Exhibit No.: 101
Issues: Rate of Return on Equity

Witness: Pauline M. Ahern
Exhibit Type: Direct
Sponsoring Party: Missouri-American Water Company
Case Nos.: WR-2010-XXXX
SR-2010-XXXX
Date: October 30, 2009

PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

CASE NOS. WR-2010-XXXX
SR-2010-XXXX

DIRECT TESTIMONY

OF

PAULINE M. AHERN, CRRA

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

JEFFERSON CITY, MISSOURI

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

IN THE MATTER OF MISSOURI-AMERICAN WATER COMPANY FOR AUTHORITY TO FILE TARIFFS REFLECTING INCREASED RATES FOR WATER AND SEWER SERVICE	)))))	**CASE NO. WR-2010-XXXX** **CASE NO. SR-2010-XXX**

AFFIDAVIT OF PAULINE M. AHERN

Pauline M. Ahern, being first duly sworn, deposes and says that she is the witness who sponsors the accompanying testimony entitled "Direct Testimony of Pauline M. Ahern"; that said testimony and schedules were prepared by her and/or under her direction and supervision; that if inquires were made as to the facts in said testimony and schedules, she would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of her knowledge.

Pauline M. Ahern

State of New Jersey
County of Burlington
SUBSCRIBED and sworn to
Before me this 21st day of October 2009.

Notary Public

My commission expires:

SHARON M. KEEFE
NOTARY PUBLIC OF NEW JERSEY
MY COMMISSION EXPIRES JULY 9, 2011

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.

A. My name is Pauline M. Ahern. I am a Principal of AUS Consultants. My business address is 155 Gaither Drive, Suite A, Mt. Laurel, New Jersey 08054.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I am a graduate of Clark University, Worcester, MA, where I received a Bachelor of Arts degree with honors in Economics in 1973. In 1991, I received a Master of Business Administration with high honors from Rutgers University.

In June 1988, I joined AUS Consultants as a Financial Analyst and am now a Principal. I am responsible for the preparation of all fair rate of return and capital structure exhibits for AUS Consultants and offering expert testimony on behalf of investor-owned utilities before twenty-five state regulatory commissions. The details of these appearances, as well as details of my educational background, are shown in Appendix A supplementing this testimony.

I am also the Publisher of AUS Utility Reports (formerly C.A. Turner), where I am responsible for the production, publication, distribution and marketing of various reports. AUS Utility Reports provides financial data and related ratios as well as merger and acquisition activity covering more than 100 public utility companies on a monthly, quarterly, and annual basis. Coverage includes electric, combination gas and electric, gas distribution, gas transmission, telephone, water and international utilities.

I also calculate and maintain the A.G.A. Index under contract with the American Gas Association (A.G.A.), which serves as the benchmark against which the performance of the American Gas Index Fund (AGIF) is measured on a monthly basis. The A.G.A. Index and AGIF are a market capitalization weighted index and fund, respectively, comprised of the common stocks of the publicly traded corporate members of the A.G.A.

I have co-authored a working paper with Frank J. Hanley, a Principal and Director of AUS Consultants and Richard A. Michelfelder, Ph.D., a professor of Finance at The School of Business, Rutgers University entitled "New Approach to Estimating the Cost of Common Equity for Public Utilities" which was presented at the Advanced Workshop in Regulation and Competition at the 28th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI) at Rutgers University on May 14, 2009. I have also co-authored a second article with Frank J. Hanley entitled "Comparable Earnings: New Life for an Old Precept" which was published in the American Gas Association's Financial Quarterly Review, Summer 1994. I also assisted in the preparation of an article authored by Frank J. Hanley and A. Gerald Harris entitled "Does Diversification Increase the Cost of Equity Capital?" published in the July 15, 1991 issue of Public Utilities Fortnightly.

I am a member of the Society of Utility and Regulatory Financial Analysts (SURFA, formerly the National Society of Rate of Return Analysts) serving as President since 2006, being reelected in 2008 with a term ending in 2010. Previously, I held the position of Secretary/Treasurer for 2004-2006. In

1992, I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by SURFA, which is based upon education, experience and the successful completion of a comprehensive written examination.

I am an associate member of the National Association of Water Companies, serving on its Finance/Accounting/Taxation Committee, a member of the Energy Association of Pennsylvania, formerly the Pennsylvania Gas Association, and a member of the American Finance and Financial Management Associations.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose is to provide testimony on behalf of Missouri-American Water Company (MAWC or the Company) relative to the appropriate common equity cost rate which it should be afforded the opportunity to earn on the common equity financed portion of its jurisdictional rate base.

Q. WHAT IS YOUR RECOMMENDED COMMON EQUITY COST?

A. I recommend that the Missouri Public Service Commission (MO PSC or the Commission) authorize the Company the opportunity to earn a common equity cost rate of 11.60% on the common equity financed portion of its jurisdictional rate base. A common equity cost rate of 11.60% results in an overall rate of return of 8.83% when applied to a common equity ratio of 48.94% pro forma at April 30, 2010 developed by Company Witness Michi Chao as summarized in Table 1 below:

Table 1

Type of Capital	Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.06%	6.36%	3.18%
Short-Term Debt	0.68	3.62	0.02
Total Debt	50.74		3.20
Preferred Stock	0.32	9.23	0.03
Common Equity	48.94	11.60	5.68
Total	100.00%		8.91%

Q. HAVE YOU PREPARED SCHEDULES WHICH SUPPORT YOUR RECOMMENDED OVERALL FAIR RATE OF RETURN?

A. Yes, I have. They have been marked for identification as Schedules PMA-1 to PMA-14.

II. SUMMARY

Q. PLEASE SUMMARIZE YOUR RECOMMENDED COMMON EQUITY COST RATE.

A. My recommended common equity cost rate of 11.60% is summarized on page 2 of Schedule PMA-1. As a wholly-owned subsidiary of American Water Works Company, Inc. (American Water or the Parent), MAWC's common stock is not publicly traded. Therefore, a market-based common equity cost rate cannot be determined directly for MAWC. Consequently, in arriving at my recommended common equity cost rate of 11.60%, I assessed the market-based cost rates of companies of relatively similar risk, i.e., proxy group(s), for insight into a recommended common equity cost rate applicable to MAWC and suitable for cost of capital purposes. Using other utilities of relatively comparable risk as

proxies is consistent with the principles of fair rate of return established in the Hope[1] and Bluefield[2] cases and adds reliability to the informed expert judgment necessary to arrive at a recommended common equity cost rate. However, no proxy group(s) can be selected to be identical in risk to MAWC. Therefore, the proxy group(s)' results must be adjusted if necessary, to reflect the greater relative business and/or financial risk of MAWC, will be subsequently discussed in detail.

Consistent with the Efficient Market Hypothesis (EMH) which will be discussed in more detail below, my recommendation results from the application of four well-tested market-based cost of common equity models, the Discounted Cash Flow ("DCF") approach, the Risk Premium Model ("RPM"), the Capital Asset Pricing Model ("CAPM"), and the Comparable Earnings Model ("CEM").

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[1] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944).

[2] Bluefield Water Works Improvement Co. v. Public Serv. Comm'n, 262 U.S. 679 (1922).

The results derived from each are as follows:

Table 2

	Proxy Group of Six AUS Utility Reports Water Companies	Proxy Group of Eight AUS Utility Rpts. Gas Distribution Companies
Discounted Cash Flow Model	11.73%	8.68%
Risk Premium Model	11.12	10.85
Capital Asset Pricing Model	11.58	10.49
Comparable Earnings Model	13.50	NMF
Indicated Common Equity Cost Rate Before Adjustment for Business Risk	12.15%	10.35%
Business Risk Adjustment	0.05	0.15
Indicated Common Equity Cost Rate After Adjustment for Business Risk	12.20%	10.50%
Financial/Credit Risk Adjustment	0.32	0.21
Range of Indicated Common Equity Cost Rate After Adjustment for Business and Financial/Credit Risk	12.52%	10.71%
Recommended Common Equity Cost Rate	11.60%	

After reviewing the cost rates based upon the four models, I conclude that common equity cost rates of 12.15% and 10.35% are indicated based upon the application of all four models to the market data of the proxy groups of six AUS Utility Reports water companies and eight AUS Utility Reports natural gas distribution companies, (LDCs), respectively before any adjustments for business and/or financial/credit risk. These indicated common equity cost rates were then adjusted upward by 5 basis points (0.05%) and 15 basis points (0.15%), respectively, to reflect MAWC's increased business risk, due to its

smaller size relative to both proxy groups and by 32 basis points (0.32%) and 21 basis points (0.21%), respectively, to reflect MAWC's increased financial/credit risk. Both adjustments will be discussed in detail subsequently. After these adjustments, the risk-adjusted common equity cost rates are 12.52% for the water company proxy group and 10.71% for the LDCs. The midpoint of the risk-adjusted common equity cost rates for both proxy groups is 11.62% ((12.52% + 10.71%)/2) which, when rounded to 11.60%, is my recommended common equity cost rate.

III. GENERAL PRINCIPLES

Q. WHAT GENERAL PRINCIPLES HAVE YOU CONSIDERED IN ARRIVING AT YOUR RECOMMENDED COMMON EQUITY COST RATE OF 11. 45%?

A. In unregulated industries, the competition of the marketplace is the principal determinant of the price of a product or service. In the case of regulated public utilities, regulation must act as a substitute for marketplace competition. Therefore, marketplace data must be relied upon in assessing a common equity cost rate appropriate for ratemaking purposes in order to assure that the utility can fulfill its obligations to the public and provide safe and adequate service at all times. This requires a level of earnings sufficient to maintain the integrity of presently invested capital and to permit the attraction of needed new capital at a reasonable cost in competition with other firms of comparable risk, consistent with the fair rate of return standards established by the U.S. Supreme Court in the Hope and Bluefield cases cited previously. Consequently, in my determination of common equity cost rate, I have

evaluated data gathered from the marketplace for utilities as similar in risk as possible to MAWC.

IV. BUSINESS RISK

Q. PLEASE DEFINE BUSINESS RISK AND EXPLAIN WHY IT IS IMPORTANT TO THE DETERMINATION OF A FAIR RATE OF RETURN.

A. Business risk is the riskiness of a company's common stock without the use of debt. Examples of business risk include the quality of management, the regulatory environment, customer mix and concentration of customers, service territory growth and the like, which have a direct bearing on earnings.

Business risk is important to the determination of a fair rate of return because the greater the level of risk, the greater the rate of return investors demand, consistent with the basic financial precept of risk and return.

Q. PLEASE DISCUSS THE BUSINESS RISKS FACING THE WATER INDUSTRY IN GENERAL.

A. One of the major risks facing the water and wastewater utility industry is related to replacing aging transmission and distribution systems. Although Value Line Investment Survey[3] (Value Line) observes the following about the water utility industry, it applies equally to the wastewater utility industry as many of the water companies followed by Value Line also have wastewater operations:

> These stocks, although up, have lost some of their luster since our April report. Indeed, the group, as a whole, has fallen from the upper echelon of the *Value Line Investment* universe for Timeliness, as the broader market showed some glimpses of rallying, and now sports an average rank.

[3] Value Line Investment Survey, July 24, 2009.

> Financing issues raise some concerns, longer-term, however, and limit the group's 3- to 5-year appeal. In fact, not a single stock in this industry stands out for 3- to 5-year appreciation potential, as rising infrastructure costs threaten to erase the bulk of future profit advances.
>
> The water utilities is [sic] an increasingly capital intensive industry. Many infrastructures are outdated and will require heavy investment in order to make the necessary repairs. Greater EPA requirements only make things more difficult, as infrastructure costs are estimated at hundreds of millions of dollars over the next decade.
>
> Cash is at a premium in this space, however, with most companies sporting highly leveraged balance sheets and nominal cash reserves. That said, debt and stock issuances have become, and are likely to remain, commonplace as providers struggle to foot the bill. Unfortunately, the increased costs associated with such financial undertakings, i.e., steeper interest rates and higher share counts, are likely to dilute share earnings growth as well as shareholder gains.

Also in its 2009 infrastructure Fact Sheet[4] published by the American Society of Civil Engineers (ASCE) they state:

> America's drinking water systems face an annual shortfall of at least $11 billion to replace aging facilities that are near the end of their useful lives and to comply with existing and future federal water regulations. This does not account for growth in the demand for drinking water over the next 20 years. Leaking pipes lose an estimated 7 billion gallons of clean drinking water a day.

In addition, because the water and wastewater industry is much more capital-intensive than the electric, natural gas or telephone industries, the investment required to produce a dollar of revenue is greater. For example, it took $3.44 of net utility plant on average to produce $1.00 in operating revenues in 2008 for the water utility industry as a whole. In contrast, for the electric, combination electric and gas, natural gas or telephone utility industries, on

[4] 2009 American Society of Civil Engineers, Report Card for American's Infrastructure 2009.

average it took only $1.87, $1.36, $0.89 and $0.87, respectively, to produce $1.00 in operating revenues in 2008. For MAWC specifically it took $5.63 of net utility plant to produce $1.00 in operating revenues in 2008. And, because investor-owned water and wastewater utilities typically do not receive federal funds for infrastructure replacement, the challenge to investor-owned water and wastewater utilities is exacerbated and their access to financing is restricted, thus increasing risk.

The National Association of Regulatory Commissioners (NARUC) has also highlighted the challenges facing the water and wastewater industry stemming from its capital intensity. NARUC's Board of Directors adopted a resolution in July 2006, taking the position that[5]:

> WHEREAS, To meet the challenges of the water and wastewater industry which may face a combined capital investment requirement nearing one trillion dollars over a 20-year period, the following policies and mechanisms were identified to help ensure sustainable practices in promoting needed capital investment and cost-effective rates: a) the use of prospectively relevant test years; b) the distribution system improvement charge; c) construction work in progress; d) pass-through adjustments; e) staff-assisted rate cases; f) consolidation to achieve economies of scale; g) acquisition adjustment policies to promote consolidation and elimination of non-viable systems; h) a streamlined rate case process; i) mediation and settlement procedures; j) defined timeframes for rate cases; k) integrated water resource management; l) a fair return on capital investment; *and* m) improved communications with ratepayers and stakeholders; *and*
>
> WHEREAS, Due to the massive capital investment required to meet current and future water quality and infrastructure requirements, adequately adjusting allowed equity returns to recognize industry risk in order to provide a fair return on invested capital was recognized as crucial...

[5] "Resolution Supporting Consideration of Regulatory Policies Deemed as 'Best Practices'", Sponsored by the Committee on Water. Adopted by the NARUC Board of Directors, July 27, 2006.

> RESOLVED, That the National Association of Regulatory Utility Commissions (NARUC), convened in its July 2006 Summer Meetings in Austin, Texas, conceptually supports review and consideration of the innovative regulatory policies and practices identified herein as "best practices;" *and be it further*
>
> RESOLVED, That NARUC recommends that economic regulators consider and adopt as many as appropriate of the regulatory mechanisms identified herein as best practices...

MAWC itself is facing an expected "massive capital investment" as it projects gross capital expenditures of $574.455 million for the years 2009 through 2014, representing an increase of 41% over 2008 gross plant of $1.389 billion.

The water and wastewater utility industry also experiences lower relative depreciation rates. Lower depreciation rates, as one of the principal sources of internal cash flows for all utilities, mean that water and wastewater utility depreciation as a source of internally-generated cash is far less than for electric, natural gas or telephone utilities. Water and wastewater utilities' assets have longer lives and, hence, longer capital recovery periods. As such, water and wastewater utilities face greater risk due to inflation which results in a higher replacement cost per dollar of net plant than for other types of utilities. Water utilities experienced an average depreciation rate of 2.5% for 2008, with MAWC experiencing a lower rate of 1.8%. In contrast, in 2008, the electric, combination electric and gas, natural gas or telephone industries, experienced average depreciation rates of 3.7%, 3.7%, 4.0% and 7.7%, respectively.

In addition, as noted by Standard & Poor's (S&P)[6]:

[6] Standard & Poor's, Credit Outlook For U.S. Investor-Owned Water Utilities Should Remain Stable in 2008 (January 31,

Standard & Poor's expects the already capital-intensive water utility industry to become even more so over the next several years. Due to the aging pipeline infrastructure and more stringent quality standards, the U.S. Environmental Protection Agency's (EPA) foresees a need for $277 billion to upgrade and maintain U.S. water utilities through 2022, with about $185 billion going toward infrastructure improvements. In addition, about $200 billion will be needed for wastewater applications, which suggests increased capital spending to be a long-term trend in this industry.

In line with these trends, many companies have announced aggressive capital spending programs. Forecast capital spending primarily focuses on infrastructure replacements and growth initiatives. Over the past five years, capital spending has been equivalent to about three times its depreciation expense. However, companies are now forecasting spending to be at or above four times depreciation expense over the intermediate term. For companies in regulatory jurisdictions that provide timely cost recovery for capital expenditures, the increased spending is likely to have a minimal effect on financial metrics and ratings. However, companies in areas without these mechanisms, earnings, and cash flow could be negatively affected by the increased spending levels, which over the longer term could harm a company's overall credit profile.

Due to the high level of capital spending, U.S. investor-owned water utilities do not generate positive free cash flow. This, coupled with the forecast increase in capital spending over the intermediate term, will require additional access to capital markets. We expect rated water companies to have enough financial flexibility to gain that access. Ratings actions shouldn't result from this increased market activity because we expect companies to use a balanced financing approach, which should maintain debt near existing levels.

Moody's[7] also notes that:

We expect that the credit quality of the investor-owned U.S. water utilities will likely deteriorate over the next several years, due to ongoing large capital spending requirements in the industry. Larger capital expenditures facing the water utility industry result from the following factors:

- Continued federal and state environmental compliance

2008) 2, 4.

[7] Moody's Investors Service, Global Credit Research, "Credit Risks and Increasing for U.S. Investor Owned Water Utilities", Special Comment (January 2004) 5.

requirements;

- Higher capital investments for constructing modern water treatment and filtration facilities;
- Ongoing improvement of maturing distribution and delivery infrastructure; and
- Heightened security measures for emergency preparedness designed to prevent potential terrorist acts.

Given the overwhelming importance of protecting the public health, the water utility industry remains regulated by the federal and state regulatory agencies. As a result of this importance, the level of state regulators' responsiveness is critical in enabling the water utilities to maintain their financial integrity. In addition, when utilities are permitted a fair rate of return and timely rate adjustments to reflect the costs of providing this essential service, they will be more able to implement the necessary safeguards to protect the public health.

Also, both the Congressional Budgeting Office (CBO) and the Environmental Protection Agency (EPA) have addressed the necessary future growth in water and wastewater utility infrastructure. In November 2002, the CBO published a study entitled, "Future Investment in Drinking Water and Wastewater Infrastructure" in which it concluded that[8]:

> CBO estimates that for the years 2000 to 2019, annual costs for investment will average between $11.6 billion and $20.1 billion for drinking water systems and between $13.00 billion and $20.9 billion for wastewater systems.

These estimates, over the ten years ending 2019, total from $116.0 - $201.0 billion for drinking water systems and between $130.0 - $209.0 billion for wastewater systems, totaling $246.0 - $410.0 billion for the water and wastewater industry combined.

[8] "Future Investment in Drinking Water and Wastewater Infrastructure", The Congress of the United States - Congressional Budget Office (November 2002) ix.

Similarly, the EPA states the following[9]:

> The survey found that the total nationwide infrastructure need is $334.8 billions for the 20-years period from January 2007 through December 2026. With $200.8 billion in needs over the next 20 years, transmission and distribution projects represent the largest category of need. This result is consistent with the fact that transmission and distribution mains account for most of the nation's water infrastructure. The other categories, in descending order of need are: treatment, storage, source and a miscellaneous category of needs called "other". The large magnitude of the national need reflects the challenges confronting water systems as they deal with an infrastructure network that has aged considerably since these systems were constructed, in many cases, 50 to 100 years ago.

In addition, the water utility industry, as well as the electric and natural gas utility industries, faces the need for increased funds to finance the increasing security costs required to protect the water supply and infrastructure from potential terrorist attacks in the post-September 11, 2001 world.

In view of the foregoing, it is clear that the water and wastewater utility industry's high degree of capital intensity and low depreciation rates coupled with the need for substantial infrastructure capital spending and increased anti-terrorism and anti-bioterrorism security spending, requires regulatory support in the form of adequate and timely rate relief, as recognized by NARUC, so water and wastewater utilities will be able to successfully meet the challenges they face.

