BEFORE THE

KENTUCKY PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	)	
	)	
THE APPLICATION OF	)	
KENTUCKY-AMERICAN WATER	)	**CASE NO. 2007-00143**
COMPANY TO INCREASE	)	
ITS WATER SERVICE RATES	)	

DIRECT TESTIMONY

OF

DR. J. RANDALL WOOLRIDGE

July 30, 2007

Kentucky-American Water Company

Direct Testimony of
Dr. J. Randall Woolridge

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

A. My name is J. Randall Woolridge and my business address is 120 Haymaker Circle, State College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration at the University Park Campus of the Pennsylvania State University. I am also the Director of the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A summary of my educational background, research, and related business experience is provided in Appendix A.

I. SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I have been asked by the Kentucky Office of Attorney General to provide an opinion as to the overall fair rate of return or cost of capital for Kentucky American Water Company ("KAWC" or "Company") and to evaluate KAWC's rate of return testimony in this proceeding.

Q. PLEASE REVIEW YOUR COST OF CAPITAL RETURN FINDINGS.

A. To arrive at an equity cost rate for the Company, I have applied the Discounted Cash Flow Model ("DCF") and the Capital Asset Pricing Model ("CAPM") to two groups of water utility companies. I have established an equity cost rate of 9.40 for KAWC. Utilizing my equity cost rate, capital structure ratios, and senior capital cost rates, I am

recommending an overall fair rate of return of 7.77% for KAWC. This recommendation is summarized in Exhibit_(JRW-1).

As discussed in my testimony, my recommendation is consistent with the current economic environment. Long-term capital costs are at historical low levels. The yields on long-term Treasury bonds have been in the 4-5 percent range for several years. Prior to this cyclical decline in rates that began in 2002, these yields had not been this low over an extended period of time since the 1960s. Long-term capital costs are also low due to the decline in the equity risk premium and the *Jobs and Growth Tax Relief Reconciliation Act of 2003* which reduced the tax rates on dividend income and capital gains.

The Company's rate of return testimony is offered by Mr. Michael A. Miller and Dr. James H. Vander Weide. Mr. Miller provides a recommended capital structure, senior capital cost rates, and overall rate of return. Dr. Vander Weide provides a recommended return on equity that is used by Mr. Miller in his overall rate of return recommendation. The Company's proposed rate of return is inflated due to an overstated equity cost rate. Dr. Vander Weide's equity cost rate estimate is 11.4%, while my analysis indicates an equity cost rate of 9.40% is appropriate for KAWC. We have both used DCF and CAPM approaches to estimating an equity cost rate for the Company. We have both applied these models to proxy groups of water utility companies. There are relatively minor differences between the proxy groups used by Dr. Vander Weide and myself. Dr. Vander Weide has also employed a Risk Premium (RP) approach.

In terms of the DCF approach, the major areas of disagreement include the DCF dividend yield adjustment and growth rate as well as Dr. Vander Weide's adjustment for flotation costs. Dr. Vander Weide adjusts his DCF dividend yield because he believes that the yield must be adjusted to account for the quarterly payment of dividends. I demonstrate that this is not necessary. Dr. Vander Weide relies exclusively on analysts EPS growth rate forecasts for his DCF growth rate. I demonstrate that there is a well known upward bias to these growth rate forecasts. Dr. Vander Weide's adjustment for flotation costs is unwarranted and simply serves to inflate his DCF equity cost rate.

The RP and CAPM approaches are both risk premium approaches. For both his RP and CAPM approaches, Dr. Vander Weide's primary error is an overstatement of the equity risk premium. In both the RP and CAPM approaches, Dr. Vander Weide estimates an equity risk premium using (1) an ex ante or expected equity risk premium model which estimates an expected return using the DCF model and (2) an ex post or historical equity risk premium model in which a historical risk premium as the difference in the arithmetic mean stock and bond returns. The primary error in Dr. Vander Weide's ex ante equity risk premium model is the sole reliance on the upwardly-biased forecasted EPS growth rate forecasts of Wall Street analysts in determining a growth rate measure for the DCF models. There are numerous errors in Dr. Vander Weide's ex post equity risk premium model in which he uses historical stock and bond returns to compute risk premiums. Among the errors are the well-known survivorship bias (only successful companies survive – poor companies do not

survive) and unattainable return bias (the methodology presumes monthly portfolio rebalancing).

As I highlight in my testimony, there are three procedures for estimating an equity risk premium – historic returns, surveys, and expected return models. I provide evidence that risk premiums based on historic returns series, as well as those using analysts' projections, are upwardly biased measures of expected equity risk premiums. I use an equity risk premium which (1) uses all three approaches to estimating an equity premium and (2) employs the results of many studies of the equity risk premium. As I note, my equity risk premium is consistent with the equity risk premiums (1) discovered in recent academic studies by leading finance scholars, (2) employed by leading investment banks and management consulting firms, and (3) that result from surveys of financial forecasters and corporate CFOs.

II. CAPITAL COSTS IN TODAY'S MARKETS

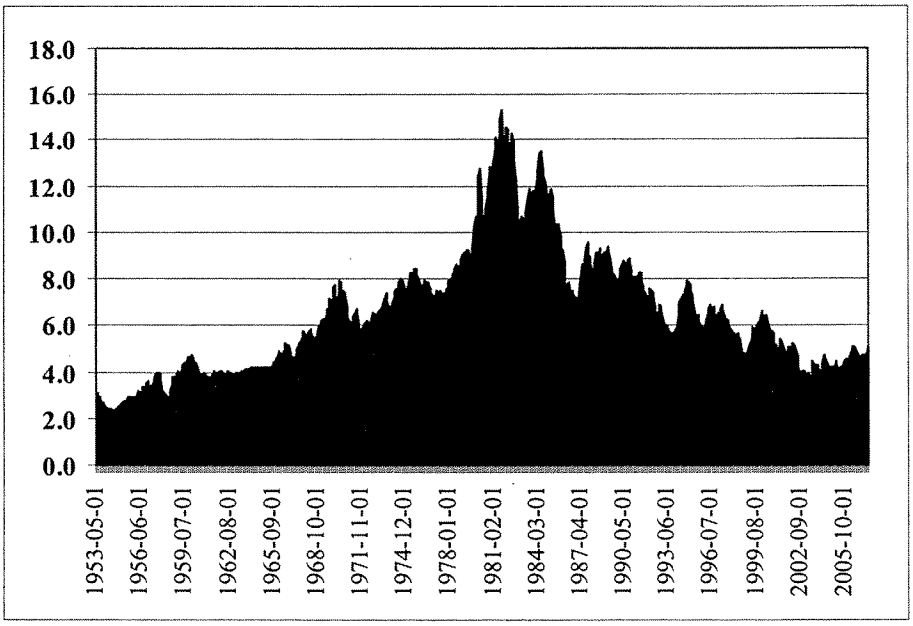
Q. PLEASE DISCUSS CAPITAL COSTS IN TODAY'S MARKETS.

A. Long-term capital cost rates for U.S. corporations are currently at their lowest levels in more than four decades. Corporate capital cost rates are determined by the level of interest rates and the risk premium demanded by investors to buy the debt and equity capital of corporate issuers. The base level of interest rates in the U.S. economy is indicated by the rates on ten-year U.S. Treasury bonds. The rates are provided in the graph below from 1953 to the present. As indicated, prior to the decline in rates that

began in the year 2000, the 10-year Treasury yield had not consistent been in the 4-5 percent range over an extended period of time since the 1960s.

Yields on Ten-Year Treasury Bonds

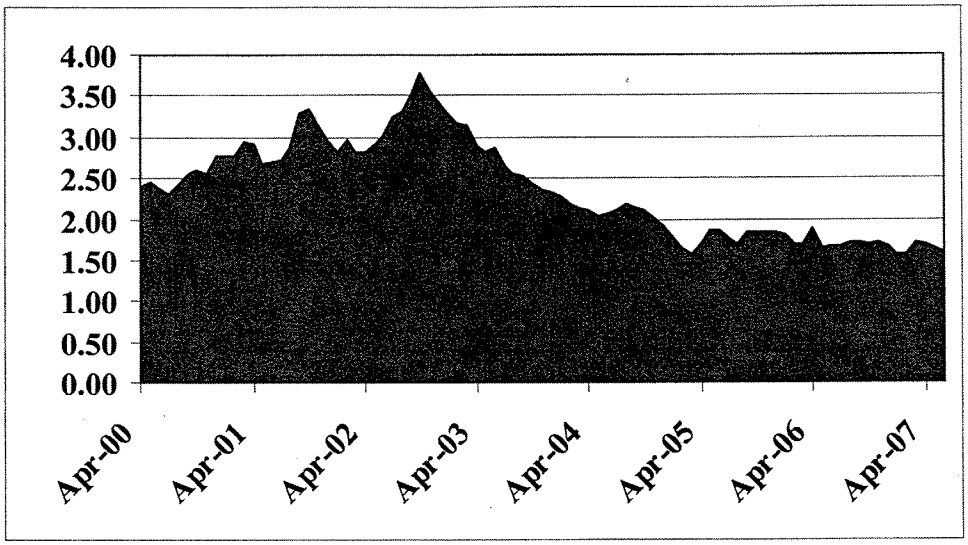
1953-Present



Source: http://research.stlouisfed.org/fred2/data/GS10.txt

The second base component of the corporate capital cost rates is the risk premium. The risk premium is the return premium required by investors to purchase securities riskier than treasury bonds. Risk premiums for bonds are the yield differentials between different bond classes as rated by agencies such as Moody's, and Standard and Poor's. The graph below provides the yield differential between Baa-rated corporate bonds and 10-year Treasuries. This yield differential peaked at 350 basis points (BPs) in 2002 and has declined significantly since that time. This is an indication that the market price of risk has declined and therefore the risk premium has declined in recent years.

Corporate Bond Yield Spreads
Baa-Rated Corporate Bond Yield Minus Ten-Year Treasury Bond Yield



Source: http://www.treas.gov/offices/domestic-finance/debt-management/interest-rate/index.html

The equity risk premium is the return premium required to purchase stocks as opposed to bonds. Since the equity risk premium is not readily observable in the markets (as are bond risk premiums), and there are alternative approaches to estimating the equity premium, it is the subject of much debate. One way to estimate the equity risk premium is to compare the mean returns on bonds and stocks over long historical periods. Measured in this manner, the equity risk premium has been in the 5-7 percent range. But recent studies by leading academics indicate the forward-looking equity risk premium is in the 3-4 percent range. These authors indicate that historical equity risk premiums are upwardly biased measures of expected equity risk premiums. Jeremy Siegel, a Wharton finance professor and author of the book *Stocks for the Long Term*, published a study entitled "The Shrinking Equity Risk Premium."[1] He concludes:

[1] Jeremy J. Siegel, "The Shrinking Equity Risk Premium," *The Journal of Portfolio Management* (Fall,

> The degree of the equity risk premium calculated from data estimated from 1926 is unlikely to persist in the future. The real return on fixed-income assets is likely to be significantly higher than estimated on earlier data. This is confirmed by the yields available on Treasury index-linked securities, which currently exceed 4%. Furthermore, despite the acceleration in earnings growth, the return on equities is likely to fall from its historical level due to the very high level of equity prices relative to fundamentals.

Numerous other academic studies, which are discussed later in my testimony, come to the same conclusion. Even Alan Greenspan, the former Chairman of the Federal Reserve Board, indicated in an October 14, 1999, speech on financial risk that the fact that equity risk premiums have declined during the past decade is "not in dispute." His assessment focused on the relationship between information availability and equity risk premiums.

> There can be little doubt that the dramatic improvements in information technology in recent years have altered our approach to risk. Some analysts perceive that information technology has permanently lowered equity premiums and, hence, permanently raised the prices of the collateral that underlies all financial assets.
>
> The reason, of course, is that information is critical to the evaluation of risk. The less that is known about the current state of a market or a venture, the less the ability to project future outcomes and, hence, the more those potential outcomes will be discounted.
>
> The rise in the availability of real-time information has reduced the uncertainties and thereby lowered the variances that we employ to guide portfolio decisions. At least part of the observed fall in equity premiums in our economy and others over the past five years does not appear to be the result of ephemeral changes in perceptions. It is presumably the result of a permanent technology-driven increase in information availability, which by definition reduces uncertainty and therefore risk premiums. This decline is most evident in equity

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1999), p. 15.

> risk premiums. It is less clear in the corporate bond market, where relative supplies of corporate and Treasury bonds and other factors we cannot easily identify have outweighed the effects of more readily available information about borrowers.[2]

In sum, the relatively low interest rates in today's markets as well as the lower risk premiums required by investors indicate that capital costs for U.S. companies are the lowest in decades. In addition, the 2003 tax law further lowered capital cost rates for companies.

Q. HOW DID THE *JOBS AND GROWTH TAX RELIEF RECONCILIATION ACT OF 2003* REDUCE THE COST OF CAPITAL FOR COMPANIES?

A. On May 28, 2003, President Bush signed the *Jobs and Growth Tax Relief Reconciliation Act of 2003*. The primary purpose of this legislation was to reduce taxes to enhance economic growth. A primary component of the new tax law was a significant reduction in the taxation of corporate dividends for individuals. Dividends have been described as "double-taxed." First, corporations pay taxes on the income they earn before they pay dividends to investors, then investors pay taxes on the dividends that they receive from corporations. One of the implications of the double taxation of dividends is that, all else equal, it results in a higher cost of raising capital for corporations. The tax legislation reduced the effect of double taxation of dividends by lowering the tax rate on dividends from the 30 percent range (the average tax bracket for individuals) to 15 percent.

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[2] Alan Greenspan, "Measuring Financial Risk in the Twenty-First Century," Office of the Comptroller of the Currency Conference, October 14, 1999.

Overall, the 2003 tax law reduced the pre-tax return requirements of investors, thereby reducing corporations' cost of equity capital. This is because the reduction in the taxation of dividends for individuals enhances their after-tax returns and thereby reduces their pre-tax required returns. This reduction in pre-tax required returns (due to the lower tax on dividends) effectively reduces the cost of equity capital for companies. The 2003 tax law also reduced the tax rate on long-term capital gains from 20% to 15%. The magnitude of the reduction in corporate equity cost rates is debatable, but my assessment indicates that it could be as large as 100 basis points.

III. COMPARISON GROUP SELECTION

Q. PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF RETURN RECOMMENDATION FOR KAWC.

A. To develop a fair rate of return recommendation for KAWC, I evaluated the return requirements of investors on the common stock of two groups of publicly-held water service companies.

Q. PLEASE DESCRIBE YOUR GROUPS OF WATER SERVICE COMPANIES.

A. The companies in the groups are listed as water utility companies in *AUS Utility Reports.*[3] The ten water companies were classified as the Small Water Company Group (annual water revenues of less than $100M) and the Large Water Company Group (annual water revenues of more than $100M). The Small Water Company Group (SWC Group) includes Artesian Resources, BIW, Ltd., Connecticut Water Service Co., Middlesex Water Company, and the York Water Company. The Large

[3] I have not included Pennichuck Corp in this group because of its ongoing condemnation proceedings.

Water Company Group (LWC Group) includes American States Water Company, Aqua America, Inc., California Water Service Co., SJW Corporation, and Southwest Water Co.

Summary financial statistics for the two groups are provided on page 1 of Exhibit (JRW-2). On average, the SWC Group has average revenues and net plant of $45.5M and $179.6M, respectively. The group has an average common equity ratio of 47.0%, and a current average earned return on common equity of 8.8%. The primary service territories for the water companies in this group are Delaware, New Jersey, Connecticut, and Pennsylvania. The mean total revenues and net plant for the LWC Group are $316.9M and $929.0M, respectively. This group's average common equity ratio and earned return on common equity are 51.4% and 10.0%, respectively. The primary service territory for four of the five companies in the LWC Group is California.

IV. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

Q. WHAT CAPITAL STRUCTURE RATIOS HAVE BEEN PROPOSED BY THE COMPANY?

A. Mr. Miller provide provides KAWC's proposed capital structure which is a 13-month average. As shown in Exhibit (JRW-3), this capital structure consists of 0.60% short-term debt, 53.20% long-term debt, 2.60% preferred stock, and 43.60% common equity.

