to the underwriting industry There are two available 'technologies' with which additional equity capital can be raised If the underwriting industry is competitive, the underwriting fees reported in table 1 would reflect a normal return to the resources required in employing that technology

However, the monitoring cost hypothesis does present some problems I do not observe the costs of monitoring management Hence the hypothesis is not directly tested Furthermore, while the incentives set up through the voting mechanism suggest that it is plausible that monitoring costs are large enough to explain the observed use of underwriters, competition in the market for management should reduce the required monitoring expenditures If the use of rights offerings is in the best interests of stockholders, then it will pay potential managers to incur bonding costs to guarantee not to use underwriters

7. Conclusions

In my examination of the choice of method for raising additional equity capital by listed firms I demonstrate that properly constructed rights offerings provide proceeds which are equivalent to those of an underwritten offering Furthermore, estimates of expenses from reports filed with the Securities and

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[33] For a firm with 50 million shares outstanding, a ten percent increase in the number of outstanding shares would change the percentage ownership for someone with 100 shares only in the sixth decimal place With so many inexpensive alternate ways for a stockholder to maintain his proportionate interest in the firm the proportionate interest argument lacks importance

Exchange Commission indicate that rights offerings involve lower out-of-pocket costs than underwritten offerings Yet underwriters are employed in over 90 percent of the issues Examination of the arguments to justify the use of underwriters advanced by the underwriting industry, finance textbooks, corporate officers, and securities lawyers suggest that none of the arguments are capable of explaining the observed choice of financing method in terms of rational, wealth-maximizing behavior by the stockholders of the firm

The one hypothesis I find which is consistent with the available evidence relates to the costs of monitoring management Although direct expenses imposed on shareholders are higher per dollar raised through the use of underwriters, I hypothesize that management derives benefits from their use From the shareholders' standpoint, the firm's use of underwriters is optimal because the cost of monitoring management exceeds the savings in out-of-pocket expenses from using rights If this hypothesis is correct, then the present value of the stream of differences in costs reported in this paper provides a lower bound on the costs of getting shareholders together to monitor and control management on the method of raising capital Thus, the present value of the differences in costs establishes a lower bound on the expected costs of control mechanisms such as proxy fights, tender offers, and takeover bids

The monitoring cost hypothesis does present some problems I do not observe directly the costs of monitoring management While it is possible that the monitoring costs are large enough to explain the observed choice of underwriters, consideration of competition in the market for management reduces the plausibility of this hypothesis But if the monitoring cost hypothesis is rejected, then the observed choice of financing method cannot be explained in terms of rational, wealth-maximizing behavior by the owners of the firm, unless it can be shown that I have either ignored or misestimated a relevant cost of using rights or benefit from using underwriters

Appendix 1: A description of the institutional arrangements for rights and underwritten offerings

A description of the procedures followed in the various types of offerings specified in sufficient detail to answer the questions addressed in this study is not available This appendix provides that information Some of this material comes from written sources [34] However, much of the material comes from conversations with underwriters, corporate financial officers, and SEC officials.

Underwritten offerings

The firm typically selects an underwriter in one of two ways – either by competitive bidding or by negotiated underwriting In competitive bidding, the firm files appropriate papers with the SEC, then specifies the terms of the issue and has potential underwriters submit sealed bids Government regulation requires the use of this procedure by electric utility holding companies the primary users of competitive bidding In a negotiated underwriting bid, the important variables in the underwriting contract are determined by direct negotiation between firm and underwriter

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[34] See Weston and Brigham (1975), SEC (1974), and Pessin (1976)

Negotiated underwriting begins with a series of pre-underwriting conferences, when decisions as to the amount of capital, type of security, and other terms of the offering are discussed Several general forms of the underwriting agreement can be employed [35] The first is a 'firm commitment' underwriting agreement, under which the underwriter agrees to purchase the whole issue from the firm at a particular price for resale to the public Almost all large underwriters employ this form In the second form, a 'best efforts' underwriting, the underwriter acts only as a marketing agent for the firm The underwriter does not agree to purchase the issue at a predetermined price, but sells the security for whatever price it will bring The underwriters take a predetermined spread and the firm takes the residual A variant of this agreement employs a fixed price but no guarantee on the quantity to be sold The third possibility is an 'all-or-nothing' commitment which requires the underwriter to sell the entire issue at a given price, usually within thirty days, otherwise the underwriting agreement is voided