Q. DOES MAWC FACE ADDITIONAL EXTRAORDINARY BUSINESS RISK?

A. Yes. MAWC faces additional extraordinary business risk due to its smaller size relative to the proxy groups, because all else equal, size has a bearing on risk.

[9] "Fact Sheet: "EPA's 2007 Drinking Water Infrastructure Needs Survey and Assessment", United States Environmental Protection Agency, Office of Water, February 2009, 1.

Q. PLEASE EXPLAIN WHY SIZE HAS A BEARING ON BUSINESS RISK.

A. Smaller companies are simply less able to cope with significant events which affect sales, revenues and earnings. In general, the loss of revenues from a few larger customers, for example, would have a greater effect on a small company than on a much larger company with a larger customer base. In addition, the effect of extreme weather conditions, i.e., prolonged droughts or extremely wet weather will have a greater affect upon a small operating water utility than upon the much larger, more geographically diverse holding companies.

Further evidence of the risk effects of size include the fact that investors demand greater returns to compensate for a lack of marketability and liquidity for the securities of smaller firms. Because MAWC is the regulated utility to whose rate base the Commission's ultimately allowed overall cost of capital will be applied, the relevant risk reflected in the cost of capital must be that of MAWC, including the impact of its small size on common equity cost rate. MAWC is smaller than the average company in either proxy group based upon the results of my study of the market capitalization of the six water companies and eight LDCs as shown on page 4 of Schedule PMA-1 and in Table 3 below as of September 30, 2009.

Table 3

	Market Capitalization(1)	Times Greater than the Company ($ Millions)
Proxy Group of Six AUS Utility Reports Water Companies	$769.035	1.2x
Proxy Group of Eight AUS Utility Reports Gas Distribution Cos.	1,464.019	2.8x
MAWC	660.080 (2)	
	520.259 (3)	

(1) From page 4 of Schedule PMA-1
(2) Based upon the average market-to-book ratio of the proxy group of six AUS Utility Reports water companies.
(3) Based upon the average market-to-book ratio of the proxy group of eight AUS Utility Reports natural gas distribution companies.

Because MAWC's common stock is not publicly traded, I have assumed that if it were, its the common shares would be selling at the same market-to-book ratio as the average market-to-book ratio for each proxy group, 194.5% and 153.3%, respectively, on September 30, 2009 as shown on page 3 of Schedule PMA-1. Hence, MAWC's market capitalization is estimated at $660.080 million based upon the average market-to-book ratio of the six water companies and $520.259 million based upon the average market-to-book ratio of the eight LDCs. In contrast, the market capitalization of the average AUS Utility Reports water company was $769.035 million on September 30, 2009, or 1.2 times larger than MAWC's estimated market capitalization and $1.464 billion for the average AUS Utility Reports LDC, or 2.8 times larger than MAWC's estimated market capitalization. It is conventional wisdom, supported by actual returns over time, that smaller companies tend to be more risky

causing investors to expect greater returns as compensation for that risk.

Q. DOES THE FINANCIAL LITERATURE AFFIRM A RELATIONSHIP BETWEEN SIZE AND COMMON EQUITY COST RATE?

A. Yes. Brigham[10] states:

> A number of researchers have observed that portfolios of small-firms have earned consistently higher average returns than those of large-firms stocks; this is called "small-firm effect." On the surface, it would seem to be advantageous to the small firms to provide average returns in a stock market that are higher than those of larger firms. In reality, it is bad news for the small firm; what *the small-firm effect means is that the capital market demands higher returns on stocks of small firms than on otherwise similar stocks of the large firms.* (italics added)

V. FINANCIAL RISK

Q. PLEASE DEFINE FINANCIAL RISK AND EXPLAIN WHY IT IS IMPORTANT TO THE DETERMINATION OF A FAIR RATE OF RETURN.

A. Financial risk is the additional risk created by the introduction of senior capital, i.e., debt and preferred stock, into the capital structure. In other words, the higher the proportion of senior capital in the capital structure, the higher the financial risk.

In November 2007, S&P published its electric, gas, and water utility ratings rankings in a framework consistent with the manner in which it presents is rating conclusions across all other corporate sectors. As S&P stated[11]:

> Incorporating utility ratings into a shared framework to communicate the fundamental credit analysis of a company furthers the goals of transparency and comparability in the ratings process.

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[10] Eugene F. Brigham, Fundamentals of Financial Management, Fifth Edition (The Dryden Press, 1989) 623.

[11] Standard & Poor's – Ratings Direct – "U.S. Utilities Ratings Analysis Now Portrayed in The S&P Corporate Ratings Matrix" (November, 30, 2007) 2.

* * *

> The utilities rating methodology remains unchanged, and the use of the corporate risk matrix has not resulted in any changes to ratings or outlooks. The same five factors that we analyzed to produce a business risk score in the familiar 10-point scale are used in determining whether a utility possesses an "Excellent," "Strong," "Satisfactory," "Weak," or "Vulnerable" business risk profile.

S&P expanded its Business Risk / Financial Risk Matrix in May 2009 in an effort to augment its independence, strengthen the rating process and increase S&P's transparency to better serve its markets (see page 11 of Schedule PMA-2).

Pages 1 through 9 of Schedule PMA-2 describe the utility bond rating process. Pages 10 through 15 describe S&P's May 2009 expansion of its Business Risk / Financial Risk Matrix with the new business risk/financial risk matrix shown in Table 1 on page 11 of Schedule PMA-2 and financial risk indicative ratios for utilities shown in Table 2 on page 13. Notwithstanding the metrics published in Table 2, S&P states:

> The rating matrix indicative outcomes are what we typically observe—but are not meant to be precise indications or guarantees of future rating opinions. Positive and negative nuances in our analysis may lead to a notch higher or lower than the outcomes indicated in the various cells of the matrix.

As shown on Schedule PMA-11, page 2, the average S&P bond rating (issuer credit rating), business risk profile and financial risk profile of the six water companies are A+ (A), Excellent and Intermediate, while the average for the eight LDCs are A (A), Excellent and Significant.

Q. CAN ONE NEVERTHELESS MEASURE THE COMBINED BUSINESS

RISKS, I.E., INVESTMENT RISK OF AN ENTERPRISE USING BOND RATINGS AND CREDIT RATINGS?

A. Yes, similar bond ratings/issue credit ratings reflect and are representative of and financial similar combined business risks, i.e., total risk. Although specific business or financial risks may differ between companies, the same bond rating indicates that the combined risks are similar as the bond rating process reflects acknowledgment of all diversifiable business and financial risks in order to assess credit quality or credit risk. Risk distinctions within a bond rating category are recognized by a plus or minus. For example, within the A category, an S&P rating can be at A+, A, or A-. Similarly, Moody's ratings within the A category are distinguished by rating gradation of A1, A2 and A3. Moreover, additional risk distinction is reflected by S&P in the assignment of one of six business risk profiles, as shown in Table 1 on PMA-2, Page 11. For example, S&P expressly indicates that the bond rating process encompasses a qualitative analysis of business and financial risks (see pages 3 through 9 of Schedule PMA-2). While not a means by which one can specifically quantify the differential in common equity risk between companies, the bond (credit) rating provides a useful means to compare/differentiate investment risk between companies because it is the result of a thorough and comprehensive analysis of all diversifiable business risks, i.e., investment risk.

VI. MISSOURI-AMERICAN WATER COMPANY

Q. PLEASE DESCRIBE MAWC?

A. MAWC provides water and wastewater services to approximately 455,000 customers, serving over 1.5 million people in and around 121 communities throughout Missouri. MAWC is a wholly-owned subsidiary of American Water Works Company, Inc.. Thus, the Company's common stock is not publicly traded.

As shown on Schedule PMA-3, during the five-year period ending 2008, the achieved average earnings rate on book common equity for MAWC was 6.68%, ranging between 3.13% in 2008 and 9.51% in 2005. The five-year ending 2008 average common equity ratio based upon total capital was 41.79%, while the five-year average dividend payout ratio was 76.55%.

Total debt as a percent of earnings before interest, taxes, depreciation and amortization (EBITDA) for the years 2004-2008 ranged between 5.13 and 6.63 times, averaging 5.74 times during the period, while funds from operations relative to total debt ranged from 6.50% to 13.62%, averaging 11.98% for the period.

Based upon these financial metrics, and recognizing that the bond rating process includes a comprehensive, qualitative assessment of business and financial risk, as discussed previously, it is my opinion that if MAWC had long-term debt which was rated by Moody's or S&P, it would likely be rated in the middle of the Baa/BBB category, with a likely S&P business position of Excellent and a financial risk profile of Aggressive to Highly Leveraged.

VII. PROXY GROUPS

Q. PLEASE EXPLAIN HOW YOU CHOSE THE PROXY GROUP OF SIX AUS UTILITY REPORTS WATER COMPANIES.

A. The basis of selection for the proxy group of six AUS Utility Reports water companies was to select those companies which meet the following criteria: 1) they are included in the Water Company Group of AUS Utility Reports (September 2009); 2) they have Value Line or Reuters consensus five-year EPS growth rate projections; 3) they have a positive Value Line five-year DPS growth rate projection: 4) they have a Value Line adjusted beta; 5) they have not cut or omitted their common dividends during the five years ending 2008 or through the time of the preparation of this testimony; 6) they have 60% or greater of 2008 total net operating income derived from, and 60% or greater of 2008 total assets devoted to, regulated water operations; and 7) which, at the time of the preparation of this testimony, had not publicly announced that they were involved in any major merger or acquisition activity.

Q. PLEASE DESCRIBE SCHEDULE PMA-3.

A. Schedule PMA-3 contains comparative capitalization and financial statistics for the six AUS Utility Reports water companies for the years 2004 - 2008. Page 1 contains a summary of the comparative data for the years 2004-2008. Page 2 contains notes relevant to page 1, as well as the basis of selection and names of the individual companies in the proxy group, while page 3 contains capital structure ratios based upon total capital (including short-term debt) by company and on average for the years 2004-2008.

During the five-year period ending 2008, the historically achieved average earnings rate on book common equity for the group averaged 9.91%. The average common equity ratio based upon total capital was 48.85%, and the average dividend payout ratio was 69.21%.

Total debt as a percent of EBITDA for the years 2004-2008 ranged between 3.52 and 3.97 times, averaging 3.71 times, while funds from operations relative to total debt ranged from 16.80% to 21.00%, averaging 19.21%.

Q. PLEASE EXPLAIN HOW YOU CHOSE THE PROXY GROUP OF EIGHT AUS UTILITY REPORTS NATURAL GAS DISTRIBUTION COMPANIES.

A. Because of the small number of publicly traded water companies available for use as proxies for MAWC as well as the limited availability of comprehensive investment analyst coverage for those companies, I have also utilized a proxy group of gas distribution companies. Like water companies, these gas distribution companies deliver a commodity, i.e., natural gas to customers through a similar distribution system whose service rates of return are set by the regulatory ratemaking process. The basis of selection for the proxy group of eight AUS Utility Reports natural gas distribution companies was to include those companies which meet the following criteria: 1) they are included in the Natural Gas Distribution and Integrated Gas Company Group of AUS Utility Reports (September 2009); 2) they have Value Line or Reuters consensus five-year EPS growth rate projections; 3) they have positive Value Line five-year DPS growth rate projections; 4) they have a Value Line adjusted beta; 5) they

have not cut or omitted their common dividends during the five years ending 2008 or to the time of the preparation of this testimony; 6) they have 60% or greater of 2008 total net operating income derived from and 60% or greater of 2008 total assets devoted to regulated gas distribution operations and 7) which, at the time of the preparation of this testimony, had not publicly announced that they were involved in any major merger or acquisition activity.

Q. PLEASE DESCRIBE SCHEDULE PMA-4.

A. Schedule PMA-4 contains comparative capitalization and financial statistics for the eight AUS Utility Reports natural gas distribution companies for the years 2004 - 2008. Page 1 contains a summary of the comparative data for the years 2004-2008. Page 2 contains notes relevant to page 1, as well as the basis of selection and names of the individual companies in the proxy group, while Page 3 contains capital structure ratios based upon total capital (including short-term debt) by company and on average for the years 2004-2008.

During the five-year period ending 2008, the historically achieved average earnings rate on book common equity for this group averaged 10.90%. The average common equity ratio based upon total capital was 45.11%, and the average dividend payout ratio was 64.07%.

Total debt as a percent of EBITDA for the years 2004-2008 ranged between 3.41 and 3.67 times, averaging 3.59 times during the five-year period, while funds from operations relative to total debt ranged from 16.41% to 21.24%, and averaging 19.13% during the five-year period.

VIII. COMMON EQUITY COST RATE MODELS

A. The Efficient Market Hypothesis (EMH)

Q. ARE THE COST OF COMMON EQUITY MODELS YOU USE MARKET-BASED MODELS, AND HENCE BASED UPON THE EMH?

A. Yes. The DCF model is market-based in that market prices are utilized in developing the dividend yield component of the model. The RPM is market-based in that the bond ratings and expected bond yields used in the application of the RPM reflect the market's assessment of bond/credit risk. In addition, the use of betas to determine the equity risk premium also reflects the market's assessment of market/systematic risk as betas are derived from regression analyses of market prices. The CAPM is market-based for many of the same reasons that the RPM is market-based i.e., the use of expected bond (Treasury bond) yields and betas. The CEM is market-based in that the process of selecting the comparable risk non-utility companies is based upon statistics which result from regression analyses of market prices and reflect the market's assessment of total risk. Therefore, all the cost of common equity models I utilize are market-based models, and hence based upon the EMH.

Q. PLEASE DESCRIBE THE CONCEPTUAL BASIS OF THE EMH.

A. The EMH, which is the foundation of modern investment theory, was pioneered by Eugene F. Fama[12] in 1970. An efficient market is one in which security prices reflect all relevant information all the time, with the implication that prices adjust instantaneously to new information, thus reflecting the intrinsic

[12] Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work" (Journal of Finance, May 1970) 383-417.

fundamental economic value of a security.[13]

As noted by Brealey and Myers[14], the generally accepted "semistrong" form of the EMH, which asserts that all publicly available information is fully reflected in securities prices, i.e., that fundamental analysis cannot enable an investor to "out-perform the market," is generally held to be true because the use of insider information often enables investors to earn excessive returns by "outperforming the market". This means that all perceived risks are taken into account by investors in the prices they pay for securities. Investors are aware of all publicly-available information, including bond ratings, discussions about companies by bond rating agencies and investment analysts as well as the discussions of the various common equity cost rate methodologies (models) in the financial literature. In an attempt to emulate investor behavior, no single common equity cost rate model should be relied upon exclusively in determining a cost rate of common equity and the results of multiple costs of common equity models should be taken into account.

Furthermore, there is substantial support in the academic literature for the need to rely upon more than one cost of common equity model in arriving at a recommended common equity cost rate.

Q. PLEASE DESCRIBE THE ACADEMIC LITERATURE SUPPORTING THE USE OF MORE THAN ONE COST OF COMMON EQUITY MODEL.

[13] Roger A. Morin, New Regulatory Finance (Public Utility Reports, Inc., 2006) 279-281.

[14] Brealey, Richared A. and Myers, Stewart C., Principles of Corporate Finance 1st Ed., (McGraw-Hill, 1996) 329.

Also, Morin[15] states:

> Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate a theory. *The inability of the DCF model to account for changes in relative market valuation, discussed below, is a vivid example of the potential shortcomings of the DCF model when applied to a given company.* Similarly, the inability of the CAPM to account for variables that affect security returns other than beta tarnishes its use. (italics added)
>
> No one individual method provides the necessary level of precision for determining a fair return, but each method provides useful evidence to facilitate the exercise of an informed judgment. Reliance on any single method or preset formula is inappropriate when dealing with investor expectations because of possible measurement difficulties and vagaries in individual companies' market data. (Morin, p. 428)

* * *

The financial literature supports the use of multiple methods. Professor Eugene Brigham, a widely respected scholar and finance academician, asserts:[1](footnote omitted)

> Three methods typically are used: (1) the Capital Asset Pricing Model (CAPM), (2) the discounted cash flow (DCF) method, and (3) the bond-yield-plus-risk-premium approach. These methods are not mutually exclusive – no method dominates the others, and all are subject to error when used in practice. Therefore, when faced with the task of estimating a company's cost of equity, we generally use all three methods and then choose among them on the basis of our confidence in the data used for each in the specific case at hand.

Another prominent finance scholar, Professor Stewart Myers, in an early pioneering article on regulatory finance, stated:[2](footnote omitted)

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically and exclusively. Beta is

[15] Morin 428, 430 - 431.

> helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data.
>
> Reliance on multiple tests recognizes that no single methodology produces a precise definitive estimate of the cost of equity. As stated in Bonbright, Danielsen, and Kamerschen (1988), '*no single or group test or technique is conclusive.*' Only a fool discards relevant evidence. (italics in original) (Morin, p. 430)
>
> * * *
>
> While it is certainly appropriate to use the DCF methodology to estimate the cost of equity, there is no proof that the DCF produces a more accurate estimate of the cost of equity than other methodologies. Sole reliance on the DCF model ignores the capital market evidence and financial theory formalized in the CAPM and other risk premium methods. The DCF model is one of many tools to be employed in conjunction with other methods to estimate the cost of equity. *It is not a superior methodology that supplants other financial theory and market evidence. The broad usage of the DCF methodology in regulatory proceedings in contrast to its virtual disappearance in academic textbooks does not make it superior to other methods. The same is true of the Risk Premium and CAPM methodologies.* (italics added) (Morin, p. 431)

In view of all of the foregoing, it is clear that investors are or should be aware of all of the models available for use in determining a common equity cost rate. Thus EMH requires the assumption that, collectively, investors consider them all.

B. Discounted Cash Flow Model (DCF)

Q. WHAT IS THE THEORETICAL BASIS OF THE DCF MODEL?

A. The theory underlying the DCF model is that the present value of an expected future stream of net cash flows during the investment holding period can be determined by discounting the cash flows at the cost of capital, or the investors' capitalization rate. DCF theory indicates that an investor buys a stock for an

expected total return rate which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate). Thus, the dividend yield on market price plus a growth rate equals the capitalization rate, i.e., the total common equity return rate expected by investors.

Q. PLEASE COMMENT UPON THE APPLICABILITY OF THE DCF MODEL IN ESTABLISHING A COST OF COMMON EQUITY FOR MAWC.

A. The DCF model has a tendency to mis-specify investors' required common equity return rate when the market value of common stock differs significantly from its book value. Mathematically, because the "simplified" DCF model traditionally used in rate regulation assumes a market-to-book ratio of one, it understates/overstates investors' required return rate when market value exceeds, or is less than, book value. It does so because, in many instances, market prices reflect investors' assessments of long-range market price growth potentials (consistent with the infinite investment horizon implicit in the standard regulatory version of the DCF model) not fully reflected in analysts' shorter range forecasts of future growth in earnings per share (EPS) and dividends per share (DPS), both accounting proxies. Thus, the market-based DCF model will result in a total annual dollar return on book common equity equal to the total annual dollar return expected by investors only when market and book values are equal, a rare and unlikely situation. In recent years, the market values of utilities' common stocks have been well in excess of their book values as shown on page 1 of Schedules PMA-3 and PMA-4 ranging

between 205.16% and 276.96% for the six AUS Utility Reports water companies and 159.78% and 173.69% for of eight LDCs.

Under DCF theory, the rate of return investors require is related to the market price paid for a security. Thus, market prices form the basis of investment decisions and investors' expected rates of return. In contrast, a regulated utility is generally limited to earning on its net book value (depreciated original cost) rate base. Market values can diverge from book values for a myriad of macroeconomic reasons including, but not limited to, EPS and DPS expectations, merger or acquisition expectations, interest rates, investor sentiment, unemployment levels, monetary policy etc.

Traditional rate base/rate of return regulation, where a market-based common equity cost rate is applied to a book value rate base, presumes that market-to-book ratios are at unity or 1.00. However, there is ample empirical evidence over sustained periods which demonstrate that this is an incorrect presumption. Since market-to-book ratios of unity or 1.00 are rarely the case as discussed above, regulatory allowed ROEs, i.e., earnings, have a limited effect on utilities' market/book ratios as the market prices of utility common stocks are also influenced by factors beyond the direct influence of the regulatory process.

As noted by Phillips:[16]

> Many question the assumption that market price should equal book value, believing that 'the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies.'

[16] Phillips 395.