Q. ARE YOU EMPLOYING KAWC PROPOSED CAPITAL STRUCTURE IN DETERMINING YOUR OVERALL RATE OF RETURN.

A. Yes, and I am also adopting the Company's senior capital cost rates. These ratios and cost rates are summarized below.

Proposed Capital Structure and Senior Capital Cost Rates

Source of Capital	Capitalization Ratio	Cost Rate
Short-Term Debt	**0.60%**	**5.25%**
Long-Term Debt	**53.20%**	**6.46%**
Preferred Stock	**2.60%**	**7.75%**
Common Equity	**43.60%**	

V. THE COST OF COMMON EQUITY CAPITAL

A. Overview

Q. WHY MUST AN OVERALL COST OF CAPITAL OR FAIR RATE OF RETURN BE ESTABLISHED FOR A PUBLIC UTILITY?

A. In a competitive industry, the return on a firm's common equity capital is determined through the competitive market for its goods and services. Due to the capital requirements needed to provide utility services, however, and to the economic benefit to society from avoiding duplication of these services, some public utilities are monopolies. It is not appropriate to permit monopoly utilities to set their own prices because of the lack of competition and the essential nature of the services. Thus, regulation seeks to establish prices which are fair to consumers and at the same time are sufficient to meet the operating and capital costs of the utility, i.e., provide an adequate return on capital to attract investors.

Q. PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE CONTEXT OF THE THEORY OF THE FIRM.

A. The total cost of operating a business includes the cost of capital. The cost of common equity capital is the expected return on a firm's common stock that the marginal investor would deem sufficient to compensate for risk and the time value of money. In equilibrium, the expected and required rates of return on a company's common stock are equal.

Normative economic models of the firm, developed under very restrictive assumptions, provide insight into the relationship between firm performance or profitability, capital costs, and the value of the firm. Under the economist's ideal model of perfect competition where entry and exit is costless, products are undifferentiated, and there are increasing marginal costs of production, firms produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is established where price equals average cost, including the firm's capital costs. In equilibrium, total revenues equal total costs, and because capital costs represent investors' required return on the firm's capital, actual returns equal required returns and the market value and the book value of the firm's securities must be equal.

In the real world, firms can achieve competitive advantage due to product market imperfections. Most notably, companies can gain competitive advantage through product differentiation (adding real or perceived value to products) and by achieving economies of scale (decreasing marginal costs of production). Competitive advantage allows firms to price products above average cost and thereby earn accounting profits greater than those required to cover capital costs. When these

profits are in excess of that required by investors, or when a firm earns a return on equity in excess of its cost of equity, investors respond by valuing the firm's equity in excess of its book value.

James M. McTaggart, founder of the international management consulting firm Marakon Associates, has described this essential relationship between the return on equity, the cost of equity, and the market-to-book ratio in the following manner:[4]

> Fundamentally, the value of a company is determined by the cash flow it generates over time for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of equity capital" is used to discount the expected equity cash flow, converting it to a present value. The cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg, are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as Texas Instruments, barely generate enough cash flow to finance growth.
>
> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable and its market value will be less than book value.

As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio is relatively straightforward. A firm which earns a return on equity above its cost of equity will see its common stock sell at a price above its book value. Conversely, a firm which earns a return on equity below its cost of equity will see its common stock sell at a price below its book value.

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[4] James M. McTaggart, "The Ultimate Poison Pill: Closing the Value Gap," *Commentary* (Spring 1988), p. 2.

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE RELATIONSHIP BETWEEN RETURN ON EQUITY AND MARKET-TO-BOOK RATIOS?

A. This relationship is discussed in a classic Harvard Business School case study entitled "A Note on Value Drivers." On page 2 of that case study, the author describes the relationship very succinctly:[5]

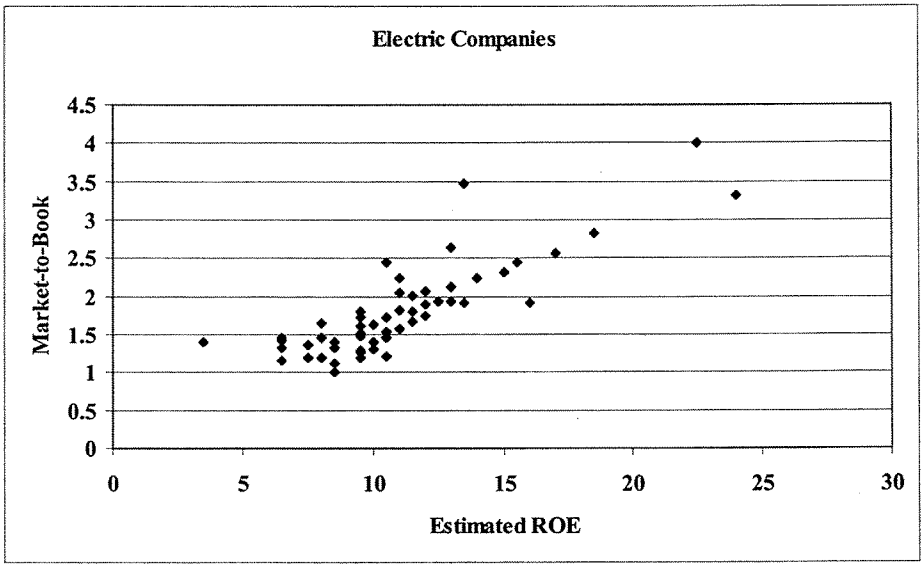
> For a given industry, more profitable firms – those able to generate higher returns per dollar of equity – should have higher market-to-book ratios. Conversely, firms which are unable to generate returns in excess of their cost of equity should sell for less than book value.

Profitability	*Value*
If ROE > K	*then Market/Book > 1*
If ROE = K	*then Market/Book =1*
If ROE < K	*then Market/Book < 1*

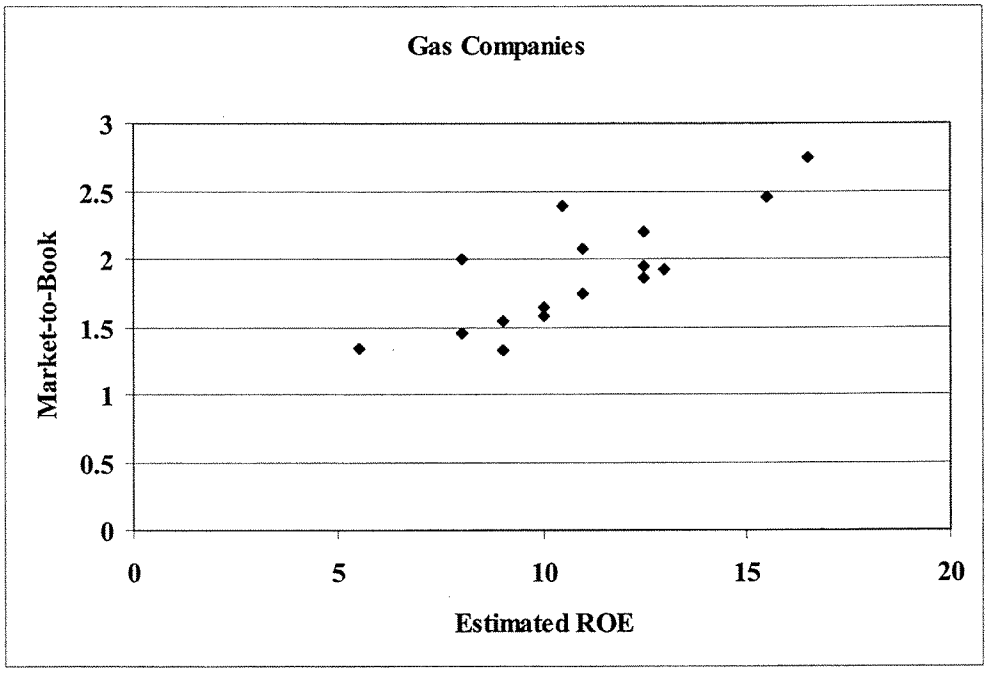
To assess the relationship by industry, as suggested above, I have performed a regression study between estimated return on equity and market-to-book ratios using natural gas distribution, electric utility and water utility companies. I used all companies in these three industries which are covered by *Value Line* and who have estimated return on equity and market-to-book ratio data. The results are presented below.

[5] Benjamin Esty, "A Note on Value Drivers," Harvard Business School, Case No. 9-297-082, April 7, 1997.

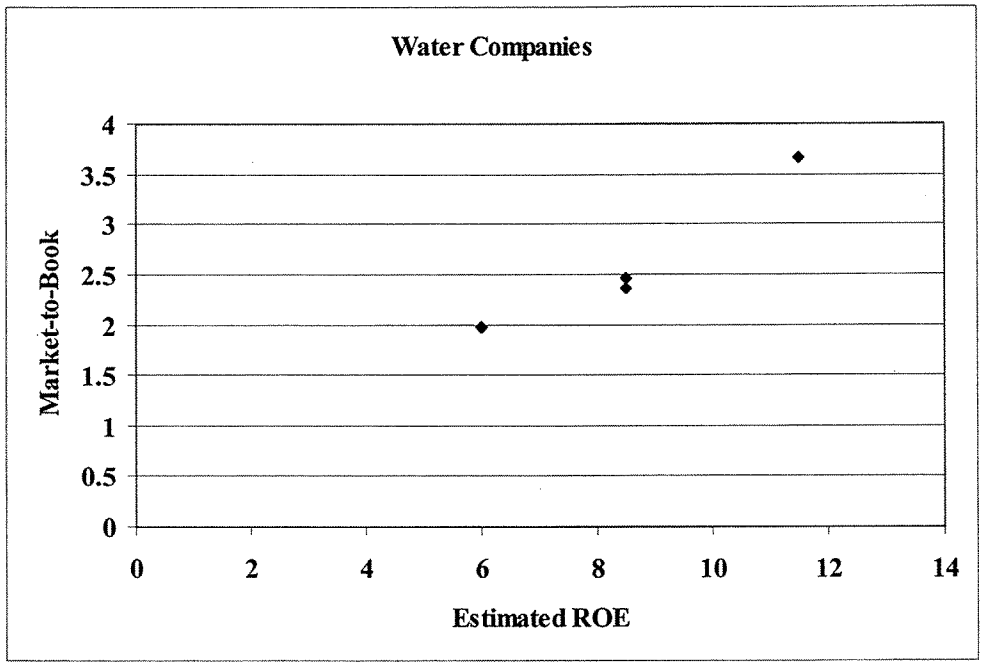
The Relationship Between Estimated ROE and Market-to-Book Ratios
Value Line Electrics Companies, Gas Distribution Companies, and Water Utilities



R-Square = .70
N=58



R-Square = .64
N=16



R-Square = .93
N=4

The average R-squares for the electric, gas, and water companies are 0.70, 0.64, and 0.93. This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities.[6]

Q. WHAT ECONOMIC FACTORS HAVE AFFECTED THE COST OF EQUITY CAPITAL FOR PUBLIC UTILITIES?

A. Exhibit_JRW-4 provides indicators of public utility equity cost rates over the past decade. Page 1 shows the yields on 10-year, 'A' rated public utility bonds. These yields peaked in the 1990s at 8.5%, then declined and again hit the 8.0 percent range in the year 2000. They subsequently hovered in the 4.5 to 5.0 percent range between

[6] R-square measures the percent of variation in one variable (e.g., market-to-book ratios) explained by another variable (e.g., expected return on equity). R-squares vary between zero and 1.0, with values closer to 1.0 indicating a higher relationship between two variables.

2003 and 2005. They increased to 6.0% in June of 2006, and have since retreated to the 5.50 percent range. Page 2 provides the dividend yields for the fifteen utilities in the Dow Jones Utilities Average over the past decade. These yields peaked in 1994 at 7.2%. Since that time they have declined and were at 3.5% as of 2006.

Average earned returns on common equity and market-to-book ratios are given on page 3 of Exhibit_JRW-4. Over the past decade, earned returns on common equity have consistently been in the 10.0-13.0 percent range. The high point was 13.45% in 2001, and they subsequently decreased before recovering in 2005 and 2006. As of 2006, the average was 13.1%. Over the past decade, market-to-book ratios for this group have increased gradually, but with several ups and downs. The market-to-book average was 1.75 as of 2001, declined to 1.45 in 2003, and increased to 2.10 as of 2006.

The indicators in Exhibit_JRW-4, coupled with the overall decrease in interest rates, suggest that capital costs for the Dow Jones Utilities have decreased over the past decade.

Q. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED RATE OF RETURN ON EQUITY?

A. The expected or required rate of return on common stock is a function of market-wide, as well as company-specific, factors. The most important market factor is the time value of money as indicated by the level of interest rates in the economy. Common stock investor requirements generally increase and decrease with like changes in interest rates. The perceived risk of a firm is the predominant factor that

influences investor return requirements on a company-specific basis. A firm's investment risk is often separated into business and financial risk. Business risk encompasses all factors that affect a firm's operating revenues and expenses. Financial risk results from incurring fixed obligations in the form of debt in financing its assets.

Q. HOW DOES THE INVESTMENT RISK OF WATER UTILITY COMPANIES COMPARE WITH THAT OF OTHER INDUSTRIES?

A. Due to the essential nature of their service as well as their regulated status, public utilities are exposed to a lesser degree of business risk than other, non-regulated businesses. The relatively low level of business risk allows public utilities to meet much of their capital requirements through borrowing in the financial markets, thereby incurring greater than average financial risk. Nonetheless, the overall investment risk of public utilities is below most other industries. Exhibit (JRW-5) provides an assessment of investment risk for 100 industries as measured by beta, which according to modern capital market theory is the only relevant measure of investment risk that need be of concern for investors. These betas come from the *Value Line Investment Survey* and are compiled by Aswath Damodoran of New York University.[7] The study shows that the investment risk of public utilities is relatively low. The average beta for water utilities of 0.73 is in the bottom tenth of the 100 industries in terms of beta. As such, the cost of equity for the water utility industry is among the lowest of all industries in the U.S.

[7] They may be found on the Internet at http://www.stern.nyu.edu/~adamodar/.

Q. HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON COMMON EQUITY CAPITAL BE DETERMINED?

A. The costs of debt and preferred stock are normally based on historical or book values and can be determined with a great degree of accuracy. The cost of common equity capital, however, cannot be determined precisely and must instead be estimated from market data and informed judgment. This return to the stockholder should be commensurate with returns on investments in other enterprises having comparable risks.

According to valuation principles, the present value of an asset equals the discounted value of its expected future cash flows. Investors discount these expected cash flows at their required rate of return that, as noted above, reflects the time value of money and the perceived riskiness of the expected future cash flows. As such, the cost of common equity is the rate at which investors discount expected cash flows associated with common stock ownership.

Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic assumptions. Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common equity capital, in determining the data inputs for these models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved as well as conditions in the economy and the financial markets.

Q. HOW DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL FOR THE COMPANY?

A. I rely primarily on the DCF model to estimate the cost of equity capital. Given the investment valuation process and the relative stability of the utility business, I believe that the DCF model provides the best measure of equity cost rates for public utilities. I have also performed a CAPM study, but I give these results less weight because I believe that risk premium studies, of which the CAPM is one form, provide a less reliable indication of equity cost rates for public utilities.

B. Discounted Cash Flow Approach

Q. BRIEFLY DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF MODEL.

A. According to the discounted cash flow model, the current stock price is equal to the discounted value of all future dividends that investors expect to receive from investment in the firm. As such, stockholders' returns ultimately result from current as well as future dividends. As owners of a corporation, common stockholders are entitled to a pro-rata share of the firm's earnings. The DCF model presumes that earnings that are not paid out in the form of dividends are reinvested in the firm so as to provide for future growth in earnings and dividends. The rate at which investors discount future dividends, which reflects the timing and riskiness of the expected cash flows, is interpreted as the market's expected or required return on the common stock.

Therefore this discount rate represents the cost of common equity. Algebraically, the DCF model can be expressed as:

$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \ldots \frac{D_n}{(1+k)^n}$$

where P is the current stock price, D_n is the dividend in year n, and k is the cost of common equity.