If the corporation and underwriter agree to proceed,[36] the underwriter will begin his underwriting investigation, in which he assesses the prospects for the offering This investigation includes an audit of the firm s financial records by a public accounting firm, which aids in preparing the registration statements required by the Securities and Exchange Commission A legal opinion of the offering will be obtained from lawyers who typically participate in writing the registration statement Reports may also be obtained from the underwriter s engineering staff when applicable

Before a company can raise capital through a public offering of new stock it must comply with the Federal Law that governs such a sale – the Securities Act of 1933, and the Securities Exchange Act of 1934 The Securities and Exchange Commission, established to administer both laws, requires full disclosure of all pertinent facts about the company before it makes a public offering of new stock The firm must file a lengthy registration statement with the SEC setting forth data about its financial condition For underwritten issues, the firm usually files the form S-1 or S-7 registration statement Form S-7 is less expensive, but requires certain conditions to qualify [37]

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[35] The underwriter may make a 'standby commitment' during a rights offering under which he will purchase and distribute to the public any amount of the rights issue not purchased by the present security holders This form will be discussed further below

[36] Agreements are usually subject to conditions, most allow the underwriters to void their obligation in the event of specified adverse developments For example, a negative finding in the lawyer's or auditor's reports may allow voiding the contract

The SEC has 20 days to examine the registration statement for material omissions or misrepresentations If any error is found, a deficiency letter is sent to the corporation and the offering is delayed until the deficiency is corrected If no deficiency letter is sent, a registration statement automatically becomes effective 20 days after filing, except when the SEC notifies the firm that the commission's workload is such that it requires more time to review the registration statement [38] The firm will typically amend the registration statement to include the offer price and the offer date after the SEC has examined the rest of the statement This procedure allows the firm and underwriter to postpone the effective date of the registration statement until they agree the offering should proceed

In addition to the registration requirements under the Securities Act of 1933, firms must qualify their securities under the state securities laws, the so-called 'Blue Sky Laws', in those states where the securities are to be sold Some states are satisfied with SEC approval, others require a registration statement be filed with state securities commissioners

The underwriter usually does not handle the purchase and distribution of the issue alone, except for the smallest of security issues The investment banker usually forms a syndicate of other investment bankers and security dealers to assist the underwriting [39] During the waiting period between the filing and the offer date, no written sales literature other than the so-called 'red herring'

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[37] For example, the majority of the board of directors have been members for the last three years, there have been no defaults on preferred stock or bond payments for the past 10 years, net income after taxes was at least $500,000 for the past five years, and earnings exceeded any dividend payments made over the past five years

[38] In 1960 and 1961, delays of four to six months occurred for this reason

[39] Prior to the passage of the Securities Act in 1933 most new issues were purchased by an originating house The originating house would resell the issue at a small increase in price to a so-called banking group, generally a few large houses The banking group would then sell the issue to an underwriting group, which in turn sold it to a selling syndicate – each sale occurred at a fractional increase in price The selling syndicate members, however, were liable for their proportional interest of any securities remaining unsold Late in the 1920s it became frequent practice to make the final group a so-called selling group, the members of which had no liability except for securities which they had purchased from the underwriting syndicate

The Securities Act, as amended shortly after its passage, contained a provision limiting an underwriter s liability for misstatements and omissions in the registration statement to an amount not 'in excess of the total price at which securities underwritten by him and distributed to the public were offered to the public' This Act changed the method of wholesaling securities, the use of the joint syndicate in handling registered securities disappeared Because of the provisions of the Act, it was to the advantage of the manager of the offering to have his fellow participants purchase direct from the company, since then the manager's liability under the Act became limited to the amount which the firm itself underwrote Liability for transfer taxes that would have been payable on the sale by the manager to the underwriters was thus avoided At the present time, underwriters of securities registered under the Act contract to buy directly from the issuer even though the manager of the offering signs the agreement with the issuer on behalf of each of the underwriting firms prospectus[40] and 'tombstone' advertisements[41] are permitted by the SEC However, oral selling efforts are permitted, and underwriters can and do note interest from their clients to buy at various prices These do not represent legal commitments, but are used to help the underwriter decide on the offer price for the issue Underwriters typically attempt to obtain indications of interest for approximately 10 percent more shares than will be available through the offering [42]