In addition, Bonbright[17] states:

> In the first place, commissions cannot forecast, except within wide limits, the effect their rate orders will have on the market prices of the stocks of the companies they regulate. In the second place, *whatever the initial market prices may be, they are sure to change not only with the changing prospects for earnings, but with the changing outlook of an inherently volatile stock market.* In short, market prices are beyond the control, though not beyond the influence of rate regulation. Moreover, even if a commission did possess the power of control, any attempt to exercise it ... would result in harmful, uneconomic shifts in public utility rate levels. (italics added)

Q. IS IT REASONABLE TO EXPECT THE MARKET VALUES OF UTILITIES' COMMON STOCKS TO CONTINUE TO SELL WELL ABOVE THEIR BOOK VALUES?

A. Yes. Although the market-to-book ratios of regulated utilities have been vacillating recently due to the current and continuing economic and capital market turmoil, I believe that the common stocks of utilities will continue to sell substantially above their book values, on average, because many investors, especially individuals who traditionally committed less capital to the equity markets, will likely continue to commit a greater percentage of their available capital to common stocks in view of lower interest rate alternative investment opportunities and to provide for retirement. The recent past and current capital market environment is in stark contrast to the late 1970's and early 1980's when very high (by historical standards) yields on secured debt instruments in public utilities were available. Despite the fact that the market declined

[17] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates (Public Utilities Reports, Inc., 1988) 334.

significantly during late 2001 through 2003, following the September 11, 2001 tragedy and despite recent and continuing market volatility due to energy prices, the stressed housing market, the credit crunch in the currently fragile U.S. economy, the current crisis in the capital markets, and agreement among economists that the U.S. has endured an economic recession of an as yet-to-be determined length, the majority of utility stocks, on average, have continued to sell at market prices well above their book value. In addition, as previously discussed, the sustained high market-to-book ratios have been influenced by factors other than fundamentals such as actual and reported growth in EPS and DPS.

Q. HAVE ANY REGULATORY COMMISSIONS RECOGNIZED THIS TENDENCY OF THE DCF MODEL TO UNDERSTATE/OVERSTATE INVESTORS' REQUIRED RETURN RATE WHEN MARKET-TO-BOOK RATIOS ARE GREATER/LESS THAN UNITY?

A. Yes. The Pennsylvania Public Utilities Commission (PA PUC) recognized this tendency in its order of August 26, 2005 in Docket No. R-00049862, et al re: The City of Lancaster – Sewer Fund when it adopted the Administrative Law Judge's market-to-book adjustment of 65 basis points (0.65%) because such an adjustment was "consistent with our recent orders in *PAWC, Aqua,* and *PPL*" and "as in *PPL*, we find that adjustment is necessary <u>because the DCF method produces the investor required return based on the current market price, not the return on the book value capitalization.</u>" With the MTB adjustment, the equity return allowance is 10.75 percent. (emphasis added)

Similarly, in 1994, the Indiana Utility Regulatory Commission (IURC) recognized the tendency of the DCF model to understate the cost of equity when market value exceeds book value noting that[18]:

> [u]nder the traditional DCF model . . . the appropriate earnings level of the utility would not be derived by applying the DCF result to the market price of the Company's stock . . . it would be applied to the utility's net original cost rate base. *If the market price of the stock exceeds its book value, . . . the investor will not achieve the return which the model finds is necessary.* (italics added)

More recently, the PA PUC affirmed the tendency of the DCF model to mis-specify investors' required return in its Order of February 8, 2007 in Docket No. R-00061398, et al re: PPL Gas Utilities Corporation when it stated:

> The ALJ stated that the OTS and the OCA are correct that the Commission favors the DCF method to determine the cost of equity. However, the ALJ concluded, based on recent precedent, that the Commission consistently has adopted a leverage adjustment to compensate for the difference between market prices and book value (used in ratemaking). (*See, Aqua Pennsylvania*, 204, 234 (2004); *Pa. PUC v. PPL Electric Utilities Corp.*, Docket No. R-00049255, at 70-71 (2004); *Pa. PUC v. Pennsylvania American Water Co.*, 2002 Pa. PUC LEXIS 1; *Pa. PUC v. Phila. Suburban Water Co.*, 219 PUR4TH 272 (2002); *Pa. PUC v. Pennsylvania American Water Co.*, 231 PUR4TH 277 (2004)). According to the ALJ, these cases are persuasive that a leverage adjustment should be employed with the DCF analysis. (R.D. at 62-63).

Q. CAN THE UNDER OR OVER STATEMENT OF THE INVESTORS' REQUIRED RATE OF RETURN ON THE MARKET BY THE DCF MODEL BE DEMONSTRATED MATHEMATICALLY?

A. Yes. Schedule PMA-6 demonstrates how a market-based DCF cost rate applied to a book value which is either below or above market value will either

[18] Re: Indiana-American Water Company, Inc. 150 PUR4th 141, 167-168 (IN URC 1994).

understate or overstate the investors' required return on market value. As shown, there is no realistic opportunity to earn the expected market-based rate of return on book value. In Column 1, investors expect a 10.00% return on a market price of $24.00. Column 2 shows that when the 10.00% return rate on market value is applied to book value which is approximately 55.5% of market value, the total annual return opportunity is just $1.333 on book value. With an annual dividend of $0.840, there is an opportunity for growth of $0.493 which is just 2.05% in contrast to the 6.50% growth in market price expected by investors.

Conversely, in Column 3, where the market-to-book ratio is 80%, when the 10.00% return rate on market value is applied to a book value which is approximately 25.0% greater than market value, the total annual return opportunity is $3.000 on book value with an annual dividend of $0.840, there is an opportunity for growth of $2.160 which is 9.00% in contrast to the 6.50% growth in market price expected by investors.

Hence, it is clear that the DCF model either understates/overstates investors' required cost of common equity capital when market values exceed/are less than their underlying book values and thus multiple cost of common equity models should be relied upon, rather than exclusive reliance upon the DCF model, when estimating investors' expectations.

Q. HAVE ANY COMMISSIONS EXPLICITLY STATED THAT THE DCF MODEL SHOULD NOT BE RELIED UPON EXCLUSIVELY?

A. Yes. In my experience the majority of regulatory commissions rely upon a

combination of the various cost of common equity models available.

Specifically, the Iowa Utilities Board (IUB) has recognized the tendency of the DCF model to understate investors' expected cost of common equity capital when market values are significantly above their book values. In its June 17, 1994 Final Decision and Order in Re U.S. West Communications, Docket No. RPU-93-9 the IUB stated:[19]

> While the Board has relied in the past on the DCF model, in *Iowa Electric Light and Power Company*, Docket No. RPU-89-9, "Final Decision and Order" (October 15, 1990), the Board stated: '[T]he DCF model may understate the return on equity in some circumstances. This is particularly true when the market is relatively volatile and the company in question has a market-to-book ratio in excess of one." Those conditions exist in this case and the Board will not rely on the DCF return. (Consumer Advocate Ex. 367, See Tr. 2208, 2250, 2277, 2283-2284). *The DCF approach underestimates the cost of equity needed to assure capital attraction during this time of market uncertainty and volatility. The board will, therefore, give preference to the risk premium approach.* (italics added)

Also, the Hawaii Public Utilities Commission (HPUC) recognized this phenomenon in a decision dated June 30, 1992[20] in a case regarding Hawaiian Electric Company, Inc., when it stated:

> In this docket, as in other rate proceedings, experts disagree on the relative merits of the various methods of determining the cost of common equity. In this docket, HECO is particularly critical of the use of the constant growth DCF methodology. It asserts that method is imbued with downward bias and, thus, its use will understate common equity cost. *We are cognizant of the shortcomings of the DCF method.* There are, however, shortcomings to be found with the use of CAPM and the RP methods as well. We reiterate that, despite the problems with the

[19] Re: U.S. West Communications, Inc. 152 PUR4th 446, 459 (IA UB 1994).

[20] Re: Hawaiian Electric Company, Inc., 134 PUR4th 418, 479 (HI PUC 1992).

use of any methodology, *all methods should be considered and that the DCF method and the combined CAPM and RP methods should be given equal weight.* (italics added)

Q. DO OTHER COST OF COMMON EQUITY MODELS CONTAIN UNREALISTIC ASSUMPTIONS AND HAVE SHORTCOMINGS?

A. Yes. That is why I am not recommending that any of the models be relied upon exclusively, but I have focused on the shortcomings of the DCF model because some regulatory commissions still place excessive or exclusive reliance upon it. Although the DCF model is useful, as noted previously, it is not a superior methodology that supplants financial theory and market evidence based upon other valid cost of common equity models. For these reasons, no model, including the DCF, should be relied upon exclusively.

Q. WHICH VERSION OF THE DCF MODEL DO YOU USE?

A. I utilize the single-stage constant growth DCF model because, in my experience, it is the most widely utilized version of the DCF used in public utility rate regulation. In my opinion, it is widely utilized because utilities are generally in the mature stage of their lifecycles and not transitioning from one growth stage to another. This is especially true for water utilities.

All companies, including utilities, go through life cycles in their development, initially progressing through a growth stage, moving onto a transition stage and finally assuming a steady-state or constant growth state. However, the U.S. public utility industry is a long-standing industry in the U.S., dating back to approximately 1882[21]. The standards of rate of return regulation

[21] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates, 1988, Public Utilities

of public utilities date back to the previously discussed principles of fair rate of return established in the Hope and Bluefield decisions of 1944 and 1923, respectively. Hence, the public utility industry in the U.S. is a stable and mature industry characterized by the steady-state or constant-growth stage of a multi-stage DCF model. The economics of the utility industry, including the water utility industry; reflect the features of relative stability and demand maturity. As regulated businesses, their returns on capital investment, i.e., rate base, are set through a ratemaking process and not determined in the competitive markets. This characteristic, taken together with the longevity of the public utility industry contribute to the stability and maturity of the water utility industry.

Since there is no basis for applying multi-stage growth versions of the DCF model to determine the common equity cost rates of mature public utility companies, the constant growth model is most appropriate.

Q. PLEASE DESCRIBE THE DIVIDEND YIELD YOU USED IN YOUR APPLICATION OF THE DCF MODEL.

A. The unadjusted dividend yields are based upon an average of a recent spot date (September 30, 2009) as well as an average of the three months ended September 30, 2009, respectively, which are derived on Schedule PMA-8. The average unadjusted dividend yield is 3.33% and the median is 3.07% for the six water companies and 4.69% and 4.62%, respectively, for the eight LDCs.

Q. PLEASE EXPLAIN THE DIVIDEND GROWTH COMPONENT SHOWN ON SCHEDULE PMA-7, COLUMN 2.

Reports, Inc., Arlington, VA, p. 334.

A. Because dividends are paid quarterly, or periodically, as opposed to continuously (daily), an adjustment to the dividend yield must be made. This is often referred to as the discrete, or the Gordon Periodic, version of the DCF model.

Since the various companies in the proxy groups increase their quarterly dividend at various times during the year, a reasonable assumption is to reflect one-half the annual dividend growth rate in the dividend yield component, or $D_{1/2}$. This is a conservative approach which does not overstate the dividend yield which should be representative of the next twelve-month period. Therefore, the actual average dividend yields in Column 1 on Schedule PMA-7 have been adjusted upward to reflect one-half the growth rates shown in Column 4.

Q. PLEASE EXPLAIN THE BASIS OF THE GROWTH RATES OF THE PROXY GROUPS WHICH YOU USE IN YOUR APPLICATION OF THE DCF MODEL.

A. Schedule PMA-9 shows that approximately 58% of the common shares of the six water companies and 47% of the common shares of the eight LDCs are held by individuals as opposed to institutional investors. Individual investors are particularly likely to place great significance on the opinions expressed by financial information services, such as Value Line and Reuters, which are easily accessible and/or available on the Internet and through public libraries. Investors realize that analysts have significant insight into the dynamics of the industries and they analyze individual companies as well as companies' abilities to effectively manage the effects of changing laws and regulations and

ever changing economic and market conditions.

Over the long run, there can be no growth in DPS without growth in EPS. Earnings expectations have a more significant, but not sole, influence on market prices than dividend expectations. Thus, the use of earnings growth rates in a DCF analysis provides a better matching between investors' market appreciation expectations implicit in market prices and the growth rate component of the DCF. Earnings expectations have a significant influence on market prices and therefore, appreciation or the "growth" experienced by investors. This should be evident even to relatively unsophisticated investors just by listening to financial new reports on radio, TV or reading the newspapers. In fact, Dr. Morin in his book, New Regulatory Finance, (2006) states on page 298[22]:

> Because of the dominance of institutional investors and their influence on individual investors, analysts' forecasts of long-run growth rates provide a sound basis for estimating required returns. Financial analysts exert a strong influence on the expectations of many investors who do not possess the resources to make their own forecasts, that is, they are a cause of g. The accuracy of these forecasts in the sense of whether they turn out to be correct is not at issue here, as long as they reflect widely held expectations. As long as the forecasts are typical and/or influential in that they are consistent with current stock price levels, they are relevant. The use of analysts' forecasts in the DCF model is sometimes denounced on the grounds that it is difficult to forecast earnings and dividends for only one year, let alone for longer time periods. This objection is unfounded, however, because it is present investor expectations that are being priced; it is the consensus forecast that is embedded in price and therefore in required return, and not the future as it will turn out to be.

* * *

[22] Morin 298.

> Published studies in the academic literature demonstrate that growth forecasts made by security analysts represent an appropriate source of DCF growth rates, are reasonable indicators of investor expectations and are more accurate than forecasts based on historical growth. These studies show that investors rely on analysts' forecasts to a greater extent than on historic data only.

In addition, Myron Gordon, the "father" of the standard regulatory version of the DCF model widely utilized throughout the United States in rate base/rate of return regulation has recognized the significance of analysts' forecasts of growth in EPS in a speech he gave in March 1990 before the Institute for Quantitative Research and Finance. He said:

> We have seen that earnings and growth estimates by security analysts were found by Malkiel and Cragg to be superior to data obtained from financial statements for the explanation of variation in price among common stocks. . . estimates by security analysts available from sources such as IBES are far superior to the data available to Malkiel and Cragg. Eq (7) is not as elegant as Eq (4), but it has a good deal more intuitive appeal. It says that investors buy earnings, but what they will pay for a dollar of earnings increases with the extent to which the earnings are reflected in the dividend or in appreciation through growth.

Professor Gordon recognized that total return is largely affected by the terminal price which is mostly affected by earnings (hence price / earnings multiples). However, while EPS is the most significant factor influencing market prices, it is by no means the only factor that affects market prices, a fact recognized by Bonbright with regard to public utilities as discussed previously.

Studies performed by Cragg and Malkiel[23] demonstrate that analysts'

[23] John G. Cragg and Burton G. Malkiel, Expectations and the Structure of Share Prices (University of Chicago Press, 1982) Chapter 4.

forecasts are superior to historical growth rate extrapolations. Some question the accuracy of analysts' forecast of EPS growth, however, it does not really matter what the level of accuracy of those analysts' forecasts is well after the fact. What is important is that they influence investors and hence the market prices they pay. Moreover, there is no empirical evidence that investors, consistent with the EMH, would discount or disregard analysts' estimates of growth in earnings per share. The "semistrong" form of the EMH which is generally held to be true indicates that all perceived risks are taken into account by investors in the prices they pay for securities and investors are aware of all publicly-available information, including bond ratings, discussions about companies by bond rating agencies and investment analysts, as well as the many analysts earnings growth forecasts available. Investors are also aware of the accuracy of past forecasts, whether for EPS or DPS growth or for interest rates levels. Investors have no prior knowledge of the accuracy of any forecasts available at the time they make their investment decisions, as that accuracy only becomes known after some future period of time has elapsed. Therefore, consistent with the EMH upon which the cost of common equity models I utilize are based, since investors have such analysts' earnings growth rate projections available to them and investors are aware of the accuracy of such projections, analysts earnings projections should be relied upon in a cost of common equity analysis.

In addition to the empirical and academic support discussed previously regarding the superiority of analysts' EPS growth forecasts in response to

concern about the use of analysts' forecasts, Dr. Burton G. Malkiel, the Chemical Bank Chairman's Professor of Economics at Princeton University and author of the widely read national bestseller book on investing entitled, "A Random Walk Down Wall Street,", affirmed his belief in the superiority of analysts' earnings forecasts when he testified before the Public Service Commission of South Carolina in November 2002:

> With all the publicity given to tainted analysts' forecasts and investigations instituted by the New York Attorney General, the National Association of Securities Dealers, and the Securities & Exchange Commission, I believe the upward bias that existed in the late 1990s has indeed diminished. In summary, I believe that current analysts' forecasts are more reliable than they were during the late 1990s. Therefore, analysts' forecasts remain the proper tool to use in performing a Gordon Model DCF analysis. (Rebuttal testimony, South Carolina Electric and Gas Co., pp. 16-17, Docket No. 2002-223-E)

Consequently, I have reviewed analysts' projected growth in EPS, as well as Value Line's projected five-year compound growth rates in EPS for each company in the proxy groups which are summarized on page 1, Schedule PMA-10.

Q. PLEASE SUMMARIZE THE DCF MODEL RESULTS.

A. As shown on Schedule PMA-7, the results of the application of the single-stage DCF model are 11.59% using the average and 11.73% when using the median value of the six water company's results. As also shown on Schedule PMA-7, the results of the application of the single-stage DCF model are 8.98% using the average and 8.68% when using the median value of the eight LDCs' result. In arriving at conclusions of indicated common equity cost rate for the proxy

groups, I have relied upon the median of the results of the DCF, due to the wide range of DCF results as well as the currently extremely volatile capital market conditions. In my opinion, the median is a more accurate and reliable measure of central tendency, and provides recognition to all the DCF results.

In view of the foregoing, as shown on Schedule PMA-7 the indicated common equity cost rate based upon the application of the DCF model is 11.73% for the six water companies and 8.68% for the eight LDCs.

C. **The Risk Premium Model (RPM)**

Q. **PLEASE DESCRIBE THE THEORETICAL BASIS OF THE RPM.**

A. The RPM is based upon the basic financial principle of risk and return, namely, that investors require a greater return for bearing greater risk. The RPM recognizes that common equity capital has greater investment risk, than debt capital, as common equity shareholders are last in line in any claim on a company's earnings and assets, with debt holders being first in line. Therefore, investors require higher returns from common stocks than from investment in bonds to compensate them for bearing the additional risk.

While the investors' required common equity return cannot be directly determined or observed, bond returns and yields can. According to RPM theory one can assess a common equity risk premium over bonds, either historically or prospectively, one can use that premium to derive a cost rate of common equity.

In summary with RPM theory, the cost of common equity equals the expected cost rate for long-term debt capital plus a risk premium to

compensate common shareholders for the added risk of being unsecured and last-in-line for any claim on the corporation's assets and earnings.

Q. SOME ANALYSTS STATE THAT THE RPM IS ANOTHER FORM OF THE CAPM. DO YOU AGREE?

A. While there are some similarities, there is a very significant distinction between the two models. The RPM and CAPM both add a "risk premium" to an interest rate. However, the beta approach to the determination of an equity risk premium in the RPM should not be confused with the CAPM. Beta is a measure of systematic, or market, risk, a relatively small percentage of total risk (the sum of both non-diversifiable systematic and diversifiable unsystematic risk). Unsystematic risk is fully captured in the RPM through the use of the long-term public utility bond yield as can be shown by reference to pages 3 through 9 of Schedule PMA-2 which confirm that the bond rating process involves an assessment of business risks. In contrast, the use of a risk-free rate of return in the CAPM does not, and by definition cannot, reflect a company's specific i.e., unsystematic risk. Consequently, a much larger portion of the total common equity cost rate is reflected in the company- or proxy group-specific bond yield (a product of the bond rating) than is reflected in the risk-free rate in the CAPM, or indeed even by the dividend yield employed in the DCF model. Moreover, the financial literature recognizes the RPM and CAPM as two separate and distinct cost of common equity models.

Q. HAVE YOU PERFORMED RPM ANALYSES OF COMMON EQUITY COST RATE FOR THE PROXY GROUPS?

A. Yes. The results of my application of the RPM are summarized on page 1 of Schedule PMA-11 and detailed on pages 2 through 9. The first step is to determine the expected bond yield.

Q. PLEASE EXPLAIN THE BASIS OF THE EXPECTED BOND YIELDS OF 6.06% AND 6.35% APPLICABLE TO THE PROXY GROUPS OF WATER AND GAS COMPANIES, RESPECTIVELY.