Q. IS THE DCF MODEL CONSISTENT WITH VALUATION TECHNIQUES EMPLOYED BY INVESTMENT FIRMS?

A. Yes. Virtually all investment firms use some form of the DCF model as a valuation technique. One common application for investment firms is called the three-stage DCF or dividend discount model ("DDM"). The stages in a three-stage DCF model are discussed below. This model presumes that a company's dividend payout progresses initially through a growth stage, then proceeds through a transition stage, and finally assumes a steady-state stage. The dividend-payment stage of a firm depends on the profitability of its internal investments, which, in turn, is largely a function of the life cycle of the product or service. These stages are depicted in the graphic below labeled the Three-Stage DCF Model.[8]

1. Growth stage: Characterized by rapidly expanding sales, high profit margins, and abnormally high growth in earnings per share. Because of highly profitable expected investment opportunities, the payout ratio is low.

[8] This description comes from William F. Sharp, Gordon J. Alexander, and Jeffrey V. Bailey, *Investments* (Prentice-Hall, 1995), pp. 590-91.

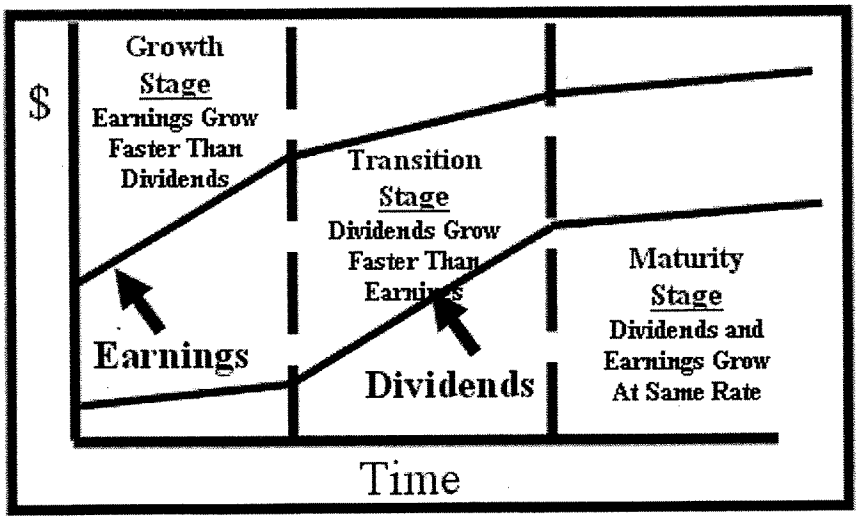
Competitors are attracted by the unusually high earnings, leading to a decline in the growth rate.

2. Transition stage: In later years, increased competition reduces profit margins and earnings growth slows. With fewer new investment opportunities, the company begins to pay out a larger percentage of earnings.

3. Maturity (steady-state) stage: Eventually the company reaches a position where its new investment opportunities offer, on average, only slightly attractive returns on equity. At that time its earnings growth rate, payout ratio, and return on equity stabilize for the remainder of its life. The constant-growth DCF model is appropriate when a firm is in the maturity stage of the life cycle.

In using this model to estimate a firm's cost of equity capital, dividends are projected into the future using the different growth rates in the alternative stages, and then the equity cost rate is the discount rate that equates the present value of the future dividends to the current stock price.

Three-Stage DCF Model



Q. HOW DO YOU ESTIMATE STOCKHOLDERS' EXPECTED OR REQUIRED RATE OF RETURN USING THE DCF MODEL?

A. Under certain assumptions, including a constant and infinite expected growth rate, and constant dividend/earnings and price/earnings ratios, the DCF model can be simplified to the following:

$$P = \frac{D_1}{k - g}$$

where D_1 represents the expected dividend over the coming year and g is the expected growth rate of dividends. This is known as the constant-growth version of the DCF model. To use the constant-growth DCF model to estimate a firm's cost of equity, one solves for k in the above expression to obtain the following:

$$k = \frac{D_1}{P} + g$$

The economics of the public utility business indicate that the industry is in the steady-state or constant-growth stage of a three-stage DCF. The economics include the relative stability of the utility business, the maturity of the demand for public utility services, and the regulated status of public utilities (especially the fact that their returns on investment are effectively set through the ratemaking process). The DCF valuation procedure for companies in this stage is the constant-growth DCF. In the constant-growth version of the DCF model, the current dividend payment and stock price are directly observable. Therefore, the primary problem and controversy in applying the DCF model to estimate equity cost rates entails estimating investors' expected dividend growth rate.

Q. WHAT FACTORS SHOULD ONE CONSIDER WHEN APPLYING THE DCF METHODOLOGY?

A. One should be sensitive to several factors when using the DCF model to estimate a firm's cost of equity capital. In general, one must recognize the assumptions under which the DCF model was developed in estimating its components (the dividend yield and expected growth rate). The dividend yield can be measured precisely at any point in time, but tends to vary somewhat over time. Estimation of expected growth is considerably more difficult. One must consider recent firm performance, in conjunction with current economic developments and other information available to investors, to accurately estimate investors' expectations.

Q. PLEASE DISCUSS EXHIBIT JRW-6.

A. My DCF analysis is provided in Exhibit JRW-6. The DCF summary is on page 1 of this Exhibit and the supporting data and analysis for the dividend yield and expected growth rate are provided on the following pages.

Q. WHAT DIVIDEND YIELDS ARE YOU EMPLOYING IN YOUR DCF ANALYSIS FOR YOUR TWO GROUPS OF WATER UTILITY COMPANIES?

A. The dividend yields on the common stock for the companies in the two groups are provided on page 2 of Exhibit (JRW-6) for the six -month period ending July, 2007. Over this period, the average monthly dividend yields for the SWC and LWC Groups were 3.50% and 2.20%, respectively. As of July, 2007, the mean dividend yields for the SWC and LWC Groups were 3.50% and 2.30%, respectively. For the DCF

dividend yields for the two groups, I use the average of the six month and July, 2007 dividend yields. Hence, the DCF dividends yields for the SWC and LWC Groups are 3.50% and 2.25%, respectively.

Q. PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT DIVIDEND YIELD.

A. According to the traditional DCF model, the dividend yield term relates to the dividend yield over the coming period. As indicated by Professor Myron Gordon, who is commonly associated with the development of the DCF model for popular use, this is obtained by: (1) multiplying the expected dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price to determine the appropriate dividend yield for a firm, which pays dividends on a quarterly basis.[9]

In applying the DCF model, some analysts adjust the current dividend for growth over the coming year as opposed to the coming quarter. This can be complicated because firms tend to announce changes in dividends at different times during the year. As such, the dividend yield computed based on presumed growth over the coming quarter as opposed to the coming year can be quite different. Consequently, it is common for analysts to adjust the dividend yield by some fraction of the long-term expected growth rate.

The appropriate adjustment to the dividend yield is further complicated in the regulatory process when the overall cost of capital is applied to a projected rate base. The net effect of this application is an overstatement of the equity cost rate estimate

[9] *Petition for Modification of Prescribed Rate of Return*, Federal Communications Commission, Docket No. 79-05, Direct Testimony of Myron J. Gordon and Lawrence I. Gould at 62 (April 1980).

derived from the DCF model. In the context of the constant-growth DCF model, both the adjusted dividend yield and the growth component are overstated. The overstatement results from applying an equity cost rate computed using current market data to a future or test-year-end rate base which includes growth associated with the retention of earnings during the year. In other words, an equity cost rate times a future, yet to be achieved rate base, results in an inflated dividend yield and growth rate.

Q. GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR WILL YOU USE FOR YOUR DIVIDEND YIELD?

A. I will adjust the dividend yield by one-half (1/2) the expected growth so as to reflect growth over the coming year.

Q. PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF MODEL.

A. There is much debate as to the proper methodology to employ in estimating the growth component of the DCF model. By definition, this component is investors' expectation of the long-term dividend growth rate. Presumably, investors use some combination of historical and/or projected growth rates for earnings and dividends per share and for internal or book value growth to assess long-term potential.

Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE TWO GROUPS OF WATER COMPANIES?

A. I have analyzed a number of measures of growth for the water utility companies. I considered historic growth rates in earnings per share (EPS), dividends per share (DPS), and book value per share (BVPS). I have reviewed *Value Line's* historic and projected growth rate estimates for EPS, DPS, and BVPS. In addition, I have utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Zacks, Reuters, and First Call. These services solicit 5-year earning growth rate projections for securities analysts and compile and publish the averages of these forecasts on the Internet. Finally, I have also assessed prospective growth as measured by prospective earnings retention rates and earned returns on common equity.

Q. PLEASE DISCUSS HISTORICAL GROWTH IN EARNINGS AND DIVIDENDS AS WELL AS INTERNAL GROWTH.

A. Historical growth rates for EPS, DPS, and BVPS are readily available to virtually all investors and presumably an important ingredient in forming expectations concerning future growth. However, one must use historical growth numbers as measures of investors' expectations with caution. In some cases, past growth may not reflect future growth potential. Also, employing a single growth rate number (for example, for five or ten years), is unlikely to accurately measure investors' expectations due to the sensitivity of a single growth rate figure to fluctuations in individual firm performance as well as overall economic fluctuations (i.e., business cycles). However, one must appraise the context in which the growth rate is being employed. According to the conventional DCF model, the expected return on a security is equal to the sum of the dividend yield and the expected long-term growth in dividends.

Therefore, to best estimate the cost of common equity capital using the conventional DCF model, one must look to long-term growth rate expectations.

Internally generated growth is a function of the percentage of earnings retained within the firm (the earnings retention rate) and the rate of return earned on those earnings (the return on equity). The internal growth rate is computed as the retention rate times the return on equity. Internal growth is significant in determining long-run earnings and, therefore, dividends. Investors recognize the importance of internally generated growth and pay premiums for stocks of companies that retain earnings and earn high returns on internal investments.

Q. PLEASE DISCUSS THE HISTORIC GROWTH OF THE COMPANIES IN THE TWO GROUPS.

A. Page 3 of Exhibit (JRW-6) provides the 5- and 10- year compounded annual growth rates for the companies in the two groups. I have evaluated both mean and median measure of central tendency. For the SWC Group, EPS growth is the most volatile, with a mean/median range of 2.39-4.44 percent. DPS growth is much steadier, with a mean/median range of 3.23-4.49 percent. And BVPS growth is higher, with a mean/median range of approximately 4.66-6.24 percent. Overall, the average of the 5-year and 10-year means and medians of historic EPS, DPS, and BVPS growth rates is 4.23%.

Historic growth for the LWC Group is a little higher - especially over the past five years – with similar EPS, DPS, and BVPS growth rate characteristics as the SWC Group. The LWV group mean/median ranges for EPS, DPS, and BVPS growth are

100 to 200 basis points higher than those for the SWC group. Overall, the average of the 5-year and 10-year means and medians of historic EPS, DPS, and BVPS growth rates is 5.53%.

Q. PLEASE SUMMARIZE YOUR ANALYSIS OF *VALUE LINE'S* HISTORIC AND PROJECTED GROWTH RATES FOR THE TWO GROUPS OF WATER UTILITY COMPANIES.

A. Page 4 of Exhibit (JRW-6) provides a summary of historic growth rates for the companies in the group as provided in the *Value Line Investment Survey.* The coverage of the SWC Group is very limited (only three companies) and provides little insight into expected growth. Average historic growth in EPS, DPS, and BVPS for the LWC Group ranges from 1.5% to 7.9%, with an average of 5.1%. Projections of EPS, DPS, and BVPS growth are available for four of the five companies in the LWC Group in *Value Line.* For these four companies, the average of projected growth for earnings, dividends, and book value is 7.0%. For the LWC Group, prospective internal growth of 4.3% is indicated, with *Value Line*'s average projected retention and equity return rates of 45.6% and 9.8%.

Q. PLEASE ASSESS GROWTH FOR THE GROUPS AS MEASURED BY ANALYSTS' FORECASTS OF EXPECTED 5-YEAR GROWTH IN EPS.

A. Zacks, First Call, and Reuters collect, summarize, and publish Wall Street analysts' projected 5-year EPS growth rate forecasts for companies. These forecasts are provided for the SWC and LWC Group companies on page 5 of Exhibit (JRW-6).

For the SWC Group, the mean/median of analysts' projected growth forecasts are 7.7%/7.3%. Analysts' growth forecasts are available all of the companies in the LWC Group, and the mean/median of the forecasts are 8.7%/9.4%.[10]

Q. WHY ARE YOU NOT RELYING EXCLUSIVELY ON THE FORECAST OF WALL STREET ANALYSTS AND VALUE LINE IN ARRIVING AT A DCF GROWTH RATE FOR THE GROUPS OF WATER COMPANIES?

A. In my opinion, it is highly unlikely that investors today would rely excessively on the forecasts of securities analysts and *Value Line*, and to ignore historical growth, in arriving at expected growth. In the academic world, the fact that EPS forecasts of securities analysts are overly optimistic and biased upwards has been known for years. In addition, as I show below, *Value Line's* EPS forecasts are excessive and unrealistic.

Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE HISTORIC AND PROSPECTIVE GROWTH OF THE TWO WATER COMPANY GROUPS.

A. The table below shows the summary DCF growth rate indicators for the two groups of water utility companies. For the SWC Group, the average of historic mean and median growth rate measures in EPS, DPS, and BVPS is 4.23%. *Value Line*'s historic and prospective growth rate figures for the SWC are very limited and not

[10]Since there is considerable overlap in analyst coverage between the three services, and not all of the companies have forecasts from the different services, I have averaged the expected 5-year EPS growth rates from the three services for each company to arrive at an expected EPS growth rate by company.

likely to provide much guidance to investors. The mean/median projected EPS growth rates for companies in the group are 7.7%/7.3%. Since there is very little coverage of the companies in the group, and given the well-known upward bias in analysts' EPS growth rate projections, investors are likely to look to historic growth rates as well as the projected growth figures. Given a historic and projected growth rate range of 4.23% to 7.7% for the SWC Group, an expected growth rate of 6.0%-6.5% range is reasonable for these smaller water companies. I will use the midpoint of this range - 6.25% - as the DCF growth rate for the SWC Group.

For the LWC Group, average of the mean/median historic growth rate measures is 5.53%. The average projected growth rate in EPS, DPS, and BVPS from Value Line is 7.0%. Prospective internal growth is 4.3%, and the mean/median projected EPS growth rates for companies in the group are 8.7%/9.4%. Giving more weight to the projected growth rate figures, expected DCF growth would appear to be in the 7.0% range for the LWC Group. I will use this figure as the DCF growth rate for the LWC Group.

DCF Growth Rate Indicators

Growth Rate Indicator	SWC Group	LWC Group
Historic Growth in EPS, DPS, and BVPS	4.23%	5.53%
Historic Value Line Growth in EPS, DPS, and BVPS	4.7%	5. 1%
Projected Value Line Growth in EPS, DPS, and BVPS	NA	7.0%
Internal Growth ROE * Retention rate	1.7%	4.3%
Projected EPS Growth from First Call, Reuters, and Zacks	7.7%/7.3%	8.7%/9.4%

Q. BASED ON THE ABOVE ANALYSIS, WHAT ARE YOUR INDICATED COMMON EQUITY COST RATES FROM THE DCF MODEL FOR THE GROUP?

A. My DCF-derived equity cost rate for the group is:

$$\text{DCF Equity Cost Rate (k)} = \frac{D}{P} + g$$

	Dividend Yield	½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
SWC Group	3.50%	1.03125	6.25%	9.86%
LWC Group	2.25%	1.03500	7.00%	9.33%

These results are summarized on page 1 of Exhibit JRW-6.

C. Capital Asset Pricing Model

Q. PLEASE DISCUSS THE CAPITAL ASSET PRICING MODEL (CAPM).

A. The CAPM is a risk premium approach to gauging a firm's cost of equity capital. According to the risk premium approach, the cost of equity is the sum of the interest rate on a risk-free bond (R_f) and a risk premium (RP), as in the following:

$$k = R_f + RP$$

The yield on long-term Treasury securities is normally used as R_f. Risk premiums are measured in different ways. The CAPM is a theory of the risk and expected returns of common stocks. In the CAPM, two types of risk are associated with a stock: firm-specific risk or unsystematic risk; and market or systematic risk, which is measured by a firm's beta. The only risk that investors receive a return for bearing is systematic risk.

According to the CAPM, the expected return on a company's stock, which is also the equity cost rate (K), is equal to:

$$K = (R_f) + ß_i * [E(R_m) - (R_f)]$$

Where:

- K represents the estimated rate of return on the stock;
- $E(R_m)$ represents the expected return on the overall stock market. Frequently, the 'market' refers to the S&P 500;
- (R_f) represents the risk-free rate of interest;
- $[E(R_m) - (R_f)]$ represents the expected equity or market risk premium—the excess return that an investor expects to receive above the risk-free rate for investing in risky stocks; and
- *Beta*—($ß_i$) is a measure of the systematic risk of an asset.