Before the effective date of the registration, the corporation's officers meet with the members of the underwriting group Given the personal liability provisions of the 1933 Act, this meeting is often identified as a due diligence meeting An investment banker who is dissatisfied with any of the terms or conditions discussed at this session can still withdraw from the group with no legal or financial liability Discussed at this meeting are (1) the information in the firm's registration statement, (2) the material in the prospectus, (3) the specific provisions of the formal underwriting agreement As a rule, all the provisions of the formal underwriting agreement are set except the final sales price

The 'Rules of Fair Practice' of the National Association of Security Dealers require that new issues must be offered at a fixed price and that a maximum offering price be announced two weeks in advance of the offering However, the actual offering price need not be established until immediately before the offering date In fact, the binding underwriting agreement which specifies the offer price is not normally signed until within 24 hours of the effective date of the registration

Once the underwriter files the final offering price with the SEC, the underwriters are precluded from selling the shares above this price The SEC permits the managing underwriter to place a standing order with the specialist to buy the stock at the public offer price If the underwriter buys more than 10 percent of the shares to be issued through this order, the syndicate usually breaks, permitting the stock to be sold below the offer price The syndicate can also be broken if the managing underwriter feels that the issue cannot be sold at the offer price [43] On the other hand, if all the indications of interest become orders

[40] The red herring prospectus derives its name from the required disclaimer on the front printed in red

> A registration statement relating to these securities has been filed with the Securities and Exchange Commission but has not yet become effective Information contained herein is subject to completion or amendment These securities may not be sold nor may offers to buy be accepted prior to the time the registration statement becomes effective This prospectus shall not constitute an offer to sell or the solicitation of an offer to buy nor shall there be any sale of these securities in any state in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such state

[41] The very limited notice of the offering permitted is often presented in a form resembling the inscription on a tombstone – hence the name

[42] This procedure is like 'over-booking' on airplane flights

[43] Syndicates break infrequently, my impression is that this occurs less than five percent of the time See *History of Corporate Finance For the Decade* (1972)

for shares, the issue is oversold In that case the managing underwriter typically sells additional shares short and covers these short sales in the aftermarket

The final settlement with the underwriter usually takes place seven to ten days after the registration statement becomes effective At that time, the firm receives the proceeds of the sale, net of the underwriting compensation

Rights offering

Offering of stock to existing shareholders on a pro rata basis is called a rights offering Each stockholder owning shares of common stock at the issue date receives an instrument (formally called a warrant) giving the owner the option to buy new shares [44] One warrant or right is issued for each share of stock held [45] This instrument states the relevant terms of the option (1) the number of rights required to purchase one new share, (2) the exercise price (or subscription price) for the rights offering, (3) the expiration date of the rights offering

Before the offering, the firm must file a registration statement for these securities For rights offerings, the firm typically files either a form S-1 or S-16 registration S-16 is simpler, but has usage requirements similar to those of form S-7

After the SEC approves the registration statement, the firm establishes a holder of record date The stock exchange establishes the date five business days earlier as the ex rights date [46] All individuals who hold the stock on the ex rights date will appear in the company's records on the holder of record date and will receive the rights However, the rights can be traded on a 'when issued' basis Usually trading begins after the formal announcement of the rights offering To ensure that there is adequate time for the stockholders to exercise or sell their rights, the New York Stock Exchange requires that the minimum period during which rights may be exercised is 14 days Rights trade on the exchange where the stock is listed

Issuing rights is costly in terms of management s time, postage and other expenses, so it is in the best interest of the firm to ensure the success of the offering Therefore, the firm has an incentive to set the subscription price of the rights low enough to ensure that the rights will be exercised But some of the warrants of most offerings do expire unexercised These unexercised rights can be offered through an over-subscription privilege to subscribing shareholders on a pro rata basis Shares not distributed through the rights offering or through the over-subscription privilege can be sold by the firm either to investment bankers or directly to the public

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[44] In the 1880s it was customary to require a stockholder to appear in person in the office of the corporation to subscribe to the issue After the 1880s, it became customary to send out a printed slip of paper so the stockholders could sign and subscribe for the stock without actually having to appear Later, it became the practice to make these slips of paper transferable, so that they could be sold Around 1910 the engraved form of warrant was first issued

[45] The Uniform Practice Code of the National Association of Security Dealers, Inc, provides that subscription rights issued to security holders shall be traded in the market on the basis of one right accruing on each share of outstanding stock, except when otherwise designated by the National Uniform Practice Committee Thus, the price quotation will be based on a single right even though several rights may be necessary to purchase one new share