A. Because both ratemaking and the cost of common equity are prospective, a prospective yield on similarly-rated long-term debt is essential. As shown on Schedule PMA-11, page 2, although based upon only one water company, the average Moody's bond rating is A2 for the six water companies while the average Moody's bond rating is A3 for the eight LDCs. I relied upon a consensus forecast of about 50 economists of the expected yield on Aaa rated corporate bonds for the six calendar quarters ending with the first calendar quarter of 2011 as derived from the October 1, 2009 Blue Chip Financial Forecasts (shown on page 7 of Schedule PMA-11). As shown on Line No. 1 of page 1 of Schedule PMA-11, the average expected yield on Moody's Aaa rated corporate bonds is 5.53%. It is necessary to adjust that average yield to be equivalent to a Moody's A2 rated public utility bond. Requiring the adjustment of 0.53%, shown on Line No. 2 and explained in Note 2. After adjustment, the expected bond yield applicable to a Moody's A rated public utility bond is 6.06% as shown on Line No. 3.

The six water companies average Moody's bond rating is A2, therefore, no adjustment is necessary to make the prospective bond yield applicable to

an A2 public utility bond. However, because the average Moody's bond rating of the eight LDCs is A3, an adjustment of 29 basis points (0.29%) is necessary to make the prospective bond yield applicable to an A3 public utility bond as shown on line No. 5. Therefore, the expected specific bond yields are 6.06% for the six water companies and 6.35% for the eight LDCs as shown on line No. 6.

Q. PLEASE EXPLAIN THE METHOD UTILIZED TO ESTIMATE THE EQUITY RISK PREMIUM.

A. I evaluated the results of two different historical equity risk premium studies, as well as Value Line's forecasted total annual market return in excess of the prospective yield on high grade corporate bonds, as detailed on pages 5, 6 and 8 of Schedule PMA-11. As shown on Line No.3, page 5, the mean equity risk premium is 5.06% applicable to the of six water companies and 4.50% applicable to the of eight LDCs. These estimates are the result of an average of a beta-derived historical equity risk premium as well as the mean historical equity risk premium applicable to public utilities with bonds rated A, respectively, based upon holding period returns.

The basis of the beta-derived equity risk premiums applicable to the proxy groups is shown on page 6 of Schedule PMA-11. The beta-determined equity risk premium should receive substantial weight because betas are derived from the market prices of common stocks over a recent five-year period. Beta is a meaningful measure of prospective relative risk to the market as a whole and is a logical means by which to allocate a relative share of the market's total equity

risk premium.

The total market equity risk premium utilized is 7.46% and is based upon an average of the long-term historical market risk premium and forecasted market risk premium as well as an equity risk premium based upon a study of the holding period returns of the S&P Public Utility Index relative to A rated public utility bond yields. To derive the historical market equity risk premium, I used the most recent Morningstar[24] data on holding period returns for the S&P 500 Composite Index and the average historical yield on Moody's Aaa and A rated corporate bonds for the period 1926-2008. The use of holding period returns over a very long period of time is useful in the beta approach because it is consistent with the long-term investment horizon presumed by the DCF model. As the Ibbotson SBBI – 2009 Valuation Yearbook – Market Result for Stocks, Bonds, Bills and Inflation – 2006-2008, (Ibbotson SBBI) states[25]:

> The estimate of the equity risk premium depends on the length of the data series studied. A proper estimate of the equity risk premium requires a data series long enough to give a reliable average without being unduly influenced by very good and very poor short-term returns. When calculated using a long data series, the historical equity risk premium is relatively stable.[5] Furthermore, because an average of the realized equity risk premium is quite volatile when calculated using a short history, using a long series makes it less likely that the analyst can justify any number he or she wants. The magnitude of how shorter periods can affect the result will be explored later in this chapter.
>
> Some analysts estimate the expected equity risk premium using a shorter, more recent time period on the basis that recent events are more likely to be repeated in the near future; furthermore, they believe that the 1920s, 1930s and 1940s contain too many unusual events. This view is suspect because all periods contain

[24] Morningstar, Inc. acquired Ibbotson Associates in 2006.
[25] Ibbotson SBBI – 2009 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926 – 2008 (Morningstar, Inc., 2009) 61.

"unusual" events. Some of the most unusual events this century took place quite recently, including the inflation of the late 1970s and early 1980s, the October 1987 stock market crash, the collapse of the high-yield bond market, the major contraction and consolidation of the thrift industry, the collapse of the Soviet Union, the development of the European Economic Community, and the attacks of September 11, 2001.

It is even difficult for economists to predict the economic environment of the future. For example, if one were analyzing the stock market in 1987 before the crash, it would be statistically improbable to predict the impending short-term volatility without considering the stock market crash and market volatility of the 1929-1931 period.

Without an appreciation of the 1920s and 1930s, no one would believe that such events could happen. The 83-year period starting with 1926 is representative of what can happen: it includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect "unusual" events to occur from time to time, and their return expectations reflect this. (footnote omitted)

Q. HOW DID YOU INCORPORATE VALUE LINE'S FORECASTED TOTAL ANNUAL MARKET RETURN IN EXCESS OF THE PROSPECTIVE YIELD ON HIGH RATED CORPORATE BONDS IN YOUR DEVELOPMENT OF AN EQUITY RISK PREMIUM FOR YOUR RPM ANALYSIS?

A. The basis of the forecasted market equity risk premium can be found on Line Nos. 4 through 6 on page 6 of Schedule PMA-11. It is derived from an average of the most recent 3-month (using the months of July 2009 through September 2009) and a recent spot (September 30, 2009) 3-5 year median market price appreciation potentials by Value Line plus an average of the median estimated

dividend yield for the common stocks of the 1,700 firms covered in Value Line's Standard Edition as explained in detail in Note 1 on page 3 of Schedule PMA-12.

The average median expected price appreciation is 61% which translates to 12.64% per annum and, when added to the average (similarly calculated) median dividend yield of 2.20% equates to a forecasted annual total return rate on the market as a whole of 14.84%. Thus, this methodology is consistent with the use of the 3-month and spot dividend yields in my application of the DCF model. To derive the forecasted total market equity risk premium of 9.31% shown on Schedule PMA-11, page 6, Line No. 6, the September 1, 2009 forecast of about 50 economists of the expected yield on Moody's Aaa rated corporate bonds for the six calendar quarters ending with the first calendar quarter 2011 of 5.53% from Blue Chip Financial Forecasts was deducted from the forecasted total market return of 14.84%. The calculation resulted in an expected market risk premium of 9.31%.

Q. WHY DO YOU GIVE EQUAL WEIGHT TO THE HISTORICAL AND FORECASTED EQUITY RISK PREMIUM?

A. Both the cost of capital and ratemaking are expectational. As such investors' expectations are, in large measure, influenced by forecasts of the future performance of the market as well as specific companies and industries.

The recent recession, which may or may not yet be over, and capital market crisis resulted in a substantial decline in market values with a concurrent flight to quality, i.e., greater investment in U.S. government

securities and better quality debt such as that rated Aaa and/or Aa in the corporate and utility sectors. Schedule PMA-14 shows that the yield spreads between Moody's A and Baa rated utility bonds from September 1989 through August 2009 have averaged 34 basis points which is in contrast to more recent spreads attributable to the recent global recession which were significantly greater than 100 basis points. Currently, the cost of debt capital is stabilizing somewhat to levels experienced prior to the beginning of the recession in late 2007. The potential for market price appreciation is still significant despite a huge increase in the Dow Jones Industrial Average (DJI) between March 9, 2009 (the low) and October 2, 2009. Over that time, the DJI increased by nearly 45% from 6,547.05 to 9,487.67. Nonetheless, there is still considerable upside potential, considering that the DJI's all-time high was 14,164.53 on October 9, 2007, or approximately 50% above current levels just prior to the beginning of the current recession. Exclusive reliance upon historical data will not properly reflect the significant increase in risk which has affected both debt and common equity capital due to the recent turmoil in the capital markets. Thus, it is appropriate to give equal weight to the current level of expected market appreciation as well as historical market returns.

In an interview at the height of the crisis, Roger Ibbotson, the founder of Ibbotson Associates, now a wholly-owned subsidiary of Morningstar, Inc. and Professor of Finance at the Yale School of Management, stated that reliance upon historical statistics including the standard deviation of returns are not reflective of current and prospective risk.

The following exchange occurred between Paul D. Kaplan of *Morningstar* and Professor Ibbotson on December 17, 2008[26]:

> **Kaplan**: Dr. Ibbotson, is the economy fundamentally unstable or does it self-stabilize? It is curious that economists of every stripe right now are calling for aggressive government action regardless of what theory they normally subscribe to.
>
> **Ibbotson**: The economy has lots of self-stabilizing features, and it has other features that are destabilizing. Most of the time the economy is stabilizing, but certainly, I won't argue that the situation is stable now; instead, we have discontinuities here of an extreme sort.
>
> But there are also behavioral aspects of this. *I think the risks are definitely much higher than you might think of just looking at standard deviation, not only from the mathematical aspects of other measures of risk, but also from the way people react when they have the bad result. People often have the bad result at the same time they are losing their human capital income. They're losing all of their wealth at the same time, so they tend to be much more risk-averse than standard economics would show them to be. There is a lot of risk, and there's more risk than we think.* (Emphasis added)
>
> * * *
>
> **Kaplan**: Our readers are getting a lot of questions from their clients about what they should do. What kinds of things should advisors be discussing with their clients?
>
> **Ibbotson**: *I would be saying that when markets pull out of calamities, they often have their highest returns.* We had the highest return ever in 1933 in the midst of a severe depression. You get the extreme pullout when things start to get a bit better. The markets in general move ahead of what's actually happening in the economy. *The risk premium on stocks has gone way up because of the fact that investors now recognize that there is*

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[26] Morningstar Advisor, February 2, 2009.

> *much more risk in the market than they had recognized.* Stocks may not be done dropping, especially in light of what's happened to the financial system, and I don't know when it's going to start to straighten out, but ultimately, in the long run, stocks are a good investment. (Emphasis added)

Thus, since we are still in the recession, or just now beginning to emerge from the recession, and the market, while recovering from the lows of early 2009, still has not recovered to its pre-recession high, there is still greater current and prospective risk for investors. This requires an equity risk premium commensurate with the greater perceived risk, certainly exceeding an equity risk premium based exclusively on historical indicators. Therefore, I have given equal weight to the historical equity risk premium and the forecasted equity risk premium.

Consequently, in arriving at my conclusion of equity risk premium of on Line No. 7 on page 6 of Schedule PMA-10, I have given equal weight to the historical equity risk premium of 5.60% and the forecasted equity risk premium of 12.51% shown on Line Nos. 3 and 6, respectively (7.46% = (5.60% + 9.31%)/2).

Q. WHAT IS YOUR CONCLUSION OF AN EQUITY RISK PREMIUM FOR USE IN YOUR RPM ANALYSIS?

A. On page 9 of Schedule PMA-11, the most current Value Line betas for the companies in the proxy groups are shown. Applying the median beta of the proxy groups, consistent with my reliance upon the median DCF results as previously discussed, to the market equity risk premium of results in a beta adjusted equity risk premium of 5.96% for the proxy group of six water

companies and 4.85% for the proxy group of eight LDCs as shown on page 6, Line No. 9.

A mean equity risk premium of 4.15% applicable to utilities with A rated public utility bonds such as the proxy group of six water companies and the proxy group of eight LDCs was calculated based upon holding period returns from a study using public utilities, as shown on Line No. 2, page 5 of Schedule PMA-12 and is detailed on page 8.

The equity risk premiums applicable to the proxy group of six water companies and eight LDCs are the averages of the beta-derived premiums and those based upon the holding period returns of public utilities with A rated bonds, as summarized on Schedule PMA-12, page 5, i.e., 5.06% and 4.50%, respectively.

Q. WHAT ARE THE INDICATED RPM COMMON EQUITY COST RATES?

A. They are 11.12% for the six water companies and 10.85% for the eight LDCs as shown on Schedule PMA-10, page 1.

Q. SOME CRITICS OF THE RPM MODEL CLAIM THAT ITS WEAKNESS IS THAT IT PRESUMES A CONSTANT EQUITY RISK PREMIUM. IS SUCH A CLAIM VALID?

A. No. The equity risk premium varies inversely with interest rate changes, although not in tandem with those changes. The presumption of a constant equity risk premium is no different than the presumption of a constant "g", or growth component, in the DCF model. If one calculates a DCF cost rate today, the absolute result "k", as well as the growth component "g", would invariably

differ from a calculation made just one or several months earlier or later. This implies that "g" does change, although in the application of the standard DCF model, "g" is presumed to be constant. Hence, there is no difference between the RPM and DCF models in that both models assume a constant component, but in reality, these components, "g" and the equity risk premium both change.

As Morin[27] states with respect to the DCF model:

> It is not necessary that *g* be constant year after year to make the model valid. *The growth rate may vary randomly around some average expected value. Random variations around trend are perfectly acceptable, as long as the mean expected growth is constant.* The growth rate must be 'expectationally constant' to use formal statistical jargon. (italics added)

The foregoing confirms that the RPM is similar to the DCF model. Both assume an "expectationally constant" risk premium and growth rate, respectively, but in reality both vary (change) randomly around an arithmetic mean. Consequently, the use of the arithmetic mean, and not the geometric mean is confirmed as appropriate in the determination of an equity risk premium as discussed previously.

D. The Capital Asset Pricing Model (CAPM)

Q. PLEASE EXPLAIN THE THEORETICAL BASIS OF THE CAPM.

A. CAPM theory defines risk as the covariability of a security's returns with the market's returns. This covariability is measured by beta ("β"), an index measure of an individual security's variability relative to the market. A beta less than 1.0 indicates lower variability while a beta greater than 1.0 indicates greater variability than the market.

[27] Morin 256.

The CAPM assumes that all other risk, i.e., all non-market or unsystematic risk, can be eliminated through diversification. The risk that cannot be eliminated through diversification is called market, or systematic, risk. In addition the CAPM presumes that investors require compensation for these systematic risks which are caused by macroeconomic and other events that affect the returns on all assets. The model is applied by adding a risk-free rate of return to a market risk premium, which is adjusted proportionately to reflect the systematic risk of the individual security relative to the market as measured by beta. The traditional CAPM model is expressed as:

$$R_s = R_f + \beta(R_m - R_f)$$

Where:

R_s	=	Return rate on the common stock
R_f	=	Risk-free rate of return
R_m	=	Return rate on the market as a whole
β	=	Adjusted beta (volatility of the security relative to the market as a whole)

Numerous tests of the CAPM have measured the extent to which security returns and betas are related as predicted by the CAPM and have confirmed its validity. However, Morin observes that while the results of these tests support the notion that beta is related to security returns, the empirical Security Market Line (SML) described by the CAPM formula is not as steeply sloped as the predicted SML. Morin[28] states:

> With few exceptions, the empirical studies agree that ... low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than

[28] Morin 175.

predicted.

* * *

Therefore, the empirical evidence suggests that the expected return on a security is related to its risk by the following approximation:

$$K = R_F + x\,\beta(R_M - R_F) + (1-x)\,\beta(R_M - R_F)$$

where x is a fraction to be determined empirically. The value of x that best explains the observed relationship Return = 0.0829 + 0.0520 β is between 0.25 and 0.30. If x = 0.25, the equation becomes:

$$K = R_F + 0.25(R_M - R_F) + 0.75\,\beta(R_M - R_F)^{29}$$

In view of theory and practical research, I have applied both the traditional CAPM and the empirical CAPM/ECAPM to the companies in the proxy groups and averaged the results.

Q. PLEASE DESCRIBE YOUR SELECTION OF A RISK-FREE RATE OF RETURN.

A. As shown at the top of column 3 on page 2 of Schedule PMA-11, the risk-free rate adopted for both applications of the CAPM is 4.72%. It is based upon the average consensus forecast of the reporting economists in the September 1, 2009 Blue Chip Financial Forecasts as shown in Note 2, page 3, of the expected yields on 30-year U.S. Treasury bonds for the six quarters ending with the first calendar quarter 2011 of 4.72% as derived in Note 2 on page 3.

Q. WHY IS THE PROSPECTIVE YIELD ON LONG-TERM U.S. TREASURY BONDS APPROPRIATE FOR USE AS THE RISK-FREE RATE?

A. The yield on long-term U.S. Treasury T-Bonds is almost risk-free and its term is

[29] Morin 190.

consistent with the long-term cost of capital to public utilities measured by the yields on A rated public utility bonds. Hence, it is consistent with the long-term investment horizon inherent in utilities' common stocks, as well as the long-term investment horizon presumed in the standard DCF model employed in regulatory ratemaking. Moreover, it is also consistent with the long-term life of the jurisdictional rate base to which the allowed fair rate of return, i.e., cost of capital will be applied. Morin[30] discusses several reasons why the yield on long-term U.S. Treasury T-bonds is appropriate as the risk-free rate:

- Common stock is a long-term investment with the dividend cash flows to investors lasting indefinitely. Hence, the yield on very long-term government bonds, such as, the yield on 30-year Treasury bonds, is the best measure of the risk-free rate for use in the CAPM.
- The expected common stock return is based on long-term cash flows, regardless of an individual's holding time period.
- Stability and consistency, i.e., the yields on long-term Treasury bonds match more closely with expected common stock returns.
- Yields on 90-day Treasury Bills typically do not match the investor's planning horizons. Investors in common stocks, typically, have an investment horizon greater than 90 days.
- Short-term rates are volatile, fluctuating widely, and subject to more random disturbances than are long-term rates, resulting in volatile and unreliable common equity return estimates.
- Short-term rates are also largely "administered" rates, and used by the Federal Reserve as a policy vehicle for economic stimulation and money supply control. Foreign governments, companies, and individuals also use them as a temporary safe harbor for money.

In addition, as noted in the Ibbotson SBBI[31]:

> Although the equity risk premia of several horizons are available, the long-horizon equity risk premium is preferable for use in most business-valuation settings, even if an investor has a shorter time horizon. Companies are entities that generally have no defined life span; when determining a company's

[30] Morin 151.

[31] Ibbotson SBBI 59.

value, it is important to use a long-term discount rate because the life of the company is assumed to be infinite. For this reason, it is appropriate in most cases to use the long-horizon equity risk premium for business valuation.

Q. PLEASE EXPLAIN THE ESTIMATION OF THE EXPECTED EQUITY RISK PREMIUM FOR THE MARKET.

A. The basis of the market equity risk premium is explained in detail in Note 1 on page 3 of Schedule PMA-12. It is derived from an average of the most recent 3-month (using the months of July 2009 through September 2009) and a recent spot (October 2, 2009) 3-5 years median total market price appreciation projections from Value Line, or total return of 14.84%, discussed previously, and the long term historical arithmetic mean total returns for the years 1926-2008 on large company stocks from Ibbotson – SBBI of 11.70%. From these returns, I then subtracted the appropriate projected and historical risk-free rates to arrive at a projected and historical equity risk premiums for the market.

For example, from the Value Line projected total market return of 14.84%, the forecasted average risk-free rate of 4.72% was deducted indicating a forecasted market risk premium of 10.12%. From the Ibbotson-SBBI long-term historical total return rate of 11.70%, the long-term historical income return rate on long-term U.S. Government Securities of 5.20% was deducted indicating an historical equity risk premium of 6.50%. Thus, the projected and historical total market risk premiums are 10.12% and 6.50%, averaging is 8.31%. As a measure of risk relative to the market as a whole, it is appropriate to use beta to apportion the market risk premium to a specific company or group. Therefore, I applied the proxy groups' respective betas to

the average 8.31% market risk premium to arrive at proxy group specific risk premiums.

Q. WHAT ARE THE RESULTS OF YOUR APPLICATION OF THE TRADITIONAL AND EMPIRICAL CAPM TO THE PROXY GROUPS?

A. As shown on Schedule PMA-12, Line No. 1 of page 1, the traditional CAPM cost rates are 11.37% for the proxy group of six water companies and 10.12% for the proxy group of eight LDCs. And, as shown on Line No. 2 of page 1, the empirical CAPM cost rates are 11.78% for the six water companies and 10.85% for the eight LDCs. The traditional and empirical CAPM cost rates are shown individually by company on page 2. As with the DCF results discussed previously, and for the same reasons, namely the range of results and the current extremely volatile capital markets, I rely upon the median results of the traditional CAPM and ECAPM for the proxy groups. As shown on Line No. 3 on page 1, the CAPM cost rate applicable to the proxy group of six water companies is 11.58%, and the CAPM cost rate applicable to the proxy group of eight LDCs is 10.49% based upon the traditional and empirical CAPM.