To estimate the required return or cost of equity using the CAPM requires three inputs: the risk-free rate of interest (R_f), the beta ($ß_i$), and the expected equity or market risk premium, $[E(R_m) - (R_f)]$. R_f is the easiest of the inputs to measure – it is the yield on long-term Treasury bonds. $ß_i$, the measure of systematic risk, is a little more difficult to measure because there are different opinions about what adjustments, if any, should be made to historical betas due to their tendency to regress to 1.0 over time. And finally, an even more difficult input to measure is the expected equity or market risk premium, $[E(R_m) - (R_f)]$. I will discuss each of these inputs, with most of the discussion focusing on the expected equity risk premium.

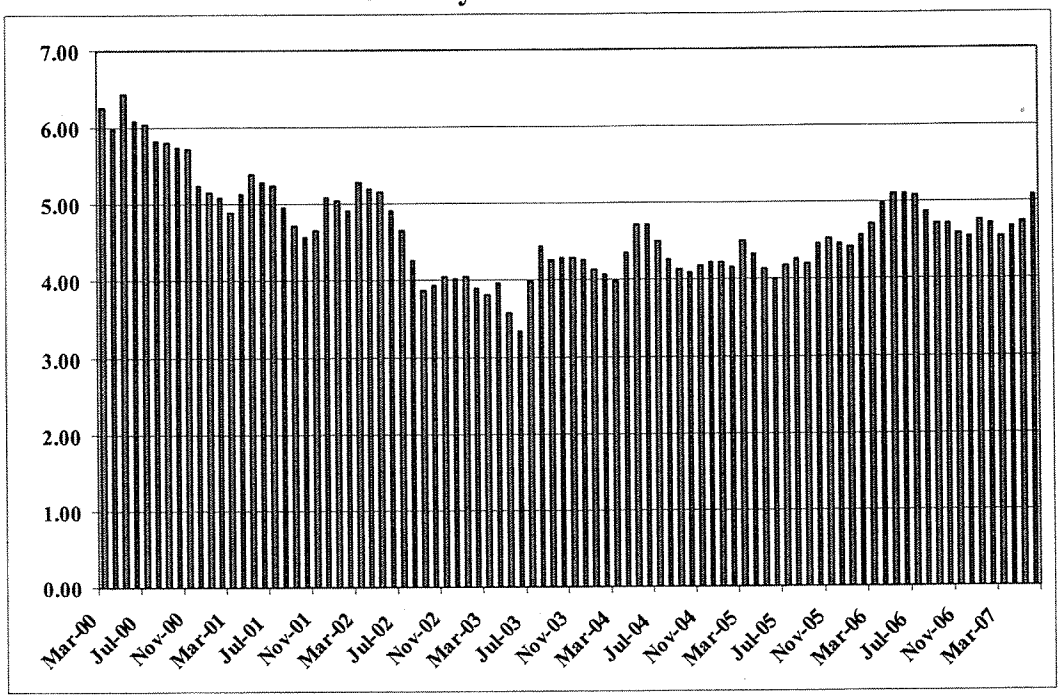
Q. PLEASE DISCUSS EXHIBIT JRW-7.

A. Exhibit JRW-7 provides the summary results for my CAPM study. Page 1 shows the results, and the pages following it, contain the supporting data.

Q. PLEASE DISCUSS THE RISK-FREE INTEREST RATE.

A. The yield on long-term Treasury bonds has usually been viewed as the risk-free rate of interest in the CAPM. The yield on long-term Treasury bonds, in turn, has been considered to be the yield on Treasury bonds with 30-year maturities. However, when the Treasury's issuance of 30-year bonds was interrupted for a period of time in recent years, the yield on 10-year Treasury bonds replaced the yield on 30-year Treasury bonds as the benchmark long-term Treasury rate. The 10-year Treasury yields over the past five years are shown in the chart below. These rates hit a 60-year low in the summer of 2003 at 3.33%. They increased with the rebounding economy and fluctuated in the 4.0-4.50 percent range over the past three years until advancing to 5.0% in early 2006 in response to a strong economy and increases in energy, commodity, and consumer prices. In late 2006, long-term interest rates retreated to below 4.5 percent as commodity and energy prices declined and inflationary pressures have subsided. However, these rates have since rebounded to the 5.0% level as the economy has remained strong.

Ten-Year U.S. Treasury Yields
January 2000-June 2007



Source: http://www.federalreserve.gov/releases/h15/current/h15.pdf

Q. WHAT RISK-FREE INTEREST RATE ARE YOU USING IN YOUR CAPM?

A. With the growing budget deficit, the U.S. Treasury has decided to again begin issuing a 30-year bond. As such, the market may again begin to focus on its yield as the benchmark for long-term capital costs in the U.S. In recent months, the yields on the 10- and 30- year Treasuries have increased and have been in the 4.75%-5.25% range. As of July 12, 2007, as shown in the table below, the rates on 10- and 30- Treasuries were 5.09% and 5.19%, respectively. Given this recent range and recent movement, I will use 5.25% as the risk-free rate, or R_f, in my CAPM.

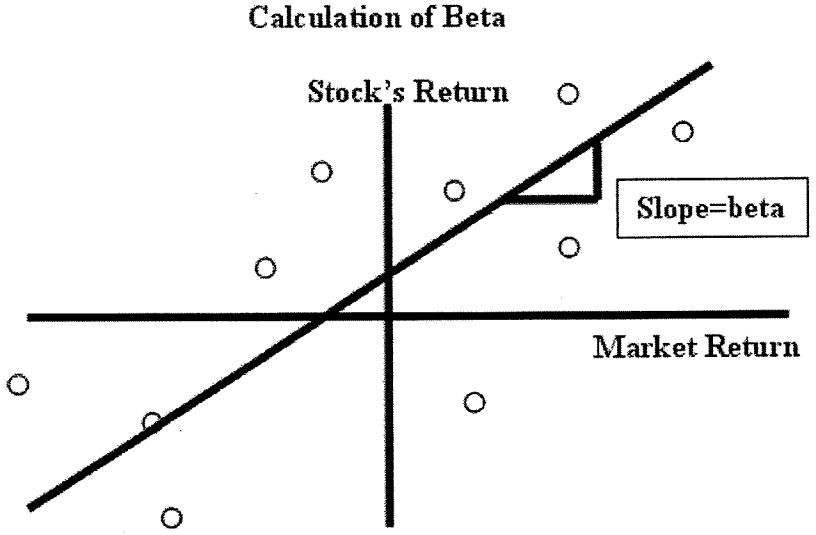
U.S. Treasury Yields
July 12, 2007

NOTES/BONDS	COUPON	MATURITY DATE	CURRENT PRICE/YIELD
2-YEAR	4.875	06/30/2009	99-30+ / 4.90
3-YEAR	4.500	05/15/2010	98-28+ / 4.92
5-YEAR	4.875	06/30/2012	99-16½ / 4.99
10-YEAR	4.500	05/15/2017	95-14 / 5.09
30-YEAR	4.750	02/15/2037	93-10¼ / 5.19

Source: www.bloomberg.com

Q. WHAT BETAS ARE YOU EMPLOYING IN YOUR CAPM?

A. Beta (ß) is a measure of the systematic risk of a stock. The market, usually taken to be the S&P 500, has a beta of 1.0. The beta of a stock with the same price movement as the market also has a beta of 1.0. A stock whose price movement is greater than that of the market, such as a technology stock, is riskier than the market and has a beta greater than 1.0. A stock with below average price movement, such as that of a regulated public utility, is less risky than the market and has a beta less than 1.0. Estimating a stock's beta involves running a linear regression of a stock's return on the market return as in the following:



The slope of the regression line is the stock's ß. A steeper line indicates the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater than average market risk. A less steep line indicates a lower ß and less market risk.

Numerous online investment information services, such as Yahoo and Reuters, provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to (1) the time period over which the ß is measured and (2) any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time. In estimating an equity cost rate for the group of water utility companies, I am using the betas for the companies as provided in the *Value Line Investment Survey*. As shown on page 2 of Exhibit JRW-7, the average betas for the companies in the SWC and LWC groups are 0.77 and 0.84, respectively.

Q. PLEASE DISCUSS THE EQUITY RISK PREMIUM.

A. The equity or market risk premium - $[E(R_m) - R_f]$ - is equal to the expected return on the stock market (e.g., the expected return on the S&P 500 ($E(R_m)$) minus the risk-free rate of interest (R_f). The equity premium is the difference in the expected total return between investing in equities and investing in "safe" fixed-income assets, such as long-term government bonds. However, while the equity risk premium is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the market.

Q. PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING THE EQUITY RISK PREMIUM.

A. The table below highlights the primary approaches to, and issues in, estimating the expected equity risk premium. The traditional way to measure the equity risk premium was to use the difference between historical average stock and bond returns. In this case, historical stock and bond returns, also called ex post returns, were used as the measures of the market's expected return (known as the ex ante or forward-looking expected return). This type of historical evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor Roger Ibbotson who popularized this method of using historical financial market returns as measures of expected returns. Most historical assessments of the equity risk premium suggest an equity risk premium of 5-7 percent above the rate on long-term Treasury bonds. However, this can be a problem because (1) ex post returns are not the same as ex ante expectations, (2) market risk premiums can change over time, increasing when investors become more risk-averse, and decreasing when investors become less risk-

averse, and (3) market conditions can change such that ex post historical returns are poor estimates of ex ante expectations.

Risk Premium Approaches

	Historical Ex Post Excess Returns	Surveys	Ex Ante Models and Market Data
Means of Assessing the Equity-Bond Risk Premium	**Historical average is a popular proxy for the ex ante premium – but likely to be misleading**	**Investor and expert surveys can provide direct estimates of prevailing expected returns/premiums**	**Current financial market prices (simple valuation ratios or DCF-based measures) can give most objective estimates of feasible ex ante equity-bond risk premium**
Problems/Debated Issues	**Time variation in required returns and systematic selection and other biases have boosted valuations over time, and have exaggerated realized excess equity returns compared with ex ante expected premiums**	**Limited survey histories and questions of survey representativeness.** **Surveys may tell more about hoped-for expected returns than about objective required premiums due to irrational biases such as extrapolation.**	**Assumptions needed for DCF inputs, notably the trend earnings growth rate, make even these models' outputs subjective.** **The range of views on the growth rate, as well as the debate on the relevant stock and bond yields, leads to a range of premium estimates.**

Source: Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003).

The use of historical returns as market expectations has been criticized in numerous academic studies.[11] The general theme of these studies is that the large equity risk premium discovered in historical stock and bond returns cannot be justified by the fundamental data. These studies, which fall under the category "Ex Ante Models and Market Data," compute ex ante expected returns using market data to arrive at an expected equity risk premium. These studies have also been called "Puzzle Research" after the famous study by Mehra and Prescott in which the authors first questioned the magnitude of historical equity risk premiums relative to fundamentals.[12]

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[11] The problems with using ex post historical returns as measures of ex ante expectations will be discussed at length later in my testimony.

[12] Rahnish Mehra and Edward Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics*

Q. PLEASE BRIEFLY SUMMARIZE SOME OF THE ACADEMIC STUDIES THAT DEVELOP EX ANTE EQUITY RISK PREMIUMS.

A. Two of the most prominent studies of ex ante expected equity risk premiums were by Eugene Fama and Ken French (2002) and James Claus and Jacob Thomas (2001). The primary debate in these studies revolves around two related issues: (1) the size of expected equity risk premium, which is the return equity investors require above the yield on bonds; and (2) the fact that estimates of the ex ante expected equity risk premium using fundamental firm data (earnings and dividends) are much lower than estimates using historical stock and bond return data. Fama and French (2002), two of the most preeminent scholars in finance, use dividend and earnings growth models to estimate expected stock returns and ex ante expected equity risk premiums.[13] They compare these results to actual stock returns over the period 1951-2000. Fama and French estimate that the expected equity risk premium from DCF models using dividend and earnings growth to be between 2.55% and 4.32%. These figures are much lower than the ex post historical equity risk premium produced from the average stock and bond return over the same period, which is 7.40%.

Fama and French conclude that the ex ante equity risk premium estimates using DCF models and fundamental data are superior to those using ex post historical stock returns for three reasons: (1) the estimates are more precise (a lower standard error); (2) the Sharpe ratio, which is measured as the [(expected stock return – risk-free rate)/standard deviation], is constant over time for the DCF models but varies

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(1985).

[13] Eugene F. Fama and Kenneth R. French, "The Equity Premium," *The Journal of Finance*, (April 2002).

considerably over time and more than doubles for the average stock-bond return model; and (3) valuation theory specifies relationships between the market-to-book ratio, return on investment, and cost of equity capital that favor estimates from fundamentals. They also conclude that the high average stock returns over the past 50 years were the result of low expected returns and that the average equity risk premium has been in the 3-4 percent range.

The study by Claus and Thomas provides direct support for the findings of Fama and French.[14] These authors compute ex ante expected equity risk premiums over the 1985-1998 period by (1) computing the discount rate that equates market values with the present value of expected future cash flows, and (2) then subtracting the risk-free interest rate. The expected cash flows are developed using analysts' earnings forecasts. The authors conclude that over this period the ex ante expected equity risk premium is in the range of 3.0%. Claus and Thomas note that, over this period, ex post historical stock returns overstate the ex ante expected equity risk premium because, as the expected equity risk premium has declined, stock prices have risen. In other words, from a valuation perspective, the present value of expected future returns increase when the required rate of return decreases. The higher stock prices have produced stock returns that have exceeded investors' expectations and therefore ex post historical equity risk premium estimates are biased upwards as measures of ex ante expected equity risk premiums.

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[14] James Claus and Jacob Thomas, "Equity Risk Premia as Low as Three Percent? Empirical Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Market," *Journal of Finance.* (October 2001).

Q. PLEASE PROVIDE A SUMMARY OF THE EX ANTE EQUITY RISK PREMIUM STUDIES.

A. Richard Derrig and Elisha Orr (2003) completed the most comprehensive paper to date which summarizes and assesses the many risk premium studies.[15] These authors reviewed the various approaches to estimating the equity risk premium, and the overall results. Page 3 of Exhibit JRW-7 provides a summary of the results of the primary risk premium studies reviewed by Derrig and Orr. In developing page 3 of Exhibit JRW-7, I have (1) updated the results of the studies that have been updated by the various authors, (2) included the results of several additional studies and surveys, and (3) included the results of the "Building Blocks" approach to estimating the equity risk premium, including a study I performed which is presented below.

On page 3, the risk premium studies listed under the 'Social Security' and 'Puzzle Research' sections are primarily ex ante expected equity risk premium studies (as discussed above). Most of these studies are performed by leading academic scholars in finance and economics. Also provided are the results of studies by Ibbotson and Chen and myself which use the Building Blocks approach.

Q. PLEASE DISCUSS YOUR DEVELOPMENT OF AN EX ANTE EXPECTED EQUITY RISK PREMIUM COMPUTED USING THE BUILDING BLOCKS METHODOLOGY.