[46] This procedure is comparable to that used in setting the ex dividend date

Rights offerings with a standby underwriting agreement

A formal commitment with an underwriter to take the shares not distributed through a rights offering is called a standby underwriting agreement Several types of fee schedules are generally employed in standby underwriting agreements A single fee may be negotiated. the firm paying the underwriter to exercise any unexercised rights at the subscription price A two fee agreement employs both a standby fee', based on the total number of shares to be distributed through the offering and a take-up fee, based on the number of warrants handled The take-up' fee may be a flat fee or a proportioned fee [47] These agreements generally include a profit sharing arrangement on unsubscribed shares (e g, if the underwriter sells the shares for more than the subscription price. this difference in prices is split between the underwriter and the firm according to an agreed formula)

Underwriters are prohibited from trading in the rights until 24 hours after the rights offering is made [48] After that time. they can sell shares of the stock short and purchase and exercise rights to cover their short position in the stock. thus hedging the risk that they bear

Appendix 2: A contingent claims analysis of rights and underwriting contracts

The derivation of general equilibrium pricing implications of rights and underwriting contracts has not been presented Black and Scholes (1973) suggest the approach I employ to value rights, but they do not carry out the analysis or present the solution Edermgton (1975) provides a model of under-

[47] A proportioned fee involves more than one price for the shares handled by the underwriter For example there may be one price for the first 15% of the issue, a higher price for from 15% to 30% of the issue, and a still higher price for any of the issue over 30% which is unexercised through the rights offering and must be purchased by the underwriter

[48] Through the late 1940s underwriters were prohibited from trading in the rights during the offering This arrangement increased the underwriter s risk because the 14-day time period allowed large adverse price movements in the stock The NYSE instituted a study in 1947 after the failure of three rights offerings They found than on 43 rights offerings which had been successful the total underwriting profit was approximately $2 4 million, while on the three unsuccessful offerings, their losses were in excess of $3 million Underwriters were reportedly refusing to sign standby agreements unless the offering period were as short as five days Since this violated NYSE rules no NYSE listed firms used rights issues with standby underwriting agreements In response to this impasse, the NYSE now allows underwriters to trade in the rights 24 hours after the rights offering is made

writer behavior, but his model assumes underwriters maximize expected profits, and thus does not represent a general equilibrium solution in a market where the agents are risk averse The option pricing framework employed here will yield a solution which is consistent with general equilibrium, no matter what the risk preferences of the agents in the market.

I employ the contingent claims pricing techniques to derive a specification of the equilibrium value of these contracts For valuing both contracts I assume

(1) There are homogeneous expectations about the dynamics of firm asset values and of security prices The distribution of firm values at the end of any finite time interval is log normal The variance rate, σ^2, is constant
(2) Capital markets are perfect There are no transactions costs or taxes and all traders have free and costless access to all available information Borrowing and perfect short sales of assets are allowed Traders are price takers in the capital markets
(3) There is a known constant instantaneously riskless rate of interest, r, which is the same for borrowers and lenders
(4) Trading takes place continuously, price changes are continuous and assets are infinitely divisible
(5) The firm pays no dividends

Rights offerings

To derive the equilibrium value of the rights offering I make the following assumptions about the specification of the rights offering

> The total proceeds to the firm if the rights are exercised is X (the exercise price per share times the total number of shares sold through the rights issue) The rights expire after T time periods If the rights are exercised, the shares sold through the offering will be a fraction, γ, of the total number of shares outstanding ($\gamma \equiv Q_R/(Q_S+Q_R)$, where Q_R is the number of shares sold through the rights offering and Q_S is the existing number of shares) Any assets acquired with the proceeds of the rights offering are acquired at competitive prices[49]

Given the above assumption, Merton (1974) has demonstrated that any contingent claim, whose value can be written solely as a function of asset value and time must satisfy the partial differential equation

$$\frac{\partial f}{\partial t}=\frac{1}{2}\frac{\partial^2 f}{\partial V^2}\sigma^2 V^2+rV\frac{\partial f}{\partial V}-rf, \tag{A1}$$

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[49] This last assumption is necessary to avoid the problem of the dependence of the dynamic behavior of the stock price on the probability of the rights being exercised

where $f(V, t)$ is the function representing the value of the contingent claim [e.g., $R = R(V, t)$]. To solve this equation, normally two boundary conditions are required, one in the time dimension and one in the firm value dimension.