Q. SOME CRITICS OF THE ECAPM MODEL CLAIM THAT USING ADJUSTED BETAS IN A TRADITIONAL CAPM AMOUNTS TO USING AN ECAPM. IS SUCH A CLAIM VALID?

A. No. Using adjusted betas in a CAPM analysis is not equivalent to the ECAPM. Betas are adjusted because of the regression tendency of betas to converge toward 1.0 over time, i.e., over successive calculations of beta. As discussed previously, numerous studies have determined that the Security Market Line

(SML) described by the CAPM formula at any given moment in time is not as steeply sloped as the predicted SML. Morin[32] states:

> Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend [sic], an ECAPM analysis results in double-counting. This argument is erroneous. Fundamentally, the ECAPM is not an adjustment, increase or decrease, in beta. This is obvious from the fact that the expected return on high beta securities is actually lower than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks. Even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to Figure 6-1, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary.

Moreover, the slope of the Security Market Line (SML) should not be confused with beta. As Eugene F. Brigham, finance professor emeritus and the author of many financial textbooks states[33] :

> The slope of the SML reflects the degree of risk aversion in the economy – the greater the average investor's aversion to risk, then (1) the steeper is the slope of the line, (2) the greater is the risk premium for any risky asset, and (3) the higher is the required rate of return on risky assets.[12]
>
> [12]Students sometimes confuse beta with the slope of the SML. This is a mistake. As we saw earlier in connection with Figure 6-8, and as is developed further in Appendix 6A, beta does represent the slope of a line, but *not* the Security Market Line. This confusion arises partly because the SML equation is generally written, in this book and throughout the finance

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[32] Morin 191.

[33] Eugene F. Brigham, Financial Management – Theory and Practice, 4th Ed. (The Dryden Press, 1985) 203.

literature, as $k_i = R_F + b_i(k_M - R_F)$, and in this form b_i looks like the slope coefficient and $(k_M - R_F)$ the variable. It would perhaps be less confusing if the second term were written $(k_M - R_F)b_i$, but this is not generally done.

In addition, regulatory support for the ECAPM can be found in the New York Public Service Commission's Generic Financing Docket, Case 91-M-0509. Also, the Regulatory Commission of Alaska (RCA) in its Order No. 151 in Docket No. P-97-4 (Order entered 11/27/02) re: In the Matter of the Correct Calculation and Use of Acceptable Input Data to Calculate the 1997, 1998, 1999, 2000, 2001 and 2002 Tariff Rates for the Intrastate Transportation of Petroleum over the TransAlaska Pipeline System, noted:

> Although we primarily rely upon Tesoro's recommendation, we are concerned, however, about Tesoro's CAPM analysis. Tesoro averaged the results it obtained from CAPM and ECAPM while at the same time providing empirical testimony[604] (footnote omitted) that the ECAPM results are more accurate then [sic] traditional CAPM results. The reasonable investor would be aware of these empirical results. Therefore, we adjust Tesoro's recommendation to reflect only the ECAPM result.

Thus, using adjusted betas in an ECAPM analysis is not incorrect, nor inconsistent with either their financial literature or regulatory precedent. Notwithstanding empirical regulatory and support for the use of only the ECAPM, my CAPM analysis, which includes both the traditional CAPM and the ECAPM, is a conservative approach resulting in a reasonable estimate of the cost of common equity.

E. Comparable Earnings Model (CEM)

Q. PLEASE DESCRIBE YOUR APPLICATION OF THE COMPARABLE EARNINGS MODEL AND HOW IT IS USED TO DETERMINE COMMON EQUITY COST RATE.

A. My application of the CEM is summarized on Schedule PMA-13 which consists of five pages. Pages 1 through 3 show the CEM results for the proxy group of six water companies and page 4 shows the CEM results for the proxy group of eight LDCs. Page 5 contains notes related to pages 1 through 4.

The comparable earnings approach is derived from the "corresponding risk" standard of the landmark cases of the U.S. Supreme Court. Therefore, it is consistent with the Hope doctrine that the return to the equity investor should be commensurate with returns on investments in other firms having corresponding risks.

The CEM is based upon the fundamental economic concept of opportunity cost which maintains that the true cost of an investment is equal to the cost of the best available alternative use of the funds to be invested. The opportunity cost principle is also consistent with one of the fundamental principles upon which regulation rests: that regulation is intended to act as a surrogate for competition and to provide a fair rate of return to investors.

The CEM is designed to measure the returns expected to be earned on the book common equity, net worth, or partners' capital of similar risk enterprises. Thus, it provides a direct measure of return, since it translates into practice the competitive principle upon which regulation rests. In my opinion, it

is inappropriate to use the achieved returns of regulated utilities of similar risk because to do so would be circular as achieved returns are a function of authorized ROEs and inconsistent with the principle of equality of risk with non-price regulated firms.

Consequently, the first step in determining a cost of common equity using the comparable earnings model is to choose an appropriate proxy group or groups of non-price regulated firms similar in risk to the proxy group of price regulated utilities. The proxy group(s) should be broad-based in order to obviate any company-specific aberrations. As stated previously, utilities need to be eliminated to avoid circularity since the returns on book common equity of utilities are substantially influenced by regulatory awards and are therefore not representative of the returns that could be earned in a truly competitive market.

Q. PLEASE DESCRIBE YOUR APPLICATION OF THE CEM.

A. As stated previously, my application of the CEM is market-based in that the selection criteria for the non-price regulated firms of comparable risk are based upon statistics derived from the market prices paid by investors.

I have chosen two proxy groups of domestic, non-price regulated firms to reflect both the systematic and unsystematic risks, equaling total risk, of the proxy groups of six water companies and eight LDCs, respectively. The proxy group of one hundred seventeen non-utility companies similar in risk to the proxy group of six water companies and twenty-five non-utility companies similar in total investment risk to the proxy group of eight LDCs are listed on pages 1 through 4, Schedule PMA-13. The criteria used in the selection of

these proxy companies were that they be domestic non-utility companies and have a meaningful rate of return on common equity, net worth, or partners' capital reported in Value Line (Std. Ed.) projected for 2012-2014. Value Line betas were used as a measure of systematic risk. The standard error of the regression was used as a measure of each firm's unsystematic or specific risk with the standard error of the regression reflecting the extent to which events specific to a company's operations will affect its stock price. In essence, companies which have similar betas and standard errors of the regressions, have similar investment risk, i.e., the sum of systematic (market) risk as reflected by beta and unsystematic (business and financial) risk, as reflected by the standard error of the regression. Those statistics are derived from regression analyses using market prices which, under the EMH, reflect all relevant risks. The application of these criteria results in proxy groups of non-price regulated firms similar in risk to the average company in each proxy group.

Using a Value Line, Inc. proprietary database dated September 15, 2009, proxy groups of one hundred seventeen and twenty-five non-price regulated companies were chosen based upon ranges of unadjusted beta and standard error of the regression. The ranges were based upon the standard deviations of the unadjusted beta and the average standard error of the regression for the proxy group of six water companies and the proxy group of eight LDCs as explained in Notes 1 and 7 on page 4 of Schedule PMA-13.

In my opinion this selection methodology is meaningful and effectively

responds to the criticisms normally associated with the selection of non-regulated firms presumed to be comparable in total risk. This is because the selection of non-price regulated companies comparable in total risk is based upon regression analyses of market prices which reflect investors' assessment of all risks, diversifiable and non-diversifiable. Thus, the empirical selection process results in companies comparable in total risk, (i.e.) both systematic and unsystematic risks.

Once proxy groups of non-price regulated companies are selected, it is then necessary to derive returns on book common equity, net worth or partners' capital for the companies in the group. These are measured using the rate of return on common equity, net worth or partners' capital reported by Value Line (std. Ed) projected for the next five years consistent with the use of five-year projected EPS growth rates in the DCF model.

Q. WHAT ARE YOUR CONCLUSIONS OF CEM COST RATE?

A. For the proxy group of six water companies, my conclusion. based upon the average of the median of all of the five-year projected returns on book common equity, net worth or partners' capital is 14.50% as shown on page 3 of Schedule PMA-13. And my conclusion for the proxy group of eight LDCs based upon the median of all of the five-year projected returns on book common equity, net worth or partners' capital is 21.25% as shown on page 4.

As with the DCF and CAPM results discussed previously, I have again relied upon median and for the same reasons, namely, the wide range of returns and the extreme volatility of the current capital markets. After I apply a

test of significance (Student's t-statistic) to determine whether any of the projected returns are significantly different from their respective means at the 95% confidence level, the projected means of several companies have been excluded. After excluding these outliers, my conclusion of CEM cost rate is 13.50% for the six water companies and 21.00% for the eight gas distribution companies. In my opinion, the 21.00% CEM result for the eight LDCs is an outlier when compared with the six water companies' 13.50% CEM result and with the results of the other cost of common equity models for the eight LDCs. Therefore, I will not rely upon it in determining a common equity cost rate based upon the eight LDCs.

IX. CONCLUSION OF COMMON EQUITY COST RATE

Q. WHAT IS YOUR OF RECOMMENDED COMMON EQUITY COST RATE?

A. It is 11.60% based upon the common equity cost rates resulting from all four cost of common equity models consistent with the EMH, which logically mandates the use of multiple cost of common equity models as adjusted for MAWC's greater business risk.

Moreover, absent empirical evidence to the contrary, it is reasonable to assume that investors rely equally upon multiple cost of common equity models in arriving at their required returns on common equity. Therefore, in formulating my recommended common equity cost rate of 11.60%, I reviewed the results of the application of four different cost of common equity models, namely, the DCF, RPM, CAPM, and CEM for the two proxy groups. I employ all four cost of common equity models as primary tools in arriving at my

recommended common equity cost rate because; 1) no single model is so inherently precise that it can be relied upon solely, to the exclusion of other theoretically sound models; 2) all four models have application problems associated with them; 3) all four models are based upon the Efficient Market Hypothesis (EMH) which as previously discussed, requires the assumption that investors rely upon multiple cost of common equity models; and 4) as demonstrated previously, the prudence of using multiple cost of common equity models is supported in the financial literature. Therefore, none should be relied upon exclusively to estimate investors' required rate of return on common equity.

The results of the four cost of common equity models applied to the proxy groups of six water companies and the proxy group of eight LDCs are shown on Schedule PMA-1, page 2 and summarized below:

Table 4

	Proxy Group of Six AUS Utility Reports Water Companies	Proxy Group of Eight AUS Utility Rpts. Gas Distribution Companies
Discounted Cash Flow Model	11.73%	8.68%
Risk Premium Model	11.12	10.85
Capital Asset Pricing Model	11.58	10.49
Comparable Earnings Model	13.50	NMF
Indicated Common Equity Cost Rate Before Adjustment for Business Risk	12.15%	10.35%
Business Risk Adjustment	0.05	0.15
Indicated Common Equity Cost Rate After Adjustment for Business Risk	12.20%	10.50%
Financial/Credit Risk Adjustment	0.32	0.21
Range of Indicated Common Equity Cost Rate After Adjustment for Business and Financial/Credit Risk	12.52%	10.71%
Recommended Common Equity Cost Rate	11.60%	

Based upon these common equity cost rate results, I conclude that common equity cost rates of 12.15% and 10.35% are indicated for the water and gas distribution proxy groups, respectively before the business risk adjustments as shown on Line No. 5, page 2 of Schedule PMA-1. However, these indicated common equity cost rates are applicable to the larger, less business risky proxy groups and less financial/credit risk.

Q. IS THERE A WAY TO QUANTIFY A BUSINESS RISK ADJUSTMENT DUE TO MAWC'S SMALL SIZE RELATIVE TO THE PROXY GROUPS?

A. Yes. As discussed previously, MAWC has greater business risk than the

average proxy group company because of its smaller size relative to the proxy groups, whether measured by book capitalization or the market capitalization of common equity (estimated market value for MAWC, whose common stock is not traded). Therefore, it is necessary to upwardly adjust the common equity cost rates of 12.15% and 10.35% based upon the two proxy groups. The adjustments are based upon data contained in Ibbotson - SBBI. The determinations are based on the size premiums for decile portfolios of New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ listed companies for the 1926-2008 period and related data shown on pages 3 through 14 of Schedule PMA-1. The average size premium for the decile in which each proxy group falls has been compared to the average size premium for the 9th and 8th - 9th deciles in and between which MAWC would fall if its stock were traded and sold at the September 30, 2009 average market/book ratio of 194.5% and 153.3% experienced by each proxy group, respectively. As shown on page 4, the size premium spread between MAWC and the six AUS Utility Reports water companies is 0.37% (37 basis points) and between MAWC and the eight AUS Utility Reports natural gas distribution companies is 0.90% (90 basis points).

Although business risk adjustments of 0.37% and 0.90% are indicated based upon the six water companies, and the eight LDCs, respectively, I will make conservatively reasonable business risk adjustments of 0.05% (5 basis points) relative to the six water companies and 0.15% (15 basis points) relative to the eight LDCs as shown on Line No. 6 on page 2 of Schedule PMA-1 to the

indicated common equity cost rates for each group to reflect MAWC's greater relative business risk as discussed previously.

Therefore, as shown on Line No. 7 page 2 and in Table 4 above, the business risk-adjusted indicated common equity cost rates are 12.20% for the six water companies and 10.50% for the eight LDCs.

Q. IS THERE A WAY TO QUANTIFY A FINANCIAL RISK ADJUSTMENT DUE TO MAWC'S GREATER FINANCIAL/CREDIT RISK RELATIVE TO THE TWO PROXY GROUPS?

A. Yes. As discussed previously, were MAWC to have long-term debt which was rated by either S&P or Moody's, in my opinion the debt would be rated in the BBB/Baa bond rating categories. Similarly, in my opinion, it's likely S&P credit rating would also be in the BBB credit rating category. In contrast, the average S&P and Moody's bond and / or credit ratings of the proxy groups as shown on page 2 of Schedule PMA-11, are in the A bond/credit rating category. Therefore, MAWC has greater financial/credit risk than the average company in either proxy group. Based upon the basic financial principle of risk and return, namely, that investors require a greater return for bearing greater risk, an upward adjustment is required in order for the common equity cost rate based upon the market data of the proxy companies to be reflective of MAWC's greater financial risk. An indication of the required financial/credit risk adjustment is the bond yield differential between Moody's A and Baa rated public utility bonds. Because recent yield differentials between Moody's A and Baa rated public utility bond yields are high by historical standards i.e., 0.88%

(88 basis points) on average for the three months ended August 2009 v. an average/median monthly differential of 0.34%/0.29% (34/29 basis points) with a midpoint of 0.32% (32 basis points) for the ten years ended August 2009, it is more appropriate to rely upon the "normalized" yields differential of 0.32% (32 basis points) and 0.21% (21 basis points) over the most recent ten-year historical period relative to the Moody's A2 and A3 bond rating of the proxy groups of six water companies and eight LDCs, respectively. In addition, adjustments of 32 and 21 basis points are conservative because they are based upon an historical ten-year period and not upon the most recent monthly yield differentials.

Therefore, as shown on page 2 of Schedule PMA-1 at Line No. 9 and Table 4 above, the indicated common equity cost rate including the financial risk adjustment of 0.32% (32 basis points) and 0.21% (0.21 basis points) as well as the business risk adjustment of 0.05% (5 basis points) and 0.15% (15 basis points) discussed previously, are 12.52 for the proxy group of six water companies and 10.71% for the proxy group of eight LDCs. Based upon these common equity cost rates, a range of common equity cost rate of 10.40% - 12.50% is indicated, with a midpoint of 11.62%, which when rounded to 11.60% which is my recommendation.

A common equity cost rate of 11.60%, when applied to the pro forma common equity ratio of 48.94% at April 10, 2010 results in an overall rate of return of 8.91%, which, in my opinion, is both reasonable and conservative and will provide MAWC with sufficient earnings to enable it to attract necessary new

capital.

Q. DOES THAT CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

APPENDIX A

PROFESSIONAL QUALIFICATIONS

OF

PAULINE M. AHERN, CRRA
PRINCIPAL

AUS CONSULTANTS

PROFESSIONAL QUALIFICATIONS
OF
PAULINE M. AHERN, CRRA
PRINCIPAL
AUS CONSULTANTS

PROFESSIONAL EXPERIENCE

1994-Present

In 1996, I became a Principal of AUS Consultants, continuing to offer testimony as an expert witness on the subjects of fair rate of return and cost of capital before state public utility commissions. I provide assistance and support to clients throughout the entire ratemaking litigation process.

As the Publisher of AUS Utility Reports (formerly C. A. Turner Utility Reports), I am responsible for the production, publishing, and distribution of the reports. AUS Utility Reports provides financial data and related ratios for about 125 public utilities, i.e., electric, combination gas and electric, natural gas distribution, natural gas transmission, telephone, and water utilities, on a monthly, quarterly and annual basis. Among the subscribers of AUS Utility Reports are utilities, many state regulatory commissions, federal agencies, individuals, brokerage firms, attorneys, as well as public and academic libraries. The publication has continuously provided financial statistics on the utility industry since 1930.

As the Publisher of AUS Utility Reports, I supervise the production, publishing, and distribution of the AGA Rate Service publications under license from the American Gas Association. I am also responsible for maintaining and calculating the performance of the AGA Index, a market capitalization weighted index of the common stocks of the approximately 70 corporate members of the AGA. In addition, I supervise the production of a quarterly survey of investor-owned water company rate case activity on behalf of the National Association of Water Companies.

As an Assistant Vice President from 1994 - 1996, I prepared fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. These supporting exhibits include the determination of an appropriate ratemaking capital structure and the development of embedded cost rates of senior capital. The exhibits also support the determination of a recommended return on common equity through the use of various market models, such as, but not limited to, Discounted Cash Flow analysis, Capital Asset Pricing Model and Risk Premium Methodology, as well as an assessment of the risk characteristics of the client utility. I also assisted in the preparation of responses to any interrogatories received regarding such testimonies filed on behalf of client utilities. Following the filing of fair rate of return testimonies, I assisted in the evaluation of opposition testimony in order to prepare interrogatory questions, areas of cross-examination, and rebuttal testimony. I also evaluated and assisted in the preparation of briefs and exceptions following the hearing process. I have submitted testimony before state public utility commissions regarding appropriate capital structure ratios and fixed capital cost rates.

1990-1994

As a Senior Financial Analyst, I supervised two analysts in the preparation of fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. The team also assisted in the preparation of interrogatory responses.

I evaluated the final orders and decisions of various commissions to determine whether further actions are warranted and to gain insight which may assist in the preparation of future rate of return studies.

I assisted in the preparation of an article authored by Frank J. Hanley and A. Gerald Harris entitled "Does Diversification Increase the Cost of Equity Capital?" published in the July 15, 1991 issue of Public Utilities Fortnightly.

I co-authored an article with Frank J. Hanley entitled "Comparable Earnings: New Life for an Old Precept" which was published in the American Gas Association's Financial Quarterly Review, Summer 1994.

I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by the National Society of Rate of Return Analysts (now the Society of Utility and Regulatory Financial Analysts (SURFA)). This designation is based upon education, experience and the successful completion of a comprehensive examination.

As Administrator of Financial Analysis for AUS Utility Reports, which reports financial data for over 200 utility companies and has approximately 1,000 subscribers, I oversee the preparation of this monthly publication, as well as the annual publication, Financial Statistics - Public Utilities.

1988-1990

As a Financial Analyst, I assisted in the preparation of fair rate of return studies including capital structure determination, development of senior capital cost rates, as well as the determination of an appropriate rate of return on equity. I also assisted in the preparation of interrogatory responses, interrogatory questions of the opposition, areas of cross-examination and rebuttal testimony. I also assisted in the preparation of the annual publication C. A. Turner Utility Reports - Financial Statistics - Public Utilities.

1973-1975

As a research assistant in the Research Department of the Regional Economics Division of the Federal Reserve Bank of Boston, I was involved in the development and maintenance of econometric models to simulate regional economic conditions in New England in order to study the effects of, among other things, the energy crisis of the early 1970's and property tax revaluations on the economy of New England. I was also involved in the statistical analysis and preparation of articles for the New England Economic Review. Also, I acted as assistant editor for New England Business Indicators.

1972

As a research assistant in the Office of the Assistant Secretary for International Affairs, U.S. Treasury Department, Washington, D.C., I developed and maintained econometric models which simulated the economy of the United States in order to study the results of various alternate foreign trade policies so that national trade policy could be formulated and recommended.