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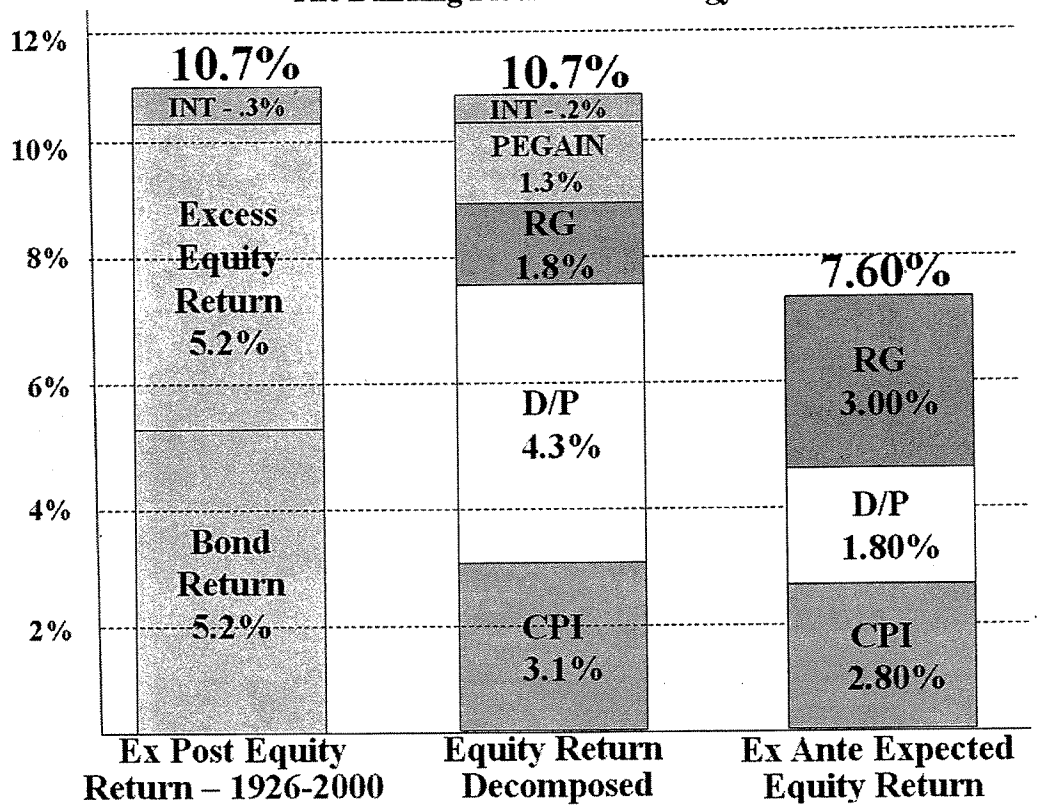
[15] Richard Derrig and Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, August 28, 2003.

A. Ibbotson and Chen (2002) evaluate the ex post historical mean stock and bond returns in what is called the Building Blocks approach.[16] They use 75 years of data and relate the compounded historical returns to the different fundamental variables employed by different researchers in building ex ante expected equity risk premiums. Among the variables included were inflation, real EPS and DPS growth, ROE and book value growth, and P/E ratios. By relating the fundamental factors to the ex post historical returns, the methodology bridges the gap between the ex post and ex ante equity risk premiums. Ilmanen (2003) illustrates this approach using the geometric returns and five fundamental variables – inflation (CPI), dividend yield (D/P), real earnings growth (RG), repricing gains (PEGAIN) and return interaction/reinvestment (INT).[17] This is shown in the graph below. The first column breaks the 1926-2000 geometric mean stock return of 10.7% into the different return components demanded by investors: the historical Treasury bond return (5.2%), the excess equity return (5.2%), and a small interaction term (0.3%). This 10.7% annual stock return over the 1926-2000 period can then be broken down into the following fundamental elements: inflation (3.1%), dividend yield (4.3%), real earnings growth (1.8%), repricing gains (1.3%) associated with higher P/E ratios, and a small interaction term (0.2%).

[16] Roger Ibbotson and Peng Chen, "Long Run Returns: Participating in the Real Economy," *Financial Analysts Journal*, January 2003.

[17] Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003), p. 11.

Decomposing Equity Market Returns
The Building Blocks Methodology

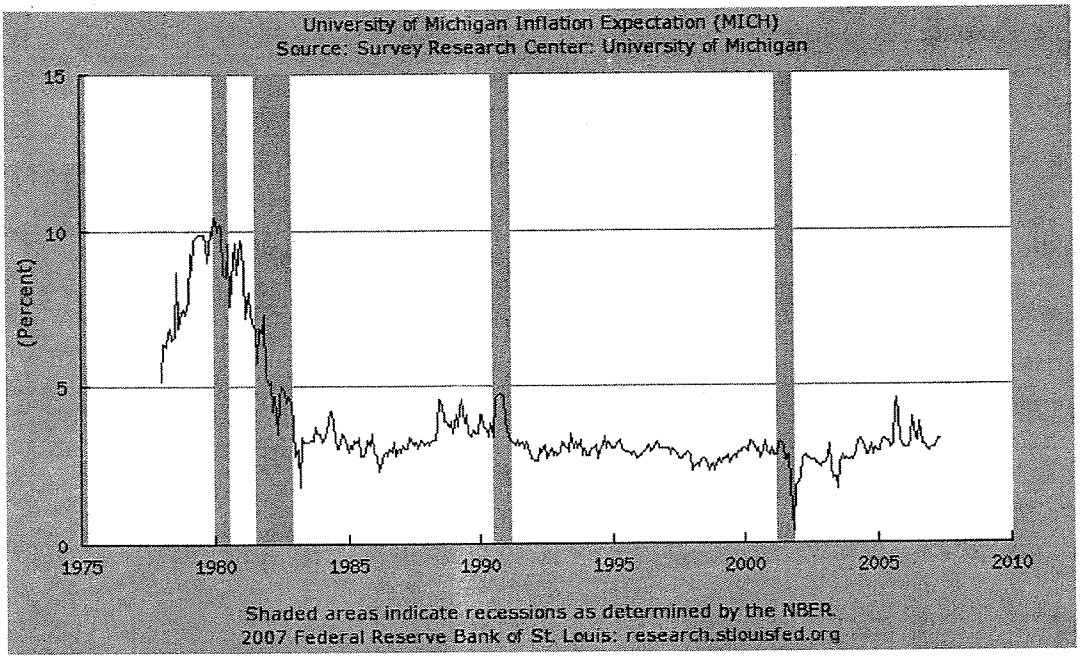


Q. HOW ARE YOU USING THIS METHODOLOGY TO DERIVE AN EX ANTE EXPECTED EQUITY RISK PREMIUM?

A. The third column in the graph above shows current inputs to estimate an ex ante expected market return. These inputs include the following:

CPI – To assess expected inflation, I have employed expectations of the short-term and long-term inflation rate. The graph below shows the expected annual inflation rate according to consumers, as measured by the CPI, over the coming year. This survey is published monthly by the University of Michigan Survey Research Center. In the most recent report, the expected one-year inflation rate was 3.3%.

Expected Inflation Rate
University of Michigan Consumer Research
(Data Source: http://research.stlouisfed.org/fred2/series/MICH/98)



Longer term inflation forecasts are available in the Federal Reserve Bank of Philadelphia's publication entitled *Survey of Professional Forecasters*.[18] This survey of professional economists has been published for almost 50 years. While this survey is published quarterly, only the first quarter survey includes long-term forecasts of GDP growth, inflation, and market returns. In the first quarter, 2007 survey, published on February 13, 2007, the median long-term (10-year) expected inflation rate as measured by the CPI was 2.35% (see page 4 of Exhibit JRW-7).

Given these results, I will use the average of the University of Michigan and Philadelphia Federal Reserve's surveys (3.3% and 2.35%), or 2.8%.

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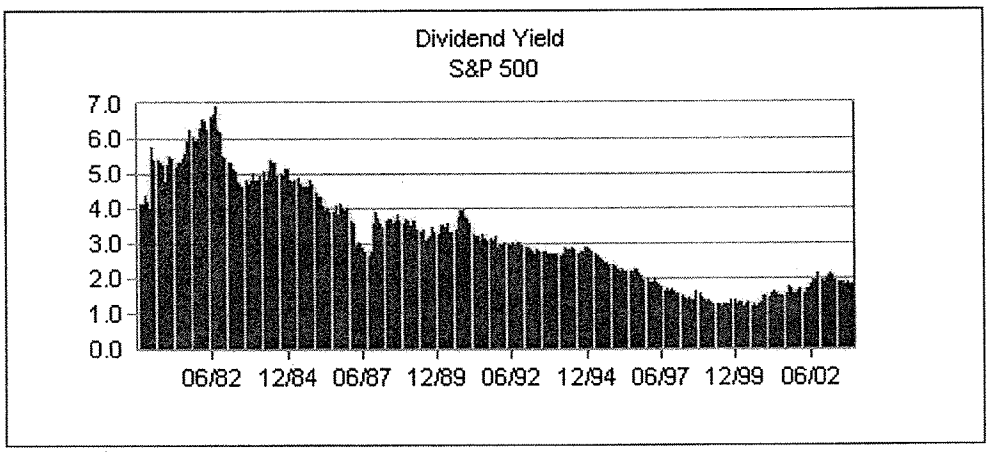
[18]Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters,* February 13, 2007. The *Survey of Professional Forecasters* was formerly conducted by the American Statistical Association (ASA) and the National Bureau of Economic Research (NBER) and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.

D/P – As shown in the graph below, the dividend yield on the S&P 500 has decreased gradually over the past decade. Today, it is far below its norm of 4.3% over the 1926-2000 time period. Whereas the S&P dividend yield bottomed out at less than 1.4% in 2000, it is currently at 1.8% which I use in the ex ante risk premium analysis.

S&P 500 Dividend Yield

(Data Source: http://www.barra.com/Research/fund_charts.asp)



RG – To measure expected real growth in earnings, I use (1) the historical real earnings growth rate for the S&P 500, and (2) expected real GDP growth. The S&P 500 was created in 1960. It includes 500 companies which come from ten different sectors of the economy. Over the 1960-2006 period, nominal growth in EPS for the S&P 500 was 7.37%. On page 5 of Exhibit JRW-7, real EPS growth is computed using the CPI as a measure of inflation. As indicated by Ibbotson and Chen, real earnings growth over the 1926-2000 period was 1.8%. The real growth figure over 1960-2006 period for the S&P 500 is 3.0 %.

The second input for expected real earnings growth is expected real GDP growth. The rationale is that over the long-term, corporate profits have averaged a

relatively consistent 5.50% of US GDP.[19] Real GDP growth, according to McKinsey, has averaged 3.5% over the past 80 years. Expected GDP growth, according to the Federal Reserve Bank of Philadelphia's *Survey of Professional Forecasters,* is 3.0% (see page 4 of Exhibit JRW-7).

Given these results, I will use the average of the historical S&P EPS real growth and the projected real GDP growth (as reported by the Philadelphia Federal Reserve Survey) -- 3.0% and 3.0% -- or 3.0%, for real earnings growth.

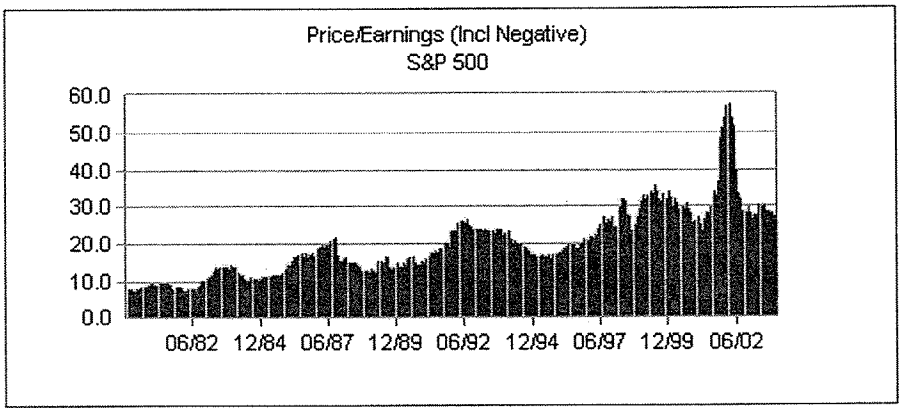
PEGAIN – the repricing gains associated with increases in the P/E ratio accounted for 1.3% of the 10.7% annual stock return in the 1926-2000 period. In estimating an ex ante expected stock market return, one issue is whether investors expect P/E ratios to increase from their current levels. The graph below shows the P/E ratios for the S&P 500 over the past 25 years. The run-up and eventual peak in P/Es is most notable in the chart. The relatively low P/E ratios (in the range of 10) over two decades ago are also quite notable. As of July, 2007 the P/E for the S&P 500, using the trailing 12 months EPS, is 20.4 according to www.investor.reuters.com.

Given the current economic and capital markets environment, I do not believe that investors expect even higher P/E ratios. Therefore, a PEGAIN would not be appropriate in estimating an ex ante expected stock market return. There are two primary reasons for this. First, the average historical S&P 500 P/E ratio is 15 – thus the current P/E exceeds this figure. Second, as previously noted, interest rates are at a cyclical low not seen in almost 50 years. This is a primary reason for the high current P/Es. Given the current market environment with relatively high P/E ratios and low

[19]Marc. H. Goedhart, et al, "The Real Cost of Equity," *McKinsey on Finance* (Autumn 2002), p.14.

relative interest rates, investors are not likely to expect to get stock market gains from lower interest rates and higher P/E ratios.

S&P 500 P/E Ratios
(Data Source: http://www.barra.com/Research/fund_charts.asp)



Q. GIVEN THIS DISCUSSION, WHAT IS YOUR EX ANTE EXPECTED MARKET RETURN AND EQUITY RISK PREMIUM USING THE "BUILDING BLOCKS METHODOLOGY"?

A. My expected market return is represented by the last column on the right in the graph entitled "Decomposing Equity Market Returns: The Building Blocks Methodology" set forth on page 44 of my testimony. As shown, my expected market return is 7.60% which is composed of 2.80% expected inflation, 1.80% dividend yield, and 3.00% real earnings growth rate.

Expected Market Return	=	Expected Inflation	+	Dividend Yield	+	Real Earnings Growth
Expected Market Return	=	2.80%	+	1.80%	+	3.0%

Expected Market Return	=	7.6%

Q. GIVEN THAT THE HISTORICAL COMPOUNDED ANNUAL MARKET RETURN IS IN EXCESS OF 10%, WHY DO YOU BELIEVE THAT AN EXPECTED MARKET RETURN OF 7.6% IS REASONABLE?

A. As discussed above in the development of the expected market return, stock prices are relatively high at the present time in relation to earnings and dividends and interest rates are relatively low. Hence, it is unlikely that investors are going to experience high stock market returns due to higher P/E ratios and/or lower interest rates. In addition, as shown in the decomposition of equity market returns, whereas the dividend portion of the return was historically 4.3%, the current dividend yield is only 1.8%. Due to these reasons, lower market returns are expected for the future.

Q. IS YOUR EXPECTED MARKET RETURN OF 7.60% CONSISTENT WITH THE FORECASTS OF MARKET PROFESSIONALS?

A. Yes. In the first quarter, 2007 survey, published on February 13, 2007, the median long-term expected return on the S&P 500 was 7.50% (see page 4 of Exhibit JRW-7). This is clearly consistent with my expected market return of 7.60%.

Q. IS YOUR EXPECTED MARKET RETURN CONSISTENT WITH THE EXPECTED MARKET RETURNS OF CORPORATE CHIEF FINANCIAL OFFICERS (CFOS)?

A. Yes. John Graham and Campbell Harvey of Duke University conduct an annual survey of corporate CFOs. The survey is a joint project of Duke University and *CFO Magazine.* In the March, 2007 survey, the mean expected return on the S&P 500 over the next ten years is 8.12%.[20]

Q. GIVEN THIS EXPECTED MARKET RETURN, WHAT IS YOUR EX ANTE EQUITY RISK PREMIUM USING THE BUILDING BLOCKS METHODOLOGY?

A. As shown above, the current 30-year treasury yield is 5.19%. My ex ante equity risk premium is simply the expected market return from the Building Blocks methodology minus this risk-free rate:

Ex Ante Equity Risk Premium = 7.60% - 5.19% = 2.41%

Q. GIVEN THIS DISCUSSION, HOW ARE YOU MEASURING AN EXPECTED EQUITY RISK PREMIUM IN THIS PROCEEDING?

A. As discussed above, page 3 of Exhibit JRW-7 provides a summary of the results of a variety of the equity risk premium studies. These include the results of (1) the study of historical risk premiums as provided by Ibbotson, (2) ex ante equity risk premium studies (studies commissioned by the Social Security Administration as well as those labeled 'Puzzle Research'), (3) equity risk premium surveys of CFOs, Financial Forecasters, as well as academics, (4) Building Block approaches to the equity risk

[20] The survey results are available at www.cfosurvey.org.

premium, and (5) other miscellaneous studies. The overall average equity risk premium of these studies is 4.12%, which I will use as the equity risk premium in my CAPM study.