To derive the appropriate boundary condition in the time dimension, note that when the time to expiration is zero, R^*, the value of the rights at the expiration date will be either zero (in which case the rights will not be exercised) or, if the rights are valuable and are exercised, their value is their claim on the total assets of the firm, $\gamma(V^*+X)$ (where V^* is the value of the firm's assets and X is the proceeds from the exercise of the rights) minus the payment the right-holders must make, X:

$$R^* = \mathrm{Max}\,[0, \gamma(V^*+X)-X], \tag{A2}$$

where:

V^* is the value of the firm's assets at the expiration date of the issue.

X is the proceeds to the firm of the exercise of the rights.

γ is the fraction of new shares issued through the rights offering to the total shares of the firm (both old and new).

The most natural boundary condition in the firm value dimension is that when the value of the firm is zero, the value of the rights issue, R, is zero. However, the first assumption, that the distribution of firm values is log normal, insures that V can never be zero; therefore, this boundary condition will never be binding.

This equation can be solved by noting that no assumptions about risk preferences have been made, thus the solution must be the same for any preference structure which permits equilibrium. Therefore choose that structure which is mathematically simplest.[50] Assume that the market is composed of risk-neutral investors. In that case, the equilibrium rate of return on all assets will be equal. Specifically, the expected rate of return on the firm, and the rights will equal the riskless rate. Then the current rights price must be the discounted terminal price:

$$R = \mathrm{e}^{-rT}\int_{((1-\gamma)/\gamma)X}^{\infty} [\gamma V^*-(1-\gamma)X]L'(V^*)\,\mathrm{d}V^*, \tag{A3}$$

where $L'(V^*)$ is the log normal density function.

Eq. (A3) can be solved to yield:[51]

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[50] See Cox and Ross (1976) or Smith (1976). For a mathematical derivation of this solution technique, see Friedman (1975), especially page 148.

[51] See Smith (1976, p. 16) for a theorem which can be employed to immediately solve (A3) to yield (A4).

$$
\begin{aligned}
R &= \gamma VN\left\{\frac{\ln(\gamma V/(1-\gamma)X)+(r+\sigma^2/2)T}{\sigma\sqrt{T}}\right\} \\
&\quad -e^{-rT}(1-\gamma)XN\left\{\frac{\ln(\gamma V/(1-\gamma)X)+(r-\sigma^2/2)T}{\sigma\sqrt{T}}\right\} \\
&= R(V, T, X, \gamma, \sigma^2, r) \qquad \text{(A4)}
\end{aligned}
$$

where $\partial R/\partial V$, $\partial R/\partial T$, $\partial R/\partial \gamma$, $\partial R/\partial \sigma^2$, $\partial R/\partial r > 0$ and $\partial R/\partial X < 0$

The indicated partial effects have intuitive interpretations Increasing the value of the firm, decreasing the exercise price (holding the proportion of the firm's shares offered through the rights offering constant), or increasing the proportion of the firm's shares offered through the rights offering (holding the total proceeds of the issue constant) increase the expected payoff to the rights and thus increases the current market value of the rights offering An increase in the time to expiration of the riskless rate lowers the present value of the exercise payment, and thus increases the value of the rights Finally, an increase in the variance rate gives a higher probability of a large increase in the value of the firm and increases the value of the rights

Underwriting agreements

To analyze the appropriate compensation to the underwriter for the risk he bears in the distribution of the securities make the following assumptions about the underwriting contract

> Underwriters submit a bid, B, today which specifies that on the offer date, T time periods from now, the underwriter will pay B dollars and receive shares of stock representing fraction γ of the total shares of the firm He can sell the securities at the offer price and receive a total payment of Ω, or (if the share price is below the offer price) at the market price, $\gamma(V^*+B)$ If his bid is accepted, he will be notified immediately

Again, (A1) can be employed where $f(V, t)$ is the function representing the value of the underwriting contract (i e , $U-U(V, t)$) The boundary condition for this problem is

$$U^* = \text{Min}[\gamma(V^*+B)-B, \Omega-B] \qquad \text{(A5)}$$

This assumes that at the offer date the underwriter will pay the firm B dollars The shares which the underwriter receives represent a claim to a fraction γ of the total assets of the firm, V^*+B If the offer price is greater than the value of the shares, $\gamma(V^*+B)$, then the underwriter will be unable to sell the shares at the offer price, hence he will receive $\gamma(V^*+B)$ If, at the offer date the offer price is less than the value of the shares, the underwriter receives the offer price Therefore, the boundary condition is that at the offer date the underwriting contract is worth the minimum of the market value of the shares minus the bid, B, or the proceeds of the sale at the offer price minus the bid