I am also a member of the Society of Utility and Regulatory Financial Analysts (formerly the National Society of Rate of Return Analysts).

Clients Served

I have offered expert testimony before the following commissions:

Arkansas
California
Connecticut
Delaware
Florida
Hawaii
Idaho
Illinois
Indiana
Iowa
Kentucky
Louisiana
Maine
Maryland
Michigan
Missouri
Nevada
New Jersey
New York
North Carolina
Ohio
Pennsylvania
South Carolina
Virginia
Washington

I have sponsored testimony on the rate of return and capital structure effects of merger and acquisition issues for:

California-American Water Company
New Jersey-American Water Company

I have sponsored testimony on fair rate of return and related issues for:

Alpena Power Company
Applied Wastewater Management, Inc.
Aqua Illinois, Inc.
Aqua New Jersey, Inc.
Aqua Virginia, Inc.
Artesian Water Company
The Atlantic City Sewerage Company
Audubon Water Company
The Borough of Hanover, PA
Carolina Pines Utilities, Inc.
Carolina Water Service, Inc. of NC
Carolina Water Service, Inc. of SC
The Columbia Water Company
Consumers Illinois Water Company
Consumers Maine Water Company
Consumers New Jersey Water Company
City of DuBois, Pennsylvania
Elizabethtown Water Company
Emporium Water Company
GTE Hawaiian Telephone Inc.
Greenridge Utilities, Inc.
Illinois American Water Company
Iowa American Water Company
Land'Or Utility Company
Long Neck Water Company
Louisiana Water Service, Inc.
Massanutten Public Service Company
Middlesex Water Company
Missouri-American Water Company
Mt. Holly Water Company
Nero Utility Services, Inc.
New Jersey-American Water Company
The Newtown Artesian Water Company
NRG Energy Center Pittsburgh LLC
NRG Energy Center Harrisburg LLC
Ohio-American Water Company
Penn Estates Utilities
Pinelands Water Company
Pinelands Waste Water Company
Pittsburgh Thermal
San Jose Water Company
Southland Utilities, Inc.
Spring Creek Utilities, Inc.
Sussex Shores Water Company
Tega Cay Water Service, Inc.
Total Environmental Services, Inc.
Treasure Lake Water & Sewer Divisions
Thames Water Americas
Tidewater Utilities, Inc.
Transylvania Utilities, Inc
Trigen-Philadelphia Energy Corporation
Twin Lakes Utilities, Inc.
United Utility Companies
United Water Arkansas, Inc.
United Water Arlington Hills Sewerage, Inc.
United Water Connecticut, Inc.
United Water Delaware, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New Rochelle, Inc.
United Water New York, Inc.
United Water Owego / Nichols, Inc.
United Water Pennsylvania, Inc.
United Water South County, Inc.
United Water Toms River, Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
United Water West Milford, Inc.
Utilities, Inc.
Utilities Inc. of Central Nevada
Utilities, Inc. of Florida
Utilities, Inc. of Louisiana
Utilities Inc. of Nevada
Utilities, Inc. of Pennsylvania
Utilities, Inc. - Westgate
Utilities Services of South Carolina
Utility Center, Inc.
Valley Energy, Inc.
Water Services Corp. of Kentucky
Wellsboro Electric Company
Western Utilities, Inc.

I have sponsored testimony on capital structure and senior capital cost rates for the following clients:

Alpena Power Company
Arkansas-Western Gas Company
Associated Natural Gas Company
PG Energy Inc.
United Water Delaware, Inc.
Washington Natural Gas Company

I have assisted in the preparation of rate of return studies on behalf of the following clients:

Algonquin Gas Transmission Company
Anadarko Petroleum Corporation
Arkansas-Louisiana Gas Company
Arkansas Western Gas Company
Artesian Water Company
Associated Natural Gas Company
Atlantic City Electric Company
Bridgeport-Hydraulic Company
Cambridge Electric Light Company
Carolina Power & Light Company
Citizens Gas and Coke Utility
City of Vernon, CA
Columbia Gas/Gulf Transmission Cos.
Commonwealth Electric Company
Commonwealth Telephone Company
Conestoga Telephone & Telegraph Co.
Connecticut Natural Gas Corporation
Consolidated Gas Transmission Company
Consumers Power Company
CWS Systems, Inc.
Delmarva Power & Light Company
East Honolulu Community Services, Inc.
Equitable Gas Company
Equitrans, Inc.
Florida Power & Light Company
Gary Hobart Water Company
Gasco, Inc.
GTE Arkansas, Inc.
GTE California, Inc.
GTE Florida, Inc.
GTE Hawaiian Telephone
GTE North, Inc.
GTE Northwest, Inc.
GTE Southwest, Inc.
Great Lakes Gas Transmission L.P.
Hawaiian Electric Company
Hawaiian Electric Light Company
IES Utilities Inc.
Illinois Power Company
Interstate Power Company
Interstate Power & Light Co.
Iowa Electric Light and Power Company
Iowa Southern Utilities Company
Kentucky-West Virginia Gas Company
Lockhart Power Company
Middlesex Water Company
Milwaukee Metropolitan Sewer District
Mountaineer Gas Company
National Fuel Gas Distribution Corp.
National Fuel Gas Supply Corp.
Newco Waste Systems of NJ, Inc.
New Jersey Natural Gas Company
New Jersey-American Water Company
New York-American Water Company
North Carolina Natural Gas Corp.
Northumbrian Water Company
Ohio-American Water Company
Oklahoma Natural Gas Company
Orange and Rockland Utilities
Paiute Pipeline Company
PECO Energy Company
Penn Estates Utilities, Inc
Penn-York Energy Corporation
Pennsylvania-American Water Co.
PG Energy Inc.
Philadelphia Electric Company
Providence Gas Company
South Carolina Pipeline Company
Southwest Gas Corporation
Stamford Water Company
Tesoro Alaska Petroleum Company
Tesoro Refining & Marketing Co.
United Telephone of New Jersey
United Utility Companies
United Water Arkansas, Inc.
United Water Delaware, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New York, Inc.
United Water Pennsylvania, Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
Utilities, Inc of Pennsylvania
Utilities, Inc - Westgate
Vista-United Telecommunications Corp.
Washington Gas Light Company
Washington Natural Gas Company
Washington Water Power Corporation
Waste Management of New Jersey – Transfer Station A
Wellsboro Electric Company
Western Reserve Telephone Company
Western Utilities, Inc.
Wisconsin Power and Light Company

EDUCATION:

1973 – Clark University – B.A. – Honors in Economics
1991 – Rutgers University – M.B.A. – High Honors

PROFESSIONAL AFFILIATIONS:

American Finance Association
Financial Management Association
Society of Utility and Regulatory Financial Analysts
President – 2006-2008 and 2008-2010
Secretary/Treasurer – 2004-2006
Energy Association of Pennsylvania
National Association of Water Companies – Member of the Finance Committee

SPEAKING ENGAGEMENT:

"New Approach to Estimating the Cost of Common Equity Capital for Public Utilities" (co-presenter with Richard A. Michelfelder, Ph.D. - Advanced Workshop in Regulation and Competition, 28th Annual Eastern Conference of the Center for Research in Regulated Industries (CRRI) at Rutgers University, May 14, 2009.

Moderator: Society of Utility and Regulatory Financial Analysis: 41st Financial Forum – "Estimating the Cost of Capital in Today's Economic and Capital Market Environment" April 16-17, 2009, Washington, DC

AWWA Pre-Conference Workshop – Water Utility Ratemaking – March 25, 2008, Atlantic City, NJ
Topic: "Water Utility Financing: Where Does All That Cash Come From?"

PAPERS:

"New Approach to Estimating the Cost of Common Equity Capital for Public Utilities", co-authored with Frank J. Hanley and Richard A. Michelfelder, forthcoming.

"Comparable Earnings: New Life for an Old Precept" co-authored with Frank J. Hanley, Financial Quarterly Review, (American Gas Association), Summer 1994.

Exhibit No.:
Issues: Rate of Return on Equity

Witness: Pauline M. Ahern
Exhibit Type: Direct Schedules
Sponsoring Party: Missouri American Water Company
Case Nos.: WR-2010-XXXX
SR-2010-XXXX
Date:

PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

CASE NOS. WR-2010-XXXX
SR-2010-XXXX

SCHEDULES

TO ACCOMPANY THE

DIRECT TESTIMONY

OF

PAULINE M. AHERN, CRRA

ON BEHALF OF

MISSOURI AMERICAN WATER COMPANY

JEFFERSON CITY, MISSOURI

Missouri-American Water Company
Table of Contents
to the Financial Supporting Schedules
of Pauline M. Ahern, CRRA

Missouri-American Water Company
Summary of Cost of Capital and Fair Rate of Return
Based upon the Pro Forma Capital Structure of at April 30, 2010

Type of Capital	Ratios (1)	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.06%	6.36% (1)	3.18%
Short-Term Debt	0.68%	3.62%	0.02%
Total Debt	50.74%		3.20%
Preferred Stock	0.32%	9.20%	0.03%
Common Equity	48.94%	11.60% (2)	5.68%
Total	100.00%		8.91%

(1) Company-provided.

(2) Based upon informed expert judgment from the entire study, the principal results of which are summarized on Page 2 of this Schedule.

Missouri-American Water Company
Brief Summary of Common Equity Cost Rate

No.	Principal Methods	Proxy Group of Six AUS Utility Reports Water Companies	Proxy Group of Eight AUS Utility Reports Gas Distribution Companies
1.	Discounted Cash Flow Model (DCF) (1)	11.73 %	8.68 %
2.	Risk Premium Model (RPM) (2)	11.12	10.85
3.	Capital Asset Pricing Model (CAPM) (3)	11.58	10.49
4.	Comparable Earnings Model (CEM) (4)	13.50	NMF
5.	Indicated Common Equity Cost Rate before Adjustment for Business Risk	12.15 %	10.35 %
6.	Business Risk Adjustment (5)	0.05	0.15
7.	Range of Indicated Common Equity Cost Rate After Adjustment for Business Risk	12.20 %	10.50 %
8.	Financial / Credit Risk Adjustment (6)	0.32	0.21
9.	Range of Indicated Common Equity Cost Rate After Adjustment for Business and Financial / Credit Risk	12.52 %	10.71 %
10.	Recommended Common Equity Cost Rate	11.60%	

Notes: (1) From Schedule PMA-7.
(2) From page 1 of Schedule PMA-11.
(3) From page 1 Schedule PMA-12.
(4) From pages 2 and 3 of Schedule PMA-14 of this Exhibit.
(5) Business risk adjustment to reflect Missouri-American Water Company's greater business risk due to its small size relative to the proxy groups as detailed in Ms. Ahern's accompanying direct testimony.

(6) Financial / credit risk adjustment to reflect Missouri-American Water Company's greater financial / credit risk relative to the proxy groups as detailed in Ms. Ahern's accompanying direct testimony.

Missouri-American Water Company
Derivation of Investment Risk Adjustment Based upon
Ibbotson Associates' Size Premia for the Decile Portfolios of the NYSE/AMEX/NASDAQ

Line No.		1 Market Capitalization on September 30, 2009 (1) (millions)	(times larger)	2 Applicable Decile of the NYSE/AMEX/ NASDAQ (2)	3 Applicable Size Premium (3)	4 Spread from Applicable Size Premium for (4)
1.	Missouri-American Water Company					
	a. Based Upon the Proxy Group of Six AUS Utility Reports Water Companies	$ 660.080		9	2.35%	
	b. Based Upon the Proxy Group of Eight AUS Utility Reports Gas Distribution Companies	$ 520.259		8 - 9	2.53%	
2.	Proxy Group of Six AUS Utility Reports Water Companies	$ 769.035	1.2 x	7 - 8	1.99%	0.37%
3.	Proxy Group of Eight AUS Utility Reports Gas Distribution Companies	$ 1,464.019	2.8 x	6	1.63%	0.90%

(A) Decile	(B) Number of Companies (millions)	(C) Recent Total Market Capitalization (millions)	(D) Recent Average Market Capitalization (millions)	(E) Size Premium (Return in Excess of CAPM) (2)
1 - Largest	165	$ 8,530,554.000	$ 51,700.327	-0.36%
2	175	1,682,132.000	$ 9,612.183	0.62%
3	183	804,806.000	$ 4,397.847	0.74%
4	189	540,900.000	$ 2,861.905	0.97%
5	211	409,557.000	$ 1,941.028	1.54%
6	243	342,820.000	$ 1,410.782	1.63%
7	319	283,476.000	$ 888.639	1.62%
8	393	241,137.000	$ 613.580	2.35%
9	603	181,013.000	$ 300.187	2.71%
10 - Smallest	1626	128,780.000	$ 79.200	5.81%

*From pages 7 and 11 of this Schedule

Notes:
(1) From Page 4 of this Schedule.
(2) Gleaned from Column (D) on the bottom of this page. The appropriate decile (Column (A)) corresponds to the market capitalization of the proxy group, which is found in Column 1.
(3) Corresponding risk premium to the decile is provided on Column (E) on the bottom of this page.
(4) Line No. 1a Column 3 – Line No. 2 Column 3 and Line No. 1b, Column 3 – Line No. 3 of Column 3 etc.. For example, the 2.28% in Column 4, Line No. 2 is derived as follows 2.28% = 4.26% - 1.99%.

Missouri-American Water Company
Market Capitalization of United Water New York, Inc.
the Proxy Group of Six AUS Utility Reports Water Companies
and the Proxy Group of Eight AUS Utility Reports Natrual Gas Distribution Companies

Company	Exchange	1 Common Stock Shares Outstanding at December 31, 2008 (millions)	2 Book Value per Share at December 31, 2008 (1)	3 Total Common Equity at December 31, 2008 (millions)	4 Closing Stock Market Price on September 30, 2009	5 Market-to-Book Ratio on September 30, 2009 (2)	6 Market Capitalization on September 30, 2009 (3) (millions)
Missouri-American Water Company		NA	NA	$ 339.373 (4)	NA		
Based Upon the Proxy Group of Six AUS Utility Reports Water Companies						194.5 % (5)	$ 660.080 (6)
Based Upon the Proxy Group of Eight AUS Utility Reports Gas Distribution Companies						153.3 % (7)	$ 520.259 (8)
Proxy Group of Six AUS Utility Reports Water Companies							
American States Water Co.	NYSE	17.301	$ 17.947	$ 310.503	$ 35.180	201.6 %	$ 625.952
Aqua America, Inc.	NYSE	138.053	7.780	1,058.448	17.640	226.7	2,399.983
California Water Service Group	NYSE	20.723	19.445	402.949	38.940	200.3	808.954
Middlesex Water Company	NASDAQ	13.404	10.281	137.803	15.080	146.7	202.132
SJW Corporation	NYSE	16.452	13.783	254.326	22.650	166.8 %	421.836
York Water Company	NASDAQ	11.367	6.137	69.768	13.880	225.6	157.550
Average		39.217	$ 12.562	$ 372.299	$ 24.092	194.5 %	$ 769.035
Proxy Group of Eight AUS Utility Reports Gas Distribution Companies							
AGL Resources, Inc.	NYSE	76.900	$ 21.482	$ 1,652.000	$ 35.270	164.2 %	$ 2,712.263
Atmos Energy Corp.	NYSE	90.815	22.601	2,052.492	28.180	124.7	2,559.158
Delta Natural Gas Company	NYSE	3.298	17.475	57.594	26.500	151.6	87.338
Laclede Group, Inc.	NYSE	21.993	22.119	486.479	32.160	145.4	707.310
Northwest Natural Gas Company	NYSE	26.594	23.628	628.373	41.660	176.3	1,107.906
Piedmont Natural Gas Co., Inc.	NYSE	73.248	12.113	887.244	23.940	197.6	1,753.509
Southwest Gas Corporation	NYSE	44.192	23.485	1,037.841	25.580	108.9	1,130.419
WGL Holdings, Inc.	NYSE	49.917	20.988	1,047.564	33.140	157.9	1,654.246
Average		48.369	$ 20.486	$ 851.198	$ 30.804	153.3 %	$ 1,464.019

NA = Not Available

Notes:
(1) Column 3 / Column 1.
(2) Column 4 / Column 2.
(3) Column 5 * Column 3.
(4) From Missouri-American Water Co.'s 2008 Annual Report to the Missouri Public Service Commission.
(5) The market-to-book ratio of Missouri-American Water Company on September 30, 2009 is assumed to be equal to the average market-to-book ratio at September 30, 2009 of the proxy group of six AUS Utility Reports water companies.
(6) Missouri-American Water Company's common stock, if traded, would trade at a market-to-book ratio equal to the average market-to-book ratio at September 30, 2009 of the proxy group of six AUS Utility Reports water companies, 194.5%, and Missouri-American Water Company's market capitalization on September 30, 2009 would therefore have been $660,080 million. ($660.080 = $339.373 * 194.5%).
(7) The market-to-book ratio of Missouri-American Water Company on September 30, 2009 is assumed to be equal to the average market-to-book ratio at September 30 , 2009 of the proxy group of eight AUS Utility Reports gas distribution companies.
(8) Missouri-American Water Company's common stock, if traded, would trade at a market-to-book ratio equal to the average market-to-book ratio at September 30, 2009 of the proxy group of eight AUS Utility Reports gas distribution companies, 153.3%, and Missouri-American Water Company's market capitalization on September 30, 2009 would therefore have been $520.259 million. ($520.259 = $339.363 * 153.3%).

Source of Information: 2008 Annual Forms 10K
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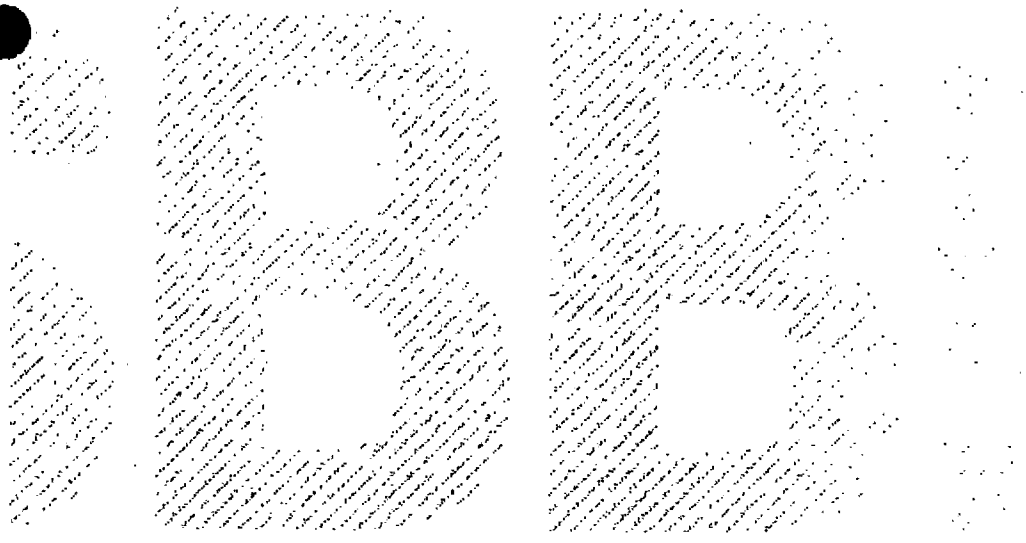
1926–2008



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Chapter 7
Firm Size and Return

The Firm Size Phenomenon

One of the most remarkable discoveries of modern finance is that of a relationship between firm size and return. The relationship cuts across the entire size spectrum but is most evident among smaller companies, which have higher returns on average than larger ones. Many studies have looked at the effect of firm size on return.[1] In this chapter, the returns across the entire range of firm size are examined.

Size and Liquidity

Capitalization is not necessarily the underlying cause of the higher returns for smaller companies. While smaller companies are usually less liquid, with fewer shares traded on any given day, not all companies of the same size have the same liquidity. Stocks that are more liquid have higher valuations for the same cash flows because they have a lower cost of capital and commensurately lower returns on average. Stocks that are less liquid have a higher cost of capital and higher returns on average.[2]

While it would be very useful to estimate the equity cost of capital of companies that are not publicly traded, there is not a direct measure of liquidity for these companies because there are no public trades. Thus, there is usually no share turnover, no bid/ask spreads, etc. in which to measure liquidity. Even though liquidity is not directly observable, capitalization is; thus the size premium can serve as a partial measure of the increased cost of capital of a less liquid stock.

Size premiums presented in this book are measured from publicly traded companies of various sizes and therefore do not represent the full cost of capital for non-traded companies. The valuation for a non-publicly traded company should also reflect a discount for the very fact that it is not traded. This would be an illiquidity discount and could be applied to the valuation directly, or alternatively reflected as an illiquidity premium in the cost of capital.

This chapter does not tell you how to estimate this incremental illiquidity valuation discount (or cost of capital illiquidity premium) that is not covered by the size premium. At the end of this chapter, we show some empirical results on the impact of liquidity on stock returns.

Construction of the Decile Portfolios

The portfolios used in this chapter are those created by the Center for Research in Security Prices (CRSP) at the University of Chicago's Graduate School of Business. CRSP has refined the methodology of creating size-based portfolios and has applied this methodology to the entire universe of NYSE/AMEX/NASDAQ-listed securities going back to 1926.

The New York Stock Exchange universe excludes closed-end mutual funds, preferred stocks, real estate investment trusts, foreign stocks, American Depository Receipts, unit investment trusts, and Americus Trusts. All companies on the NYSE are ranked by the combined market capitalization of their eligible equity securities. The companies are then split into 10 equally populated groups, or deciles. Eligible companies traded on the American Stock Exchange (AMEX) and the Nasdaq National Market (NASDAQ) are then assigned to the appropriate deciles according to their capitalization in relation to the NYSE breakpoints. The portfolios are rebalanced, using closing prices for the last trading day of March, June, September, and December. Securities added during the quarter are assigned to the appropriate portfolio when two consecutive month-end prices are available. If the final NYSE price of a security that becomes delisted is a month-end price, then that month's return is included in the quarterly return of the security's portfolio. When a month-end NYSE price is missing, the month-end value of the security is derived from merger terms, quotations on regional exchanges, and other sources. If a month-end value still is not determined, the last available daily price is used.

Base security returns are monthly holding period returns. All distributions are added to the month-end prices, and appropriate price adjustments are made to account for stock splits and dividends. The return on a portfolio for one month is calculated as the weighted average of the returns for its individual stocks. Annual portfolio returns are calculated by compounding the monthly portfolio returns.

Table 7-1: Size-Decile Portfolios of the NYSE/AMEX/NASDAQ Bounds, Size, and Composition

Decile	Historical Average Percentage of Total Capitalization	Recent Number of Companies	Recent Decile Market Capitalization (in Thousands)	Recent Percentage of Total Capitalization
1-Largest	63.22	165	$8,530,554	64.89
2	13.96	175	1,682,132	12.80
3	7.56	183	804,806	6.12
4	4.72	189	540,930	4.11
5	3.24	211	409,557	3.12
6	2.39	243	342,820	2.61
7	1.75	319	283,476	2.16
8	1.30	393	241,137	1.83
9	1.02	603	181,013	1.38
10-Smallest	0.83	1626	128,780	0.98
Mid-Cap 3–5	15.52	583	1,755,263	13.35
Low-Cap 6–8	5.44	955	867,434	6.60
Micro-Cap 9–10	1.85	2229	309,793	2.35

Data from 1926–2008. Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

Historical average percentage of total capitalization shows the average, over the last 83 years, of the decile market values as a percentage of the total NYSE/AMEX/NASDAQ calculated each month. Number of companies in deciles, recent market capitalization of deciles and recent percentage of total capitalization are as of September 30, 2008.

Table 7-2: Size-Decile Portfolios of the NYSE/AMEX/NASDAQ, Largest Company and Its Market Capitalization by Decile

Decile	Recent Market Capitalization (in Thousands)	Company Name
1-Largest	465,651,936	Exxon Mobil Corp.
2	18,503,467	Waste Management Inc. Del
3	7,360,271	Reliant Energy Inc.
4	4,225,152	IMS Health Inc.
5	2,765,538	Family Dollar Stores Inc.
6	1,848,981	Bally Technologies Inc.
7	1,197,133	Temple Inland Inc.
8	753,448	Kronos Worldwide Inc.
9	453,254	SWS Group Inc.
10-Smallest	218,533	Beazer Homes USA Inc.

Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.
Market capitalization and name of largest company in each decile as of September 30, 2008.

Size of the Deciles

Table 7-1 reveals that the top three deciles of the NYSE/AMEX/NASDAQ account for most of the total market value of its stocks. Nearly two-thirds of the market value is represented by the first decile, which currently consists of 165 stocks, while the smallest decile accounts for just over one percent of the market value. The data in the second column of Table 7-1 are averages across all 83 years. Of course, the proportion of market value represented by the various deciles varies from year to year.

Columns three and four give recent figures on the number of companies and their market capitalization, presenting a snapshot of the structure of the deciles near the end of 2008.

Table 7-2 gives the current breakpoints that define the composition of the NYSE/AMEX/NASDAQ size deciles. The largest company and its market capitalization are presented for each decile. Table 7-3 shows the historical breakpoints for each of the three size groupings presented throughout this chapter. Mid-cap stocks are defined here as the aggregate of deciles 3–5. Based on the most recent data (Table 7-2), companies within this mid-cap range have market capitalizations at or below $7,360,271,000 but greater than $1,848,961,000. Low-cap stocks include deciles 6–8 and currently include all companies in the NYSE/AMEX/NASDAQ with market capitalizations at or below $1,848,961,000 but greater than $453,254,000. Micro-cap stocks include deciles 9–10 and include companies with market capitalizations at or below $453,254,000. The market capitalization of the smallest company included in the micro-capitalization group is currently $1,575,000.

Presentation of the Decile Data

Summary statistics of annual returns of the 10 deciles over 1926–2008 are presented in Table 7-4. Note from this exhibit that both the average return and the total risk, or standard deviation of annual returns, tend to increase as one moves from the largest decile to the smallest. Furthermore, the serial correlations of returns are near zero for all but the smallest deciles. Serial correlations and their significance will be discussed in detail later in this chapter.

Table 7-3
Size-Decile Portfolios of the NYSE/AMEX/NASDAQ
Largest and Smallest Company by Size Group

1926–1965

Date (Sept 30)	Capitalization of Largest Company (in Thousands) Mid-Cap 3–5	Low-Cap 6–8	Micro-Cap 9–10	Capitalization of Smallest Company (in Thousands) Mid-Cap 3–5	Low-Cap 6–8	Micro-Cap 9–10
1926	$60,103	$13,795	$4,213	$13,800	$4,263	$43
1927	64,820	14,491	4,415	14,522	4,450	65
1928	80,910	18,761	5,074	18,788	5,119	135
1929	103,054	24,328	5,862	24,480	5,873	118
1930	66,750	12,918	3,359	13,050	3,369	30
1931	42,607	8,142	1,927	8,222	1,944	15
1932	12,212	2,208	468	2,223	469	19
1933	40,298	7,210	1,830	7,280	1,875	120
1934	38,019	6,638	1,673	6,669	1,691	69
1935	37,631	6,549	1,350	6,605	1,383	39
1936	46,963	11,505	2,754	11,526	2,800	98
1937	51,760	13,635	3,539	13,793	3,563	69
1938	35,019	8,372	2,195	8,400	2,200	60
1939	35,409	7,478	1,819	7,500	1,854	75
1940	29,903	7,990	1,861	8,007	1,872	51
1941	30,362	8,316	2,086	8,396	2,087	72
1942	28,037	6,868	1,770	6,870	1,779	82
1943	42,721	11,403	3,847	11,475	3,903	395
1944	45,221	13,066	4,812	13,068	4,820	309
1945	55,125	17,325	6,413	17,575	6,428	225
1946	77,784	24,192	10,149	24,199	10,168	829
1947	57,830	17,719	6,373	17,735	6,380	508
1948	67,238	19,632	7,329	19,651	7,348	683
1949	56,082	14,549	5,037	14,577	5,108	379
1950	66,143	18,675	6,225	18,700	6,243	303
1951	82,517	22,750	7,598	22,860	7,600	668
1952	95,636	25,405	8,428	25,452	8,480	480
1953	98,218	25,340	8,156	25,374	8,168	459
1954	125,834	29,707	8,488	29,791	8,502	463
1955	170,829	41,445	12,366	41,681	12,444	553
1956	183,792	46,805	13,524	46,886	13,623	1,122
1957	194,300	47,858	13,844	48,509	13,848	925
1958	195,536	46,774	13,789	46,871	13,816	550
1959	256,283	64,110	19,548	64,221	19,701	1,804
1960	252,292	61,485	19,293	61,529	19,344	831
1961	296,261	77,983	23,562	77,996	23,613	2,455
1962	250,786	58,785	18,952	58,866	18,968	1,019
1963	308,903	71,846	23,927	71,971	24,056	296
1964	349,675	79,508	25,595	79,937	25,607	223
1965	365,675	84,600	28,483	85,065	28,543	250

Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

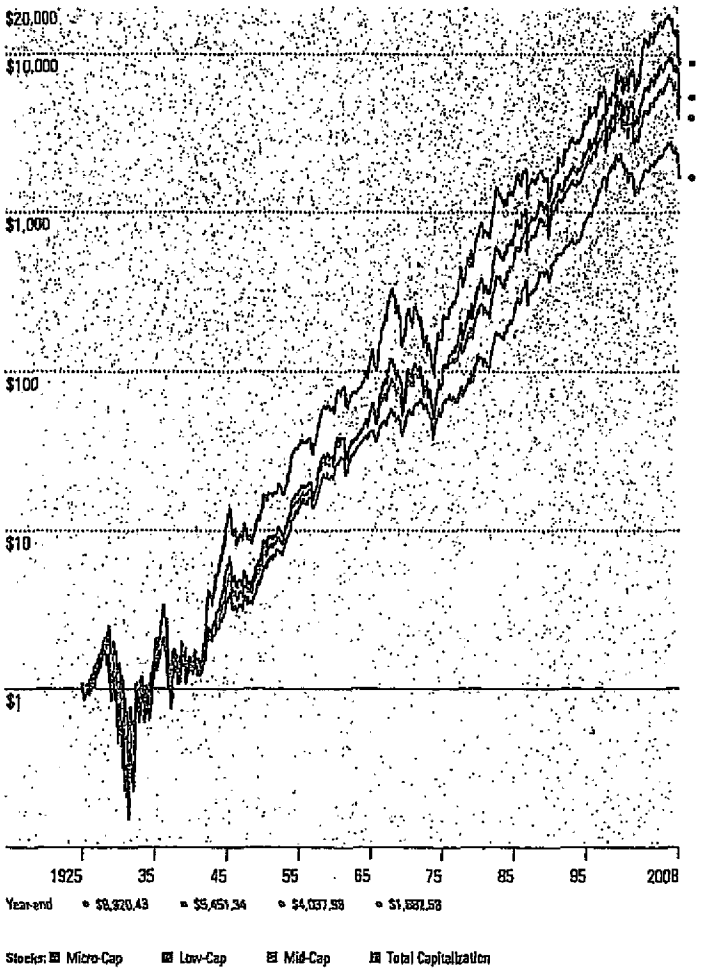
Table 7-3 (Continued)
Size-Decile Portfolios of the NYSE/AMEX/NASDAQ
Largest and Smallest Company by Size Group

1966–2008

Date (Sept 30)	Capitalization of Largest Company (in Thousands)			Capitalization of Smallest Company (in Thousands)		
	Mid-Cap 3-5	Low-Cap 6-8	Micro-Cap 9-10	Mid-Cap 3-5	Low-Cap 6-8	Micro-Cap 9-10
1966	$403,137	$99,960	$34,884	$100,107	$34,966	$381
1967	459,438	118,988	42,188	119,635	42,237	381
1968	531,308	150,893	60,543	151,260	60,719	592
1969	518,485	146,792	54,353	147,311	54,503	2,119
1970	382,884	94,754	29,916	94,845	29,932	822
1971	551,690	147,426	45,570	147,810	45,571	865
1972	557,181	143,635	46,728	144,263	46,757	1,031
1973	431,354	96,699	29,352	96,710	29,430	561
1974	356,876	79,878	23,355	80,280	23,400	444
1975	477,054	102,313	30,353	103,283	30,394	540
1976	568,295	121,717	34,864	121,992	34,901	564
1977	564,577	139,198	40,700	139,620	40,765	513
1978	580,881	164,093	47,927	164,455	48,038	830
1979	665,019	177,378	51,197	177,769	51,274	948
1980	762,195	199,312	50,496	199,315	50,544	549
1981	962,397	264,690	72,104	264,783	72,450	1,446
1982	770,517	210,301	55,336	210,630	55,423	1,060
1983	1,209,911	353,889	104,382	356,238	104,588	2,025
1984	1,075,436	315,985	91,004	316,103	91,195	2,093
1985	1,440,436	370,224	94,875	370,729	94,887	760
1986	1,857,621	449,015	110,617	449,462	110,953	706
1987	2,052,143	468,948	113,419	470,662	113,430	1,277
1988	1,957,926	421,340	94,449	421,675	94,573	696
1989	2,145,947	480,975	100,285	483,623	100,384	96
1990	2,171,217	474,065	93,750	474,477	93,790	132
1991	2,128,863	457,958	87,586	458,653	87,733	278
1992	2,428,671	500,327	103,352	500,346	103,500	510
1993	2,705,192	603,588	137,105	607,449	137,137	602
1994	2,470,244	598,059	148,104	597,975	148,216	598
1995	2,789,938	647,210	155,366	647,253	155,532	89
1996	3,142,657	751,316	193,001	751,680	193,016	1,043
1997	3,484,440	813,923	228,900	814,355	229,058	585
1998	4,216,707	925,686	252,553	926,215	253,031	1,671
1999	4,251,741	875,309	220,397	875,582	220,456	1,502
2000	4,143,902	840,000	192,083	840,730	192,439	1,393
2001	5,156,315	1,109,224	265,734	1,108,969	265,736	443
2002	4,930,326	1,116,525	308,980	1,124,331	309,245	501
2003	4,744,580	1,163,369	329,060	1,163,423	329,529	332
2004	6,241,953	1,607,854	505,437	1,607,931	506,410	1,393
2005	7,167,244	1,728,888	586,393	1,729,364	587,243	1,079
2006	7,777,183	1,946,588	626,955	1,947,240	627,017	2,247
2007	9,206,713	2,411,794	723,258	2,413,563	725,267	1,922
2008	7,360,271	1,848,951	453,254	1,849,950	453,398	1,575

Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

Graph 7-1: Size-Decile Portfolios of the NYSE/AMEX/NASDAQ
Wealth Indices of Investments in Mid-, Low-, Micro-, and Total Capitalization Stocks
Index (Year-End 1925 = $1.00)



Data from 1925–2008.

Graph 7-1 depicts the growth of one dollar invested in each of three NYSE/AMEX/NASDAQ groups broken down into mid-cap, low-cap, and micro-cap stocks. The index value of the entire NYSE/AMEX/NASDAQ is also included. All returns presented are value-weighted based on the market capitalizations of the deciles contained in each subgroup. The sheer magnitude of the size effect in some years is noteworthy. While the largest stocks actually declined 9 percent in 1977, the smallest stocks rose more than 20 percent. A more extreme case occurred in the depression-recovery year of 1933, when the difference between the first and tenth decile returns was far more substantial, with the largest stocks rising 46 percent, and the smallest stocks rising 218 percent. This divergence in the performance of small and large company stocks is a common occurrence.

Table 7-4: Size-Decile Portfolios of the NYSE/AMEX/NASDAQ
Summary Statistics of Annual Returns

Decile	Geometric Mean	Arithmetic Mean	Standard Deviation	Serial Correlation
1-Largest	8.9	10.8	19.48	0.09
2	10.1	12.5	22.33	0.04
3	10.4	13.1	23.89	-0.01
4	10.4	13.4	26.13	0.00
5	10.9	14.2	26.90	-0.02
6	10.9	14.5	27.59	0.04
7	10.8	14.8	29.82	0.02
8	11.0	16.0	34.44	0.06
9	11.1	16.6	36.70	0.05
10-Smallest	12.5	20.1	44.95	0.17
Mid Cap	10.5	13.4	24.93	-0.01
Low Cap	10.9	14.9	29.41	0.04
Micro	11.6	17.7	39.16	0.09
NYSE/AMEX/ NASDAQ Total Value Weighted Index	9.4	11.4	20.53	0.04

Data from 1925–2008. Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

Results are for quarterly re-ranking for the deciles. The small company stock summary statistics presented in earlier chapters comprise a re-ranking of the portfolios every five years prior to 1982.

Aspects of the Firm Size Effect

The firm size phenomenon is remarkable in several ways. First, the greater risk of small stocks does not, in the context of the capital asset pricing model (CAPM), fully account for their higher returns over the long term. In the CAPM only systematic, or beta risk, is rewarded; small company stocks have had returns in excess of those implied by their betas.

Second, the calendar annual return differences between small and large companies are serially correlated. This suggests that past annual returns may be of some value in predicting future annual returns. Such serial correlation, or autocorrelation, is practically unknown in the market for large stocks and in most other equity markets but is evident in the size premia.

Table 7-5: Size-Decile Portfolios of the NYSE/AMEX/NASDAQ
Long-Term Returns in Excess of CAPM

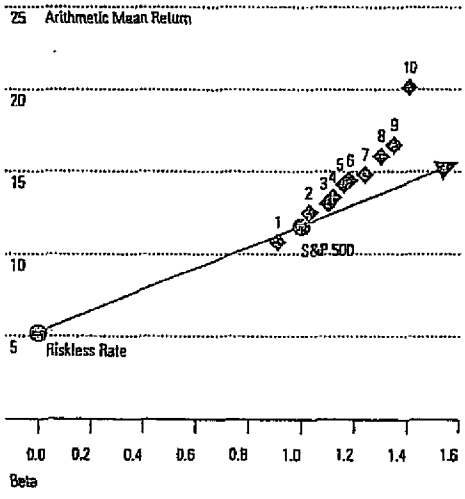
Decile	Beta*	Arithmetic Mean Return (%)	Actual Return in Excess of Riskless Rate** (%)	CAPM Return in Excess of Riskless Rate† (%)	Size Premium (Return in Excess of CAPM) (%)
1-Largest	0.91	10.75	5.56	5.91	-0.36
2	1.03	12.51	7.31	6.69	0.62
3	1.10	13.06	7.87	7.13	0.74
4	1.12	13.45	8.25	7.28	0.97
5	1.16	14.23	9.03	7.49	1.54
6	1.18	14.48	9.28	7.65	1.63
7	1.24	14.84	9.65	8.03	1.62
8	1.30	15.95	10.76	8.41	2.35
9	1.35	16.62	11.42	8.71	2.71
10-Smallest	1.41	20.13	14.93	9.12	5.81
Mid-Cap, 3–5	1.12	13.37	8.18	7.24	0.94
Low-Cap, 6–8	1.22	14.86	9.66	7.92	1.74
Micro-Cap, 9–10	1.36	17.72	12.52	8.79	3.74

Data from 1926–2008.
*Betas are estimated from monthly returns in excess of the 30-day U.S. Treasury bill total return, January 1926–December 2008.

**Historical riskless rate measured by the 83-year arithmetic mean income return component of 20-year government bonds (5.28).

†Calculated in the context of the CAPM by multiplying the equity risk premium by beta. The equity risk premium is estimated by the arithmetic mean total return of the S&P 500 (11.67 percent) minus the arithmetic mean income return component of 20-year government bonds (5.20 percent) from 1926–2008.

Graph 7-2: Security Market Line Versus Size-Decile Portfolios of the NYSE/AMEX/NASDAQ†



Data from 1926–2008.

†Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

Third, the firm size effect is seasonal. For example, small company stocks outperformed large company stocks in the month of January in a large majority of the years. Such predictability is surprising and suspicious in light of modern capital market theory. These three aspects of the firm size effect—long-term returns in excess of systematic risk, serial correlation, and seasonality—will be analyzed thoroughly in the following sections.

Long-Term Returns in Excess of Systematic Risk

The capital asset pricing model (CAPM) does not fully account for the higher returns of small company stocks. Table 7-5 shows the returns in excess of systematic risk over the past 83 years for each decile of the NYSE/AMEX/NASDAQ. Recall that the CAPM is expressed as follows:

$$k_s = r_f + (\beta_s \times ERP)$$

Table 7-5 uses the CAPM to estimate the return in excess of the riskless rate and compares this estimate to historical performance. According to the CAPM, the expected return on a security should consist of the riskless rate plus an additional return to compensate for the systematic risk of the security. The return in excess of the riskless rate is estimated in the context of the CAPM by multiplying the equity risk premium by β (beta). The equity risk premium is the return that compensates investors for taking on risk equal to the risk of the market as a whole (systematic risk).[3] Beta measures the extent to which a security or portfolio is exposed to systematic risk.[4] The beta of each decile indicates the degree to which the decile's return moves with that of the overall market.

A beta greater than one indicates that the security or portfolio has greater systematic risk than the market; according to the CAPM equation, investors are compensated for taking on this additional risk. Yet, Table 7-5 illustrates that the smaller deciles have had returns that are not fully explained by their higher betas. This return in excess of that predicted by CAPM increases as one moves from the largest companies in decile 1 to the smallest in decile 10. The excess return is especially pronounced for micro-cap stocks (deciles 9–10). This size-related phenomenon has prompted a revision to the CAPM, which includes a size premium. Chapter 4 presents this modified CAPM theory and its application in more detail.

Table 7-6: Size-Decile Portfolios 10a and 10b of the NYSE/AMEX/NASDAQ

Decile	Recent Number of Companies	Recent Decile Market Capitalization (in Thousands)	Market Capitalization of Largest Company (in Thousands)	Company Name
10a	409	$77,980,249	$218,533,000	Beazer Homes U.S.A. Inc.
10b	1182	75,412,545	136,500,000	Great Northern Iron Ore

Note: These numbers may not aggregate to equal decile 10 figures.

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Market capitalization and name of largest company in each decile as of September 30, 2008.

This phenomenon can also be viewed graphically, as depicted in the Graph 7-2. The security market line is based on the pure CAPM without adjustment for the size premium. Based on the risk (or beta) of a security, the expected return lies on the security market line. However, the actual historic returns for the smaller deciles of the NYSE/AMEX/NASDAQ lie above the line, indicating that these deciles have had returns in excess of that which is appropriate for their systematic risk.

Further Analysis of the 10th Decile

The size premia presented thus far do a great deal to explain the return due solely to size in publicly traded companies. However, by splitting the 10th decile into two size groupings we can get a closer look at the smallest companies. This magnification of the smallest companies will demonstrate whether the company size to size premia relationship continues to hold true.

As previously discussed, the method for determining the size groupings for size premia analysis was to take the stocks traded on the NYSE and break them up into 10 deciles, after which stocks traded on the AMEX and NASDAQ were allocated into the same size groupings. This same methodology was used to split the 10th decile into two parts: 10a and 10b, with 10b being the smaller of the two. This is equivalent to breaking the stocks down into 20 size groupings, with portfolios 19 and 20 representing 10a and 10b.

Table 7-7 shows that the pattern continues; as companies get smaller their size premium increases. There is a noticeable increase in size premium from 10a to 10b, which can also be demonstrated visually in Graph 7-3. This can be useful in valuing companies that are extremely small. Table 7-6 presents the size, composition, and breakpoints of deciles 10a and 10b.

First, the recent number of companies and total decile market capitalization are presented. Then the largest company and its market capitalization are presented.

Breaking the smallest decile down lowers the significance of the results compared to results for the 10th decile taken as a whole, however. The same holds true for comparing the 10th decile with the Micro-Cap aggregation of the 9th and 10th deciles. The more stocks included in a sample the more significance can be placed on the results. While this is not as much of a factor with the recent years of data, these size premia are constructed with data back to 1926. By breaking the 10th decile down into smaller components we have cut the number of stocks included in each grouping. The change over time of the number of stocks included in the 10th decile for the NYSE/AMEX/NASDAQ is presented in Table 7-8. With fewer stocks included in the analysis early on, there is a strong possibility that just a few stocks can dominate the returns for those early years.

While the number of companies included in the 10th decile for the early years of our analysis is low, it is not too low to still draw meaningful results even when broken down into subdivisions 10a and 10b. All things considered, size premia developed for deciles 10a and 10b are significant and can be used in cost of capital analysis. These size premia should greatly enhance the development of cost of capital analysis for very small companies.

Table 7-7: Long-Term Returns in Excess of CAPM Estimation for Decile Portfolios of the NYSE/AMEX/NASDAQ, with 10th Decile Split

	Beta*	Arithmetic Mean Return (%)	Realized Return in Excess of Riskless Rate** (%)	Estimated Return in Excess of Riskless Rate† (%)	Size Premium (Return in Excess of CAPM) (%)
1-Largest	0.91	10.75	5.56	5.91	-0.36
2	1.03	12.51	7.31	6.69	0.62
3	1.10	13.06	7.87	7.13	0.74
4	1.12	13.45	8.25	7.28	0.97
5	1.16	14.23	9.03	7.49	1.54
6	1.18	14.48	9.28	7.65	1.63
7	1.24	14.84	9.65	8.03	1.62
8	1.30	15.95	10.76	8.41	2.35
9	1.35	16.62	11.42	8.71	2.71
10a	1.42	18.49	13.29	9.19	4.11
10b-Smallest	1.38	23.68	18.48	8.95	9.53
Mid-Cap, 3–5	1.12	13.37	8.18	7.24	0.94
Low-Cap, 6–8	1.22	14.86	9.66	7.92	1.74
Micro-Cap, 9–10	1.36	17.72	12.52	8.79	3.74

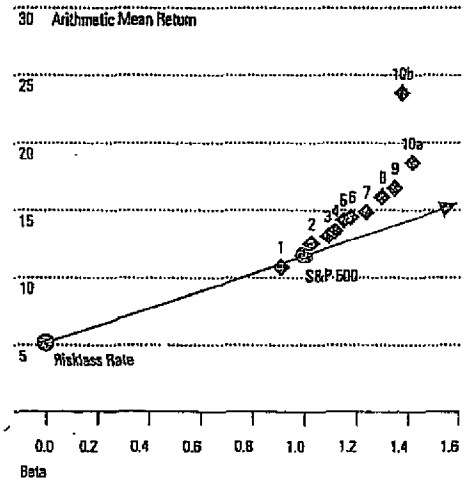
Data from 1926–2008. Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

*Betas are estimated from monthly portfolio total returns in excess of the 30-day U.S. Treasury bill total return versus the S&P 500 total returns in excess of the 30-day U.S. Treasury bill, January 1926–December 2008.

**Historical riskless rate is measured by the 83-year arithmetic mean income return component of 20-year government bonds (5.20 percent).

†Calculated in the context of the CAPM by multiplying the equity risk premium by beta. The equity risk premium is estimated by the arithmetic mean total return of the S&P 500 (11.67 percent) minus the arithmetic mean income return component of 20-year government bonds (5.20 percent) from 1926–2008.

Graph 7-3: Security Market Line versus Size-Decile Portfolios of the NYSE/AMEX/NASDAQ, with 10th Decile Split‡



Data from 1926–2008.

‡Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

Table 7-8: Historical Number of Companies for NYSE/AMEX/NASDAQ Decile 10

Sept.	Number of Companies
1926	52*
1930	72
1940	78
1950	100
1960	109
1970	865
1980	685
1990	1,814
2000	1,927
2005	1,746
2006	1,744
2007	1,775
2008	1,626

Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

*The fewest number of companies was 49 in March, 1926

Alternative Methods of Calculating the Size Premia

The size premia estimation method presented above makes several assumptions with respect to the market benchmark and the measurement of beta. The impact of these assumptions can best be examined by looking at some alternatives. In this section we will examine the impact on the size premia of using a different market benchmark for estimating the equity risk premia and beta. We will also examine the effect on the size premia study of using sum beta or an annual beta.[5]

Changing the Market Benchmark

In the original size premia study, the S&P 500 is used as the market benchmark in the calculation of the realized historical equity risk premium and of each size group's beta. The NYSE total value-weighted index is a common alternative market benchmark used to calculate beta. Table 7-9 uses this market benchmark in the calculation of beta. In order to isolate the size effect, we require an equity risk premium based on a large company stock benchmark. The NYSE deciles 1–2 large company index offers a mutually exclusive set of portfolios for the analysis of the smaller company groups: mid-cap deciles 3–5, low-cap deciles 6–8, and micro-cap deciles 9–10. The size premia analyses using these benchmarks are summarized in Table 7-9 and depicted graphically in Graph 7-4.

Table 7-9: Long-Term Returns in Excess of CAPM Estimation for Decile Portfolios of the NYSE/AMEX/NASDAQ, with NYSE Market Benchmarks

	Beta*	Arithmetic Mean Return (%)	Realized Return in Excess of Riskless Rate** (%)	Estimated Return in Excess of Riskless Rate† (%)	Size Premium (Return in Excess of CAPM) (%)
1-Largest	0.99	10.75	5.56	5.72	-0.16
2	1.11	12.51	7.31	6.45	0.86
3	1.18	13.06	7.87	6.81	1.05
4	1.20	13.45	8.25	6.97	1.28
5	1.23	14.23	9.03	7.14	1.89
6	1.26	14.48	9.28	7.28	2.00
7	1.32	14.84	9.65	7.63	2.01
8	1.38	15.95	10.76	8.00	2.76
9	1.42	16.62	11.42	8.25	3.17
10-Smallest	1.48	20.13	14.93	8.60	6.33
Mid-Cap, 3–5	1.19	13.37	8.18	6.92	1.26
Low-Cap, 6–8	1.30	14.86	9.66	7.54	2.12
Micro-Cap, 9–10	1.43	17.72	12.52	8.32	4.21

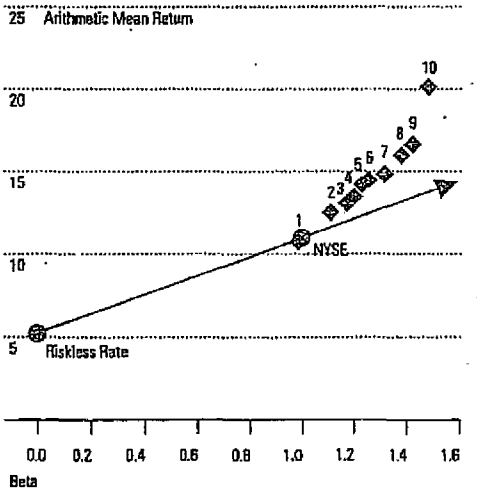
Data from 1926–2008. Source: Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2009 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

*Betas are estimated from monthly portfolio total returns in excess of the 30-day U.S. Treasury bill total return versus the S&P 500 total returns in excess of the 30-day U.S. Treasury bill, January 1926–December 2008.

**Historical riskless rate is measured by the 83-year arithmetic mean income return component of 20-year government bonds (5.20 percent).

†Calculated in the context of the CAPM by multiplying the equity risk premium by beta. The equity risk premium is estimated by the arithmetic mean total return of the S&P 500 (11.67 percent) minus the arithmetic mean income return component of 20-year government bonds (5.20 percent) from 1926–2008.

Graph 7-4: Security Market Line versus Size-Decile Portfolios of the NYSE/AMEX/NASDAQ, with NYSE Market Benchmarks*



Data from 1926–2008.

For the entire period analyzed, 1926–2008, the betas obtained using the NYSE total value-weighted index are higher than those obtained using the S&P 500. Since smaller companies had higher betas using the NYSE benchmark, one would expect the size premia to shrink. However, as was illustrated in Chapter 5, the equity risk premium calculated using the NYSE deciles 1–2 benchmark results in a value of 5.80, as opposed to 6.47 when using the S&P 500. The effect of the higher betas and lower equity risk premium cancel each other out, and the resulting size premia in Table 7-9 are slightly higher than those resulting from the original study.

Measuring Beta with Sum Beta

The sum beta method attempts to provide a better measure of beta for small stocks by taking into account their lagged price reaction to movements in the market. (See Chapter 6.) Table 7-10 shows that using this method of beta estimation results in larger betas for the smaller size deciles of the NYSE/AMEX/NASDAQ while those of the larger size deciles remain relatively stable. From these results, it appears that the sum beta method corrects for possible errors that are made when estimating small company betas without adjusting for the lagged price reaction of small stocks. However, the sum beta, when applied to the CAPM, still does not account for all of the returns in excess of the riskless rate historically found for small stocks. Table 7-10 demonstrates that a size premium is still necessary to estimate the expected returns using sum beta in conjunction with the CAPM, though the premium is smaller than that needed when using the typical calculation of beta.

Graph 7-5 compares the 10 deciles of the NYSE/AMEX/NASDAQ to the security market line. There are two sets of decile portfolios—one set is plotted using the single variable regression method of calculating beta, as in Graph 7-2, and the second set uses the sum beta method. The portfolios plotted using sum beta more closely resemble the security market line. Again, this demonstrates that the sum beta method results in the desired effect: a higher estimate of returns for small companies. Yet the smaller portfolios still lie above the security market line, indicating that an additional premium may be required.

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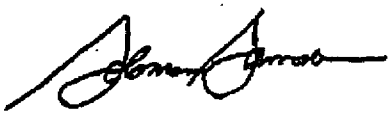

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Utilities

The utilities rating methodology encompasses two basic components: business risk analysis and financial analysis. Evaluation of industry characteristics, the utility's position within that industry, its regulation, and its management provides the context for assessing a firm's financial condition.

Historical analysis is a tool for identifying strengths and weaknesses, and provides a starting point for evaluating financial condition. Business position assessment is the qualitative measure of a utility's fundamental creditworthiness. It focuses on the forces that will shape the utilities' future.

Utilities credit analysis factors

Business risk	Financial risk
• Markets and service area economy	• Earnings protection
• Competitive position	• Capital structure
• Operations	• Cash flow adequacy
• Regulation	• Financial flexibility/capital attraction
• Management	
• Fuel, power, and water supply	
• Asset concentration	

The credit analysis of utilities is quickly evolving, as utilities are treated less as regulated monopolies and more as entities faced with a host of challengers in a competitive environment. Marketplace dynamics are supplanting the power of regulation, making it critically important to reduce costs and/or market new services in order to thwart competitors' inroads.

Markets and service area economy

Assessing service territory begins with the economic and demographic evaluation of the area in which the utility has its franchise. Strength of long-term demand for the product is examined from a macroeconomic perspective. This enables Standard & Poor's to evaluate the affordability of rates and the staying power of demand.

Standard & Poor's tries to discern any secular consumption trends and, more importantly, the reasons for them. Specific items examined include the size and growth rate of the market, strength of the franchise, historical and projected sales growth, income levels and trends in population, employment, and per capita income. A utility with a healthy economy and customer base—as illustrated by diverse employment opportunities, average or above-average wealth and income statistics, and low unemployment—will have a greater capacity to support its operations.

For electric and gas utilities, distribution by customer class is scrutinized to assess the depth and diversity of the utility's customer mix. For example, heavy industrial concentration is viewed cautiously, since a utility may have significant exposure to cyclical volatility. Alternatively, a large residential component yields a stable and more predictable revenue stream. The largest utility customers are identified to determine their importance to the bottom line and assess the risk of their loss and potential adverse effect on the utility's financial position. Credit concerns arise when individual customers represent more than 5% of revenues. The company or industry may play a significant role in the overall economic base of the service area. Moreover, large customers may turn to cogeneration or alternative power supplies to meet their energy needs, potentially leading to reduced cash flow for the utility (even in cases where a large customer pays discounted rates and is not a profitable account for the utility). Customer concentration is less significant for water and telecommunication utilities.

Competitive position

As competitive pressures have intensified in the utilities industry, Standard & Poor's analysis has deepened to include a more thorough review of competitive position.

Electric utility competition

For electric utilities, competitive factors examined include: percentage of firm wholesale revenues that are most vulnerable to competition; industrial load concentration; exposure of key customers to alternative suppliers; commercial concentrations; rates for various customer classes; rate design and flexibility; production costs, both marginal and fixed; the regional capacity situation; and transmission constraints. A regional focus is evident, but high costs and rates relative to national averages are also of significant concern because of the potential for electricity substitutes over time.

Mounting competition in the electric utility industry derives from excess generating capacity, lower barriers to entering the electric generating business, and marginal costs that are below embedded costs. Standard & Poor's has already witnessed declining prices in wholesale markets, as *de facto* retail competition is already being seen in several parts of the country. Standard & Poor's believes that over the coming years more and more customers will want and demand lower prices. Initial concerns focus on the largest industrial loads, but other customer classes will be increasingly vulnerable. Competition will not necessar-

ily be driven by legislation. Other pressures will arise from global competition and improving technologies, whether it be the declining cost of incremental generation or advances in transmission capacity or substitute energy sources like the fuel cell. It is impossible to say precisely when wide-open retail competition will occur; this will be evolutionary. However, significantly greater competition in retail markets is inevitable.

Gas utility competition

Similarly, gas utilities are analyzed with regard to their competitive standing in the three major areas of demand: residential, commercial, and industrial. Although regulated as holders of monopoly power, natural gas utilities have for some time been actively competing for energy market share with fuel oil, electricity, coal, solar, wood, etc. The long-term staying power of market demand for natural gas cannot be taken for granted. In fact, as the electric utility industry restructures and reduces costs, electric power will become more cost competitive and threaten certain gas markets. In addition, independent gas marketers have made greater inroads behind the city gate and are competing for large gas users. Moreover, the recent trend by state regulators to unbundle utility services is creating opportunities for outsiders to market niche products. Distributors still have the upper hand, but those who do not reduce and control costs, and thus rates, could find competition even more difficult.

Natural gas pipelines are judged to carry a somewhat higher business risk than distribution companies because they face competition in every one of their markets. To the extent a pipeline serves utilities versus industrial end users, its stability is greater. Over the next five years, pipeline competition will heat up since many service contracts with customers are expiring. Most distributor or end-use customers are looking to reduce pipeline costs and are working to improve their load factor to do so. Thus, pipelines will likely find it difficult to recontract all capacity in coming years. Being the pipeline of choice is a function of attractive transportation rates, diversity and quality of services provided, and capacity available in each particular market. In all cases though, periodic discounting of rates to retain customers will occur and put pressure on profitability.

Water utility competition

As the last true utility monopoly, water utilities face very little competition and there is currently no challenge to the continuation of franchise areas. The only exceptions have been cases where investor-owned water companies have been subject to condemnation and municipalization because of poor service or political motivations. In that regard, Standard & Poor's pays close attention to costs and rates in relation to neighboring utilities and national averages. (In contrast, the privatization of public water facilities has begun, albeit at a slower pace than anticipated. This is occurring mostly in the form of operating contracts and public/private partnerships, and not in asset transfers. This trend should continue as cities look for ways to balance their tight budgets.) Also, water utilities are not fully immune to the forces of competition; in a few instances wholesale customers can access more than one supplier.

Telephone competition

The Telecommunications Act of 1996 accelerates the continuing challenge to the local exchange companies' (LECs) century-old monopoly in the local loop. Competitive access providers (CAPs), both facilities-based and resellers, are aggressively pursuing customers, generally targeting metropolitan areas, and promising lower rates and better service.

Most long-distance calls are still originated and terminated on the local telephone company network. To complete such a call, the long-distance provider (including AT&T, MCI, Sprint and a host of smaller interexchange carriers or "IXCs") must pay the local telephone company a steep "access" fee to compensate the local phone company for the use of its local network. CAPs, in contrast, build or lease facilities that directly connect customers to their long-distance carrier, bypassing the local telephone company and avoiding access fees, and thereby can offer lower long-distance rates. But the LECs are not standing still; they are combating the loss of business to CAPs by lowering access fees, thereby reducing the economic incentive for a high usage long-distance customer to use a CAP. LECs are attempting to make up for the loss of revenues from lower access fees by increasing basic local service rates (or at least not lowering them), since basic service is far less subject to competition. LECs are improving operating efficiency and marketing high margin, value-added new services. Additionally, in the wake of the Telecommunications Act, LECs will capture at least some of the inter-LATA long-distance market. As a result of these initiatives, LECs continue to rebuild themselves—from the traditional utility monopoly to leaner, more marketing oriented organizations.

While LECs, and indeed all segments of the telecommunications sector, face increasing competition, there are favorable industry factors that tend to offset heightened business risk and auger for overall ratings stability for most LECs. Importantly, telecommunications is a declining-cost business. With increased deployment of fiber optics, the cost of transport has fallen dramatically and digital switching hardware and software have yielded more capable, trouble-free and cost-efficient networks. As a result, the cost of network maintenance has dropped sharply, as illustrated by the ratio of employees per 10,000 access lines, an oft cited measurement of efficiency. Ratios as low as 25 employees per 10,000 lines are being seen, down from the typical 40 or more employees per 10,000 ratio of only a few years ago.

In addition, networks are far more capable. They are increasingly digitally switched and able to accommodate high-speed communications. The infrastructure needed to accommodate switched broadband services will be built into telephone networks over the next few years. These advanced networks will enable telephone companies to look to a greater variety of high-margin, value-added serv-