Q. IS YOUR EX ANTE EQUITY RISK PREMIUM CONSISTENT WITH THE EQUITY RISK PREMIUMS OF LEADING INVESTMENT FIRMS?

A. Yes. One of the first studies in this area was by Stephen Einhorn, one of Wall Street's leading investment strategists.[21] His study showed that the market or equity risk premium had declined to the 2.0 to 3.0 percent range by the early 1990s. Among the evidence he provided in support of a lower equity risk premium is the inverse relationship between real interest rates (observed interest rates minus inflation) and stock prices. He noted that the decline in the market risk premium has led to a significant change in the relationship between interest rates and stock prices. One implication of this development was that stock prices had increased higher than would be suggested by the historical relationship between valuation levels and interest rates.

The equity risk premiums of some of the other leading investment firms today support the result of the academic studies. An article in *The Economist* indicated that some other firms like J.P. Morgan are estimating an equity risk premium for an average risk stock in the 2.0 to 3.0 percent range above the interest rate on U.S. Treasury Bonds.[22]

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[21] Steven G. Einhorn, "The Perplexing Issue of Valuation: Will the Real Value Please Stand Up?" *Financial Analysts Journal* (July-August 1990), pp. 11-16.

[22] For example, see "Welcome to Bull Country," *The Economist* (July 18, 1998), pp. 21-3, and "Choosing the

Q. IS YOUR EX ANTE EQUITY RISK PREMIUM CONSISTENT WITH THE EQUITY RISK PREMIUMS USED BY CORPORATE CHIEF FINANCIAL OFFICERS (CFOS)?

A. Yes. In the previously-referenced 2007 CFO survey conducted by John Graham and Campbell Harvey, the average ex ante 10-year equity risk premium was 3.42%.

Q. IS YOUR EX ANTE EQUITY RISK PREMIUM CONSISTENT WITH THE EX ANTE EQUITY RISK PREMIUMS OF PROFESSIONAL FORECASTERS?

A. Yes. The financial forecasters in the previously-referenced Federal Reserve Bank of Philadelphia survey project both stock and bond returns. As shown on page 4 of Exhibit JRW-7, the median long-term expected stock and bond returns were 7.50% and 5.00%, respectively. This provides an ex ante equity risk premium of 2.50%.

Q. IS YOUR EX ANTE EQUITY RISK PREMIUM CONSISTENT WITH THE EQUITY RISK PREMIUMS USED BY THE LEADING CONSULTING FIRMS?

A. Yes. McKinsey & Co. is widely recognized as the leading management consulting firm in the world. They recently published a study entitled "The Real Cost of Equity" in which they developed an ex ante equity risk premium for the US. In reference to the decline in the equity risk premium, as well as what is the appropriate equity risk premium to employ for corporate valuation purposes, the McKinsey authors concluded the following:

Right Mixture," *The Economist* (February 27, 1999), pp. 71-2.

> We attribute this decline not to equities becoming less risky (the inflation-adjusted cost of equity has not changed) but to investors demanding higher returns in real terms on government bonds after the inflation shocks of the late 1970s and early 1980s. We believe that using an equity risk premium of 3.5 to 4 percent in the current environment better reflects the true long-term opportunity cost of equity capital and hence will yield more accurate valuations for companies.[23]

Q. WHAT EQUITY COST RATE IS INDICATED BY YOUR CAPM ANALYSIS?

A. The results of my CAPM study for the two groups of water utility companies are provided below:

$$K = (R_f) + ß_i * [E(R_m) - (R_f)]$$

	Risk-Free Rate	Beta	Equity Risk Premium	Equity Cost Rate
SWC Group	5.25 %	0.77	4.12%	8.42%
LWC Group	5.25%	0.84	4.12%	8.71%

D. Equity Cost Rate Summary

Q. PLEASE SUMMARIZE YOUR EQUITY COST RATE STUDY.

A. The results for my DCF and CAPM analyses for the two groups of water utility companies are indicated below:

	DCF	CAPM
SWC Group	9.86%	8.42%
LWC Group	9.33%	8.71%

[23] Marc H. Goedhart, et al, "The Real Cost of Equity," *McKinsey on Finance* (Autumn 2002), p. 15.

Q. GIVEN THESE RESULTS, WHAT IS YOUR ESTIMATED EQUITY COST RATE FOR THE TWO GROUPS OF WATER COMPANIES?

A. Giving these results, I conclude that the equity cost rate for the two groups of water utilities is in the 8.42-9.86 percent range. Giving more weight to the DCF results, especially for the SWC group, an equity cost rate in the upper half (9.0-9.86 percent) of this range is appropriate. I will use the mid-point of this range - 9.4% - as my equity cost rate for KAWC.

Q. ISN'T THIS RATE OF RETURN LOW BY HISTORICAL STANDARDS?

A. Yes it is, and appropriately so. My rate of return is low by historical standards for three reasons. First, as discussed above, current capital costs are very low by historical standards, with interest rates at a cyclical low not seen since the 1960s. Second, the 2003 tax law, which reduces the tax rates on dividend income and capital gains, lowers the pre-tax return required by investors. And third, as discussed below, the equity or market risk premium has declined.

Q. FINALLY, PLEASE DISCUSS YOUR RATE OF RETURN IN LIGHT OF RECENT YIELDS ON 'A' RATED PUBLIC UTILITY BONDS.

A. In recent months the yields on long-term public utility bonds have been in the 6.00 percent range. My rate of return may appear to be low given these yields. However, as previously noted, my recommendation must be viewed in the context of the significant decline in the market or equity risk premium. As a result, the return premium that equity investors require over bond yields is much lower than today.

This decline was previously reviewed in my discussion of capital costs in today's markets.

Q. HOW DO YOU TEST THE REASONABLENESS OF YOUR COST OF EQUITY AND OVERALL RATE OF RETURN RECOMMENDATION?

A. To test the reasonableness of my equity cost rate recommendation, I examine the relationship between the return on common equity and the market-to-book ratios for the two groups of water utility companies. To assess the adequacy of my overall rate of return recommendation, I evaluate the implied interest coverage ratios.

Q. WHAT DO THE RETURNS ON COMMON EQUITY AND MARKET-TO-BOOK RATIOS FOR THE GROUPS OF WATER UTILITIES INDICATE ABOUT THE REASONABLENESS OF YOUR RECOMMENDATION?

A. Exhibit_(JRW-2) provides financial performance and market valuation statistics for the two groups of water utility companies. The current return on equity and market-to-book ratios for the two groups are summarized below:

	Current ROE	Market-to-Book Ratio
SWC Group	8.8 %	2.29
LWC Group	10.0%	2.33

Source: Exhibit (JRW-3).

These results clearly indicate that, on average, these companies are earning returns on equity above their equity cost rates. As such, this observation provides evidence that my recommended equity cost rate of 9.4% is reasonable and fully consistent with the financial performance and market valuation of the two groups of water utility companies.

Q. WHAT DO THE IMPLIED INTEREST COVERAGE RATIOS INDICATED ABOUT THE ADEQUACY OF YOUR OVER RATE OF RETURN RECOMMENDATIONS FOR KAWC?

A. The implied pre-tax interest coverage ratio for KAWC based on my recommendation is 3.03X. Exhibit (JRW-2) provides financial performance and market valuation statistics for the two groups of water utility companies. The average pre-tax interest coverage ratios for the two groups for 2006 are 2.13X and 2.89X. This indicates that my overall recommended rate of return is adequate in terms of the implied interest coverage ratios.

	KAWC Implied with 9.40% ROE	SWC GROUP Group Average 2006	LWC GROUP Group Average 2006
Pre-Tax Interest Coverage	3.03X	2.13X	2.89X

I. VI. CRITIQUE OF KAWC'S RATE OF RETURN TESTIMONY

Q. PLEASE SUMMARIZE KAWC'S OVERALL RATE OF RETURN RECOMMENDATION.

A. The Company's proposed rate of return position is summarized below:

Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Short Term Debt	**0.60%**	**5.25%**	**0.03%**
Long Term Debt	**53.20%**	**6.46%**	**3.44%**
Preferred Stock	**2.60%**	**7.75%**	**0.20%**
Common Equity	**43.60%**	**11.40%**	**4.97%**
Total Capitalization	**100.00%**		**8.64%**

Q. PLEASE EVALUATE THE COMPANY'S RATE OF RETURN POSITION.

A. The Company's requested rate of return is excessive due to an overstated equity cost rate. I am employing the Company's proposed capital structure and senior capital cost rates. The equity cost rate of 11.4% is extremely overstated and not reflective of current market fundamentals.

Q. PLEASE REVIEW THE EQUITY COST RATE APPROACHES AND RESULTS OF DR. VANDER WEIDE.

A. Dr. Vander Weide's equity cost rate approaches and results are summarized below:

Dr. Vander Weide

Approach	Cost of Equity
DCF	10.7%
Ex Ante Risk Premium	11.4%
Ex Post Risk Premium	11.4%
Historical CAPM	11.6%
DCF CAPM	12.6%
Average	11.4%

Q. WHAT IS YOUR ASSESSMENT OF DR. VAN DER WEIDE'S EQUITY COST RATE FOR KAWC?

A. Dr. Vander Weide errs in estimating KAWC's equity cost rate in several ways. These errors include: (1) In his DCF analysis, Dr. Vander Weide has employed upwardly-biased and unjustified dividend yields and expected growth rates, made an unwarranted flotation cost adjustment, and used a weighting scheme which overweighs the results for a couple firms; and (2) in his risk premium and CAPM approaches, Dr. Vander Weide has employed overstated risk premium estimates.

A. DCF Approach

Q. PLEASE SUMMARIZE DR. VANDER WEIDE'S DCF ESTIMATES.

A. The DCF results for Dr. Vander Weide are summarized below

DCF Results

	Seven Company Water Group	Eleven Company Gas Group
Dividend Yield	2.2%	2.9%
Long-Term Growth	8.5 %	7.3%
Median Cost Rate	10.7%	10.2%

Q. PLEASE EVALUATE THE DCF RESULTS OF DR. VANDER WEIDE.

A. There are several issues with Dr. Vander Weide's DCF results: (1) he has made an inappropriate adjustment to his dividend yields to reflect the quarterly payment of dividends; (2) He has relied on the upwardly-biased forecasted EPS growth rate forecasts of Wall Street analysts in determining a growth rate measure for his DCF model; (3) He has adjusted his DCF results for flotation costs; (4) Dr. Vander Weide's has used market value weights for his DCF equity cost rate results which

give far more weight (a) to one company – Aqua America – in his water group and (b) to the three companies with have the three highest equity cost rates which also have significant business interests outside of regulated gas distribution business; and (5) He have given much weight to his DCF results in arriving at his equity cost rate recommendations.

DCF Dividend Yield Adjustment

Q. PLEASE DISCUSS THE ADJUSTMENT TO THE DIVIDEND YIELD TO REFLECT THE QUARTERLY PAYMENT OF DIVIDENDS.

A. Dr. Vander Weide has adjusted the dividend yield term of his DCF model to reflect the quarterly timing of dividend payments. The quarterly timing adjustment is in error and results in an overstated equity cost rate. First, as indicated in the previously cited testimony of Dr. Myron Gordon before the FCC, the appropriate dividend yield adjustment for growth in the DCF model is the expected dividend for the next quarter multiplied by four. The quarterly adjustment procedure is clearly inconsistent with this approach. Second, Dr. Vander Weide's approach presumes that investors require additional compensation during the coming year because their dividends are paid out quarterly instead of being paid all in a lump sum. Therefore, he compounds each dividend to the end of the year using the long-term growth rate as the compounding factor. The justification is provided in his Appendix 1. The error in this logic and approach is that the investor receives the money from each quarterly dividend and has the option to reinvest it as he or she chooses. This reinvestment

generates its own compounding, but it is outside of the dividend payments of the issuing company. Dr. Vander Weide's approach simply serves to duplicate this compounding process, thereby inflating the return to the investor. Finally, the notion that an adjustment is required to reflect the quarterly timing issue is refuted in a study by Richard Bower of Dartmouth College. Bower acknowledges the timing issue and downward bias addressed by Dr. Vander Wide. However, he demonstrates that this does not result in a biased required rate of return. He provides the following assessment: [24]

> "... authors are correct when they say that the conventional cost of equity calculation is a downward-biased estimate of the market discount rate. They are not correct, however, in concluding that it has a bias as a measure of required return. As a measure of required return, the conventional cost of equity calculation (K*), ignoring quarterly compounding and even without adjustment for fractional periods, serves very well."

He also makes the following observation on the issue:

> "Too many rate cases have come and gone, and too many utilities have survived and sustained market prices above book, to make downward bias in the conventional calculation of required return a likely reality."

Sole Reliance on Analysts' EPS Growth Rate Forecasts for DCF Growth Rate

Q. WHAT ARE YOUR CONCERNS WITH THE USE OF ANALYSTS' EPS GROWTH RATE FORECASTS BY DR. VANDER WEIDE?

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[24] See Richard Bower, The N-Stage Discount Model and Required Return: A Comment," *Financial Review* (February 1992), pp 141-9.

A. As measures of growth in his DCF model, Dr. Vander Weide employed the EPS growth rate forecasts of Wall Street analysts for DCF growth. In doing so, he has ignored all other indicators of expected growth – including expected growth in dividends and book value and have also ignored historic growth. It seems highly unlikely that investors today would rely exclusively on the forecasts of securities firms and analysts, and ignore historic growth, in arriving at expected growth. In the academic world, the fact that the EPS forecasts of securities' analysts are overly optimistic and biased upwards has been known for years.

Q. PLEASE REVIEW THE BIAS IN ANALYSTS' GROWTH RATE FORECASTS.

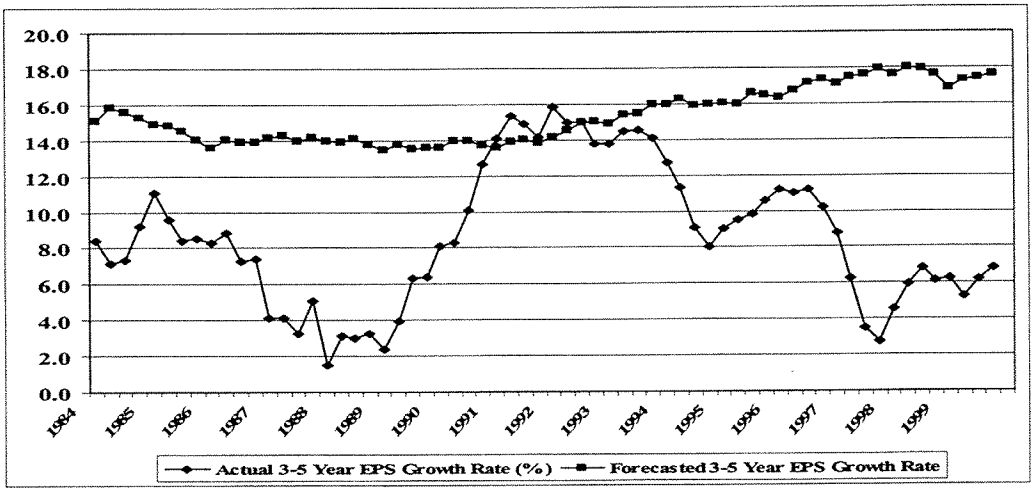
A. Analysts' growth rate forecasts are collected and published by Zacks, First Call, I/B/E/S, and Reuters. These services retrieve and compile EPS forecasts from Wall Street Analysts. These analysts come from both the sell side (Merrill Lynch, Paine Webber) and the buy side (Prudential Insurance, Fidelity).

The problem with using these forecasts to estimate a DCF growth rate is that the objectivity of Wall Street research has been challenged, and many have argued that analysts' EPS forecasts are overly optimistic and biased upwards. To evaluate the accuracy of analysts' EPS forecasts, I have compared actual 3-5 year EPS growth rates with forecasted EPS growth rates on a quarterly basis over the past 20 years for all companies covered by the I/B/E/S data base. In the graph below, I show the average analysts' forecasted 3-5 year EPS growth rate with the average actual 3-5 year EPS growth rate. Because of the necessary 3-5 year follow-up period to measure

actual growth, the analysis in this graph only (1) covers forecasted and actual EPS growth rates through 1999, and (2) includes only companies that have 3-5 years of actual EPS data following the forecast period.

The following example shows how the results can be interpreted. As of the first quarter of 1995, analysts were projecting an average 3-5-year annual EPS growth rate of 15.98%, but companies only generated an average annual EPS growth rate over the next 3-5 years of 8.14%. This 15.98% figure represented the average projected growth rate for 1,115 companies, with an average of 4.70 analysts' forecasts per company over the 20 year period covered by the study. The only periods when firms met or exceeded analysts' EPS growth rate expectations were for six consecutive quarters in 1991-92 following the one-year economic downturn at the turn of the decade.

Analysts' Forecasted 3-5-Year Forecasted Versus Actual EPS Growth Rates 1984-1999



Source: J. Randall Woolridge.

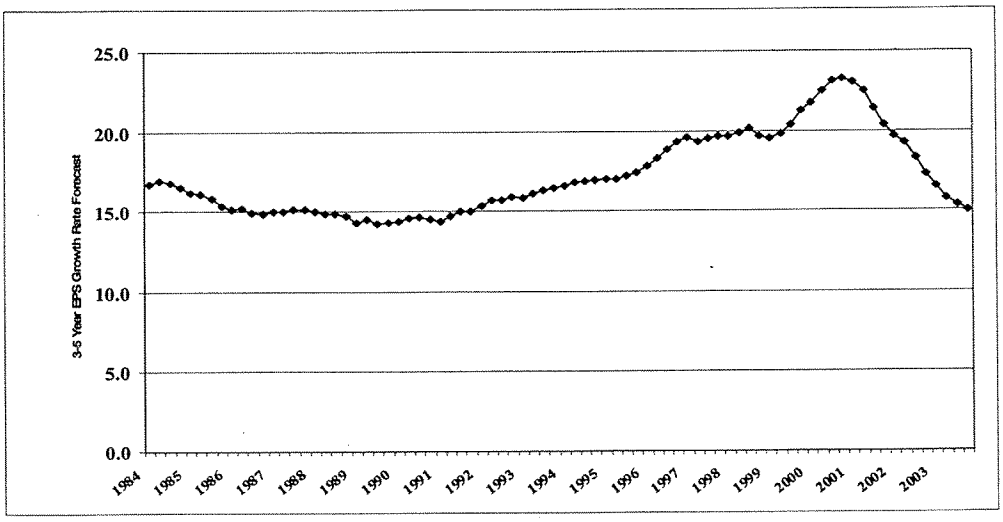
Over the entire time period, Wall Street analysts have continually forecasted 3-5-year EPS growth rates in the 14-18 percent range (mean = 15.32%), but these firms have only delivered an average EPS growth rate of 8.75%.

The post-1999 period has seen the boom and then the bust in the stock market, an economic recession, 9/11, and the Iraq war. Furthermore, and highly significant in the context of this study, we have also had the Elliott Spitzer investigation of Wall Street firms and the subsequent Global Securities Settlement in which nine major brokerage firms paid a fine of $1.5B for their biased investment research.

To evaluate the impact of these events on analysts' forecasts, the graph below provides the average 3-5-year EPS growth rate projections for all companies provided in the I/B/E/S database on a quarterly basis from 1985 to 2004. In this graph, no comparison to actual EPS growth rates is made and hence there is no follow-up period. Therefore, 3-5 year growth rate forecasts are shown until 2004 and, since companies are not lost due to a lack of follow-up EPS data, these results are for a larger sample of firms.[25] Analysts' forecasts for EPS growth were higher for this larger sample of firms, with a more pronounced run-up and then decline around the stock market peak in 2000. The average projected growth rate hovered in the 14.5%-17.5% range until 1995, and then increased dramatically over the next five years to 23.3% in the fourth quarter of the year 2000. Forecasted growth has since declined to the 15.0% range.

[25] The number of companies in the sample grows from 2,220 in 1984, peaks at 4,610 in 1998, and then declines to 3,351 in 2004. The number of analysts' forecasts per company averages between 3.75 to 5.10, with an overall mean of 4.37.

Mean Analysts' 3-5-Year Forecasted EPS Growth Rates
1985-2004



While analysts' EPS growth rates forecasts have subsided since 2000, these results suggest that, despite the Elliot Spitzer investigation and the Global Securities Settlement, analysts' EPS forecasts are still upwardly biased. The actual average 3-5 year EPS growth rate over time has been about one half the average projected 3-5 year growth rate forecast of 15.0%. Furthermore, as discussed above, historic growth in GNP and corporate earnings has been in the 7% range. As such, an EPS growth rate forecast of 15% does not reflect economic reality. This observation is supported by a *Wall Street Journal* article entitled "Analysts Still Coming Up Rosy – Over-Optimism on Growth Rates is Rampant – and the Estimates Help to Buoy the Market's Valuation." The following quote provides insight into the continuing bias in analysts' forecasts:

> Hope springs eternal, says Mark Donovan, who manages Boston Partners Large Cap Value Fund. 'You would have thought that, given what happened in the last three years, people would have given up the ghost. But in large measure they have not.'
> These overly optimistic growth estimates also show that, even with all the regulatory focus on too-bullish analysts allegedly influenced by their firms'

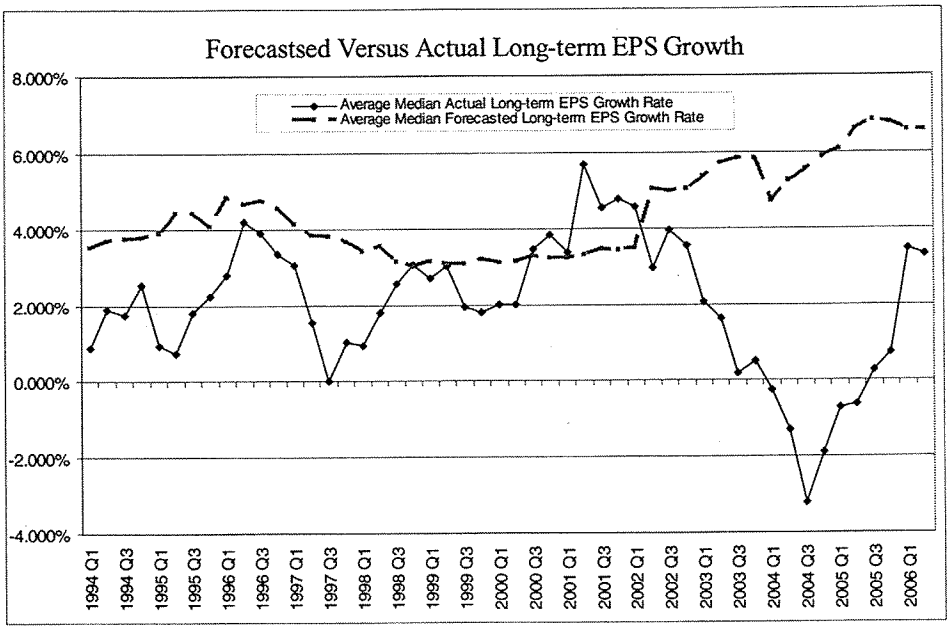
investment-banking relationships, a lot of things haven't changed: Research remains rosy and many believe it always will.[26]

Q. ARE ANALYSTS' EPS GROWTH RATE FORECASTS LIKEWISE UPWARDLY BIASED FOR UTILITY COMPANIES?

A. Yes. To evaluate whether analysts' EPS growth rate forecasts are upwardly biased for electric utility companies, I conducted a study similar to the one described above using a group of electric utility companies. The projected EPS growth rates, which were in the four percent range in the 1990s, have increased over the past five years to the six percent range today. Actual EPS growth has been volatile, and consistently below projected EPS growth rates. Over the entire period, the average quarterly projected and actual EPS growth rates are 4.41% and 1.99%, respectively. It also appears that analysts tend to miss downturns in EPS growth. Overall, the results here are consistent with the results for companies in general -- analysts' projected EPS growth rate forecasts are upwardly-biased for utility companies.

[26] Ken Brown, "Analysts Still Coming Up Rosy – Over-Optimism on Growth Rates is Rampant – and the Estimates Help to Buoy the Market's Valuation," *Wall Street Journal*, (January 27, 2003), p. C1.

Analysts' Forecasted 3-5-Year Forecasted Versus Actual EPS Growth Rates
Electric Utility Group
1990-2006



Q. DR. VANDER WEIDE HAS DEFENDED THE USE OF ANALYSTS' EPS FORECASTS IN HIS DCF MODEL BY CITING A STUDY HE PUBLISHED WITH DR. WILLARD CARLETON. PLEASE DISCUSS DR. VANDER WEIDE'S STUDY.

A. In the study, Dr. Vander Weide performs a linear regression of a company's stock price to earnings ratio (P/E) on the dividend yield payout ratio (D/E), alternative measures of growth (g), and three measures of risk (beta, covariance, r-squared, and the standard deviation of analysts' growth rate projections). He performed the study for three one-year periods – 1981-1982, and 1983 – and used a sample of approximately 65 companies. His results indicated that regressions measuring growth as analysts' forecasted EPS growth were more statistically significant that those using

various historic measures of growth. Consequently, he concluded that analysts' growth rates are superior measures of expected growth.

Q. PLEASE CRITIQUE DR. VANDER WEIDE'S STUDY.

A. Before highlighting the errors in the study, it is important to note that the study was published fifteen years ago, used a sample of only sixty-five companies, and evaluated a three-year time period (1981-93) that was over twenty years ago. Since that time, many more exhaustive studies have been performed using significantly larger data bases and, from these studies, much has been learned about Wall Street analysts and their stock recommendations and earnings forecasts. Nonetheless, there are several errors that invalidate the results of the study.

Q. PLEASE DESCRIBE THE ERRORS IN DR. VANDER WEIDE'S STUDY.

A. The primary error in the study is that his regression model is misspecified. As a result, he cannot conclude whether one growth rate measure is better than the other. The misspecification results from the fact that Dr. Vander Weide did not actually employ a modified version of the DCF model. Instead, he used a "linear approximation." He used the approximation so that he did not have to measure k, investors' required return, directly, but instead he used some proxy variables for risk. The error in this approach is there can be an interaction between growth (g) and investors' required return (k) which could lead him to conclude that one growth rate measure is superior to others. Furthermore, due to this problem, analysts' EPS

forecasts could be upwardly biased and still appear to provide better measures of expected growth.

There are other errors in the study as well that further invalidate the results. Dr. Vander Weide does not use both historic and analysts' projections growth rate measures in the same regression to assess if both historic and forecasts should be used together to measure expected growth. In addition, he did not perform any tests to determine if the difference between historic and projected growth measures is statistically significant. Without such tests, he cannot make any conclusions about the superiority of one measure versus the other.

Q. PLEASE SUMMARIZE YOUR ASSESSMENT OF THE DCF GROWTH RATES OF DR. VANDER WEIDE.

A. The DCF growth rate estimates are upwardly biased because Dr. Vander Weide has relied solely on forecasts of EPS growth by Wall Street analysts to measure a DCF growth rate. Dr. Vander Weide has ignored all other indicators of growth to measure investors' expectations. As demonstrated and discussed above, it is well known that analysts' EPS growth rate forecasts are upwardly biased measures of actual growth. Hence, it is highly unlikely that investors would simply look to these biased forecasts as the only measures of expected growth.

Q. DO YOU HAVE ANY OTHER OBSERVATIONS REGARDING DR. VANDER WEIDE'S ANALYSIS?

A. Yes, one other observation is worth noting. In the DCF model, investors are presumed to be forecasting and discounting future dividends per share. *Value Line's* average projected dividend growth rate for Dr. Vander Weide's water utility group is only 5.75%. He gave no weight to this growth rate indicator, which is especially significant *since the relevant growth variable in the DCF model is dividends.*

Flotation Cost Adjustment

Q. PLEASE CRITIQUE DR. VANDER WEIDE'S ADJUSTMENT FOR FLOTATION COSTS.

A. Dr. Vander Weide has made a 5% flotation cost adjustment to the DCF results for the water and gas groups. There is no need for such an adjustment. Usually it is argued that a flotation cost adjustment is necessary to prevent the dilution of the existing shareholders. Such an adjustment is commonly justified by reference to bonds and the manner in which issuance costs are recovered by including the amortization of bond flotation costs in annual financing costs. However, this is incorrect for several reasons:

(1) If an equity flotation cost adjustment is similar to a debt flotation cost adjustment, the fact that the market-to-book ratios for water utility companies are over 2.0 actually suggests that there should be a flotation cost reduction (and not increase) to the equity cost rate. This is because when (a) a bond is issued at a price in excess of face or book value, and (b) the difference between market price and the book value is greater than the flotation or

issuance costs, the cost of that debt is lower than the coupon rate of the debt. The amount by which market values of water utility companies are in excess of book values is much greater than flotation costs. Hence, if common stock flotation costs were exactly like bond flotation costs, and one was making an explicit flotation cost adjustment to the cost of common equity, the adjustment would be downward;

(2) It is commonly argued that a flotation cost adjustment is needed to prevent dilution of existing stockholders' investment. However, the reduction of the book value of stockholder investment associated with flotation costs can occur only when a company's stock is selling at a market price at/or below its book value. As noted above, gas distribution companies are selling at market prices well in excess of book value. Hence, when new shares are sold, existing shareholders realize an increase in the book value per share of their investment, not a decrease;

(3) Flotation costs consist primarily of the underwriting spread or fee and not out-of-pocket expenses. On a per share basis, the underwriting spread is the difference between the price the investment banker receives from investors and the price the investment banker pays to the company. Hence, these are not expenses that must be recovered through the regulatory process. Furthermore, the underwriting spread is known to the investors who are buying the new issue of stock, who are well aware of the difference between

the price they are paying to buy the stock and the price that the Company is receiving. The offering price which they pay is what matters when investors decide to buy a stock based on its expected return and risk prospects. Therefore, the company is not entitled to an adjustment to the allowed return to account for those costs; and

(4) Flotation costs, in the form of the underwriting spread, are a form of a transaction cost in the market. They represent the difference between the price paid by investors and the amount received by the issuing company. However, neither Dr. Vander Weide nor myself have accounted for other market transaction costs in determining a cost of equity for the Company. Most notably, brokerage fees that investors pay when they buy shares in the open market are another market transaction cost. Brokerage fees increase the effective stock price paid by investors to buy shares. If Dr. Vander Weide and I had included these brokerage fees or transaction costs in our DCF analyses, the higher effective stock prices paid for stocks would lead to lower dividend yields and equity cost rates. To be fair then, if Dr. Vander Weide is to make an upward adjustment for transaction costs in the form of using the high-end DCF results, he also should have made a downward adjustment for transaction costs in the form of brokerage fees.

Market Value Weighting of DCF Results

Q. PLEASE DISCUSS DR. VANDER WEIDE'S MARKET VALUE WEIGHTING OF HIS DCF RESULTS.

A. Dr. Vander Weide has weighted his DCF results using the market values of the companies in his water and gas distribution groups. For the water group, this results in giving much higher weight to the results of one company – Aqua America – since it is over five times the size of the average of the other companies in the group. And it also gives the lowest weights to the companies that are closest in size to KAWC – Middlesex and York Water. For the gas group, Dr. Vander Weide's weighting scheme gives the greatest weight to the three companies with have the three highest equity cost rates and also have significant business interests outside of regulated gas distribution business.

Company	Market Value	Market Value Rank	Equity Cost Rate	% Regulated Gas Revenue
Questar Corp.	7405.9	1	13.2%	36%
Equitable Resources	5237.0	2	12.3%	66%
ONEOK Inc.	4763.7	3	11.2%	17%

In fact, *Value Line* classifies each of these three companies as integrated gas companies and not as gas distribution companies. Had he used a straight arithmetic average of the equity cost rate results, his gas group would have had an equity cost rate of 9.4%.

B. Risk Premium Studies

Q. PLEASE SUMMARIZE THE RISK PREMIUM STUDIES OF BY DR. VANDER WEIDE.

A. The tables below provide the RP results of Dr. Vander Weide.

Ex Ante RP Results

	Gas Distribution Group
'A' Rated PU Yield	6.42%
Risk Premium	4.71%
Equity Cost Rate	11.1 %

Ex Post Historical RP Results

	S&P Utilities	S&P 500
'A' Rated PU Yield	6.42%	6.42%
Risk Premium	4.45%	5.10%
Equity Cost Rate	10.9 %	11.5%

Midpoint of Range **11.2%**

Q. PLEASE REVIEW DR. VANDER WEIDE'S RISK PREMIUM ANALYSES.

A. Dr. Vander Weide's ex ante and ex post RP analyses provide equity cost rate estimates of 11.1% and 11.2%. There are three errors in the analysis which invalidates these estimates as equity cost rates for KAWC. The errors include: (1) The base yields – the yield on 'A' rated public utility bonds, are overstated; (2) The equity risk premiums are subject to several biases which result in excessive risk premium estimates; and (3) Dr. Vander Weide has provided no empirical evidence that these risk premium results pertain to KAWC.

Base Yield

Q. PLEASE DISCUSS THE BASE YIELD OF THE RISK PREMIUM ANALYSIS.

A. The base yield in the RP analyses of Dr. Vander Weide are excessive because they are well above current market yields. The current yield long-term, 'A' rated public utility bonds is the 6.0% range. The base yield is also erroneous and inflates the required return on equity in two ways. First, long-term bonds are subject to interest rate risk, a risk which does not affect common stockholders since dividend payments (unlike bond interest payments) are not fixed but tend to increase over time. Second, the base yield is subject to credit risk since it is not default risk-free like an obligation of the U.S. Treasury. As a result, its yield-to-maturity includes a premium for default risk and therefore is above its expected return. Hence using such a bond's yield-to-maturity as a base yield results in an overstatement of investors' return expectations.

Risk Premium Estimates

Q. DR. VANDER WEIDE EMPLOYS A DCF-BASED EX ANTE RISK PREMIUM APPROACH. PLEASE DISCUSS THE ERRORS IN THIS APPROACH.

A. Dr. Vander Weide computes a DCF-based equity risk premium. On a monthly basis for the period 1998-2007, he estimates an expected return for a group of gas distribution companies using the DCF model and subtracts the current 'A' rated

utility bond yield. The expected return is computed for utilities using the quarterly DCF model with analysts' EPS growth rate forecasts for the growth rate.

The errors in Dr. Vander Weide's DCF-based or ex ante risk premium approaches are the same as the errors in his DCF approach since he has used the same DCF methodology to compute the expected return for the gas distributions companies. These errors include (1) the inappropriate adjustment to the dividend yields to reflect the quarterly payment of dividends; (2) sole reliance on the upwardly-biased forecasted EPS growth rate forecasts of Wall Street analysts in determining a growth rate measure for his DCF model; and (3) the adjustment of the DCF results for flotation costs. All of these factors serve to inflate the expected return which results in an overstated equity risk premium.

Q. WHAT ARE THE PROBLEMS WITH THE HISTORIC RISK PREMIUM STUDIES PERFORMED BY DR. VANDER WEIDE?

A. Dr. Vander Weide computes a historical risk premium as the difference in the arithmetic mean stock and bond returns. The stock returns are computed over the 1937-2006 time period for the S&P Utility Stock Index and the S&P 500. The bond returns are for Moody's long-term, 'A' rated, public utility bonds.

There are numerous errors in using historical stock and bond returns to compute risk premiums. The bottom line is that these errors provide for inflated estimates of expected stock return and therefore risk premiums. Among the errors are the well-known survivorship bias (only successful companies survive – poor companies do not survive) and unattainable return bias (the methodology presumes

monthly portfolio rebalancing). These errors in the historical evaluation of stock and bond returns to measure an ex ante equity risk premium are discussed in depth below. In short, using the historic relationship between stock and bond returns is subject to a myriad of empirical biases which results in an overstatement of the ex ante or expected equity risk premium.

RP Results Applicability to KAWC

Q. HAS DR. VANDER WEIDE PROVIDED ANY EMPIRICAL EVIDENCE AS TO WHY THESE RISK PREMIUM RESULTS PERTAIN TO KAWC?

A. No. In both these case of the ex ante and the ex post risk premium studies, Dr. Vander Weide has not provided any evidence indicating why the returns can be applied to water companies and/or to KAWC. He has performed no studies comparing the risks of gas distribution companies, the S&P Utilities, and/or the S&P 500 to water utilities and/or KAWC over the 1937-2006 time period. As such, these risk premium results are not applicable in estimating a required equity cost rate for KAWC.

Q. AT PAGE 34 OF HIS TESTIMONY, DR. VANDER WEIDE CLAIMS THAT THE RISK OF KAWC IS BETWEEN THAT OF THE S&P UTILITIES AND THE S&P 500. IS THAT CLAIM SUPPORTED WITH ANY EMPIRICAL STUDIES?

A. No.

C. CAPM

Q. PLEASE PROVIDE A SUMMARY OF THE CAPM STUDIES PRESENTED BY THE COMPANY WITNESS.

A. The tables below provide the CAPM results of Dr. Vander Weide.

CAPM Results – Historical Equity Risk Premium

	Water Utility Group	Gas Distribution Group
Risk-Free Rate	5.20%	5.20%
Average Beta	.86	.87
Market Risk Premium	7.1%	7.1%
Equity Cost Rate	11.31 %	11.38%
Flotation Cost	0.25	0.25
Adj. Equity Cost Rate*	11.6%	11.6%

CAPM Results – DCF Equity Risk Premium

	Water Utility Group	Gas Distribution Group
Risk-Free Rate	5.20%	5.20%
Average Beta	.86	.87
Market Risk Premium	8.58%	8.58%
Adj. Equity Cost Rate*	12.58 %	12.66%

* Includes a flotation cost adjustment.

Q. WHAT ARE THE ERRORS IN THE CAPM ANALYSES OF DR. VANDER WEIDE?

A. The primary error in both of Dr. Vander Weide's CAPM analyses is the magnitude of the equity risk premiums. Dr. Dr. Vander Weide has also made a flotation cost adjustment in both of his CAPM equity cost rate approaches. The error of this adjustment was previously discussed.

Q. **PLEASE ASSESS THE EQUITY RISK PREMIUMS USED BY DR. VANDER WEIDE.**

A. Dr. Vander Weide computes a CAPM using a historic equity risk premium and a CAPM using a DCF-based equity risk premium. The historic equity risk premium is measured as the difference between arithmetic mean stock returns and bond income returns as complied by Ibbotson Associates. The ex ante or expected risk premiums are determined by using a DCF model to estimate expected market returns with analysts' projected EPS growth rate forecasts for the S&P 500 as the growth rate measure. Dr. Vander Weide uses a historic equity risk premium of 7.10% and a projected equity risk premium of 8.58%.

Q. **PLEASE ADDRESS THE ISSUE INVOLVING THE USE OF HISTORIC STOCK AND BOND RETURNS TO COMPUTE A FORWARD-LOOKING OR EX ANTE RISK PREMIUM.**

A. This historic evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor Roger Ibbotson who popularized this method of assessing historic financial market returns. Using the historic relationship between stock and bond returns to measure an ex ante equity risk premium is erroneous and, especially in this case, overstates the true market equity risk premium. The equity risk premium is based on expectations of the future and when past market conditions vary significantly from the present, historic data does not provide a realistic or accurate barometer of expectations of the future. At the present time, using historic returns to measure the ex ante equity risk premium ignores current market conditions and masks

the dramatic change in the risk and return relationship between stocks and bonds. This change suggests that the equity risk premium has declined.

Q. PLEASE DISCUSS THE ERRORS IN USING HISTORIC STOCK AND BOND RETURNS TO ESTIMATE AN EQUITY RISK PREMIUM.

A. There are a number of flaws in using historic returns over long time periods to estimate expected equity risk premiums. These issues include:

a. Biased historic bond returns;

b. The arithmetic versus the geometric mean return;

c. Unattainable and biased historic stock returns;

d. Survivorship bias;

e. The "Peso Problem;"

f. Market conditions today are significantly different than the past; and

g. Changes in risk and return in the markets.

These issues will be addressed in order.

<u>Biased Historic Bond Returns</u>

Q. HOW ARE HISTORIC BOND RETURNS BIASED?

A. An essential assumption of these studies is that over long periods of time investors' expectations are realized. However, the experienced returns of bondholders in the past violate this critical assumption. Historic bond returns are biased downward as a

measure of expectancy because of capital losses suffered by bondholders in the past. As such, risk premiums derived from this data are biased upwards.

The Arithmetic versus the Geometric Mean Return

Q. PLEASE DISCUSS THE ISSUE RELATING TO THE USE OF THE ARITHMETIC VERSUS THE GEOMETRIC MEAN RETURNS IN THE IBBOTSON METHODOLOGY.

A. The measure of investment return has a significant effect on the interpretation of the risk premium results. When analyzing a single security price series over time (i.e., a time series), the best measure of investment performance is the geometric mean return. Using the arithmetic mean overstates the return experienced by investors. In a study entitled "Risk and Return on Equity: The Use and Misuse of Historical Estimates," Carleton and Lakonishok make the following observation: "The geometric mean measures the changes in wealth over more than one period on a buy and hold (with dividends invested) strategy."[27] Since the Ibbotson study covers more than one period (and he assumes that dividends are reinvested), they should be employing the geometric mean and not the arithmetic mean.

Q. PLEASE PROVIDE AN EXAMPLE DEMONSTRATING THE PROBLEM WITH USING THE ARITHMETIC MEAN RETURN.

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[27] Willard T. Carleton and Josef Lakonishok, "Risk and Return on Equity: The Use and Misuse of Historical Estimates," *Financial Analysts Journal* (January-February, 1985), pp. 38-47.

A. To demonstrate the upward bias of the arithmetic mean, consider the following example. Assume that you have a stock (that pays no dividend) that is selling for $100 today, increases to $200 in one year, and then falls back to $100 in two years. The table below shows the prices and returns.

Time Period	Stock Price	Annual Return
0	$100	
1	$200	100%
2	$100	-50%

The arithmetic mean return is simply (100% + (-50%))/2 = 25% per year. The geometric mean return is $((2 * .50)^{(1/2)}) - 1 = 0\%$ per year. Therefore, the arithmetic mean return suggests that your stock has appreciated at an annual rate of 25%, while the geometric mean return indicates an annual return of 0%. Since after two years, your stock is still only worth $100, the geometric mean return is the appropriate return measure. For this reason, when stock returns and earnings growth rates are reported in the financial press, they are generally reported using the geometric mean. This is because of the upward bias of the arithmetic mean. As further evidence of the appropriate mean return measure, the U.S. Securities and Exchange Commission requires equity mutual funds to report historic return performance using geometric mean and not arithmetic mean returns.[28] Therefore, Dr. Vander Weide's arithmetic mean return measure is inappropriate and should be disregarded.

[28] U.S. Securities and Exchange Commission, Form N-1A.

Unattainable and Biased Historic Stock Returns

Q. YOU NOTE THAT HISTORIC STOCK RETURNS ARE BIASED USING THE IBBOTSON METHODOLOGY. PLEASE ELABORATE.

A. Returns developed using Ibbotson's methodology are computed on stock indexes and therefore: (1) cannot be reflective of expectations because these returns are unattainable to investors, and (2) produce biased results. This methodology assumes (a) monthly portfolio rebalancing and (b) reinvestment of interest and dividends. Monthly portfolio rebalancing presumes that investors rebalance their portfolios at the end of each month in order to have an equal dollar amount invested in each security at the beginning of each month. The assumption would obviously generate extremely high transaction costs and thereby render these returns unattainable to investors. In addition, an academic study demonstrates that the monthly portfolio rebalancing assumption produces biased estimates of stock returns.[29]

Transaction costs themselves provide another bias in historic versus expected returns. The observed stock returns of the past were not the realized returns of investors due to the much higher transaction costs of previous decades. These higher transaction costs are reflected through the higher commissions on stock trades, and the lack of low cost mutual funds like index funds.

[29] See Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics* (1983), pp. 371-86.

Survivorship Bias

Q. HOW DOES SURVIVORSHIP BIAS AFFECT DR. VANDER WEIDE'S HISTORIC EQUITY RISK PREMIUM?

A. Using historic data to estimate an equity risk premium suffers from survivorship bias. Survivorship bias results when using returns from indexes like the S&P 500. The S&P 500 includes only companies that have survived. The fact that returns of firms that did not perform so well were dropped from these indexes is not reflected. Therefore these stock returns are upwardly biased because they only reflect the returns from more successful companies.

The "Peso Problem"

Q. WHAT IS THE "PESO PROBLEM" AND HOW DOES IT AFFECT HISTORIC RETURNS AND EQUITY RISK PREMIUMS?

A. Dr. Vander Weide's use of historic return data also suffers from the so-called "peso problem." The "peso problem" issue was first highlighted by the Nobel laureate, Milton Friedman, and gets its name from conditions related to the Mexican peso market in the early 1970s. This issue involves the fact that past stock market returns were higher than were expected at the time because despite war, depression, and other social, political, and economic events, the US economy survived and did not suffer hyperinflation, invasion, and the calamities of other countries. As such, highly improbable events, which may or may not occur in the future, are factored into stock

prices, leading to seemingly low valuations. Higher than expected stock returns are then earned when these events do not subsequently occur. Therefore, the "peso problem" indicates that historic stock returns are overstated as measures of expected returns.

Market Conditions Today are Significantly Different than in the Past

Q. FROM AN EQUITY RISK PREMIUM PERSPECTIVE, PLEASE DISCUSS HOW MARKET CONDITIONS ARE DIFFERENT TODAY.

A. The equity risk premium is based on expectations of the future. When past market conditions vary significantly from the present, historic data does not provide a realistic or accurate barometer of expectations of the future. As noted previously, stock valuations (as measured by P/E) are relatively high and interest rates are relatively low, on a historic basis. Therefore, given the high stock prices and low interest rates, expected returns are likely to be lower on a going forward basis.

Changes in Risk and Return in the Markets

Q. PLEASE DISCUSS THE NOTION THAT HISTORIC EQUITY RISK PREMIUM STUDIES DO NOT REFLECT THE CHANGE IN RISK AND RETURN IN TODAY'S FINANCIAL MARKETS.

A. The historic equity risk premium methodology is unrealistic in that it makes the explicit assumption that risk premiums do not change over time based on market

conditions such as inflation, interest rates, and expected economic growth. Furthermore, using historic returns to measure the equity risk premium masks the dramatic change in the risk and return relationship between stocks and bonds. The nature of the change, as I will discuss below, is that bonds have increased in risk relative to stocks. This change suggests that the equity risk premium has declined in recent years.

Page 1 of Exhibit_(JRW-8) provides the yields on long-term U.S. Treasury bonds from 1926 to 2006. One very obvious observation from this graph is that interest rates increase dramatically from the mid-1960s until the early 1980s, and since have returned to their 1960 levels. The annual market risk premiums for the 1926 to 2006 period are provided on page 2 of Exhibit_(JRW-8). The annual market risk premium is defined as the return on common stock minus the return on long-term Treasury Bonds. There is considerable variability in this series and a clear decline in recent decades. The high was 54% in 1933 and the low was -38% in 1931. Evidence of a change in the relative riskiness of bonds and stocks is provided on page 3 of Exhibit_(JRW-8) which plots the standard deviation of monthly stock and bond returns since 1930. The plot shows that, whereas stock returns were much more volatile than bond returns from the 1930s to the 1970s, bond returns became more variable than stock returns during the 1980s. In recent years stocks and bonds have become much more similar in terms of volatility, but stocks are still a little more volatile. The decrease in the volatility of stocks relative to bonds over time has been attributed to several stock related factors: the impact of technology on productivity and the new economy; the role of information (see former Federal Reserve Chairman

Greenspan's comments referred to earlier in this testimony) on the economy and markets; better cost and risk management by businesses; several bond related factors (which are discussed above); deregulation of the financial system; inflation fears and interest rates; and the increase in the use of debt financing. Further evidence of the greater relative riskiness of bonds is shown on page 4 of Exhibit_(JRW-8), which plots real interest rates (the nominal interest rate minus inflation) from 1926 to 2006. Real rates have been well above historic norms during the past 10-15 years. These high real interest rates reflect the fact that investors view bonds today as riskier investments than in previous decades.

The net effect of the change in risk and return has been a significant decrease in the return premium that stock investors require over bond yields. In short, the equity or market risk premium has declined in recent years. This decline has been discovered in studies by leading academic scholars and investment firms, and has been acknowledged by government regulators. As such, using a historic equity risk premium analysis is simply outdated and not reflective of current investor expectations and investment fundamentals.

Q. DO YOU HAVE ANY OTHER THOUGHTS ON THE USE OF HISTORICAL RETURN DATA TO ESTIMATE AN EQUITY RISK PREMIUM?

A. Yes. Jay