Again, the above solution technique can be employed to solve (A1) subject to (A5). In a risk-neutral world, the expected value of the underwriting contract can be expressed as [52]

$$U = \int_0^{(\Omega/\gamma)-B} [\gamma(V^*+B)-B]L'(V^*)\mathrm{d}V^* + \int_{(\Omega/\gamma)-B}^{\infty} [\Omega-B]L'(V^*)\mathrm{d}V^*. \tag{A6}$$

Note that this can be rewritten as

$$U = \int_0^{\infty} [\gamma(V^*+B)-B]L'(V^*)\mathrm{d}V^* - \int_{(\Omega/\gamma)-B}^{\infty} \gamma\left[V^*-\left(\frac{\Omega}{\gamma}-B\right)\right]L'(V^*)\mathrm{d}V^* \tag{A7}$$

Eq (A7) can be solved for the risk-neutral case to yield

$$U = \mathrm{e}^{rT}\gamma V-(1-\gamma)B-\mathrm{e}^{rT}\gamma VN\left\{\frac{\ln(\gamma V/(\Omega-\gamma B))+(r+\sigma^2/2)T}{\sigma\sqrt{T}}\right\} + (\Omega-B\gamma)N\left\{\frac{\ln(\gamma V/(\Omega-\gamma B)+(r-\sigma^2/2)T}{\sigma\sqrt{T}}\right\} \tag{A8}$$

Examination of (A8) reveals that the underwriting contract is equivalent to a portfolio consisting of a long position in the firm, a cash payment, and writing a call on γ of the firm with an exercise price equal to $(\Omega-\gamma B)$

$$U = \mathrm{e}^{rT}\gamma V-(1-\gamma)B-\mathrm{e}^{rT}C(\gamma V, T, \Omega-\gamma B) = \mathrm{e}^{rT}\gamma V-(1-\gamma)B-\mathrm{e}^{rT}\gamma C\left(V, T, \frac{\Omega}{\gamma}-B\right), \tag{A9}$$

where C( ) is the Black-Scholes call option function

If the process of preparing and submitting a bid is costless, then in a competitive equilibrium, the value of the underwriting contract must be zero [53]

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[52] Since the contract calls for the payment only at t^*, to find the current value of the underwriting contract does not require discounting

[53] If this were not the case, arbitrage profits could be earned by acquiring an underwriting contract and establishing the above hedge

Therefore the bid which would represent a normal compensation for the risk he bears is implicitly defined by the equation [54]

$$B-e^{rT}\frac{\gamma}{1-\gamma}\left[V-C\left(V,T,\frac{\Omega}{\gamma}-B\right)\right]=0 \qquad \text{(A10)}$$

The firm generally receives less than the market value of the stock[55] given the specification of the underwriting contract, if the equilibrium stock price at the offer date is above the offer price then the initial purchaser of the issue receives 'rents', he obtains the shares for less than the market value of the shares Therefore, if the offer price in the underwriting agreement represents a binding constraint to the underwriter, then in a perfect market underwriting must be a more expensive method of raising additional capital than is a rights issue Therefore, under these conditions, underwriting would not be employed

The above analysis implicitly assumes that the terms of the underwriting contract represent a binding constraint to the underwriter, i e , if the security price is above the offer price, then the offer price presents a constraint to the underwriter and a pure profit opportunity to the potential investor However, in a market without transactions costs, this could not be the case If the security price is above the offer price there will be excess demand for the issue To the extent that the underwriter can, through the rationing process, extract those profits, they will accrue to the underwriter rather than to the initial purchaser In this situation competition among underwriters would ensure that the profits were in fact garnered by the firm In that case the offer price presents no effective constraint and the competitive bid becomes simply

$$B=e^{rT}\left(\frac{\gamma}{1-\gamma}\right)V \qquad \text{(A11)}$$

Therefore, if through tie-in sales or other means the offer price in an underwriting agreement can be circumvented, then underwriting is no more expensive a method of raising additional capital than a rights offering

[54] This equation implicitly defines the bid because B appears twice in the equation The explicit solution for equilibrium bid can be found by standard numerical analysis techniques

[55] A sufficient condition for the bid to be less than the market value of the shares is that $(1-\gamma)$ be less than $e^{\gamma T}$ Since T is generally a matter of days, this condition should be met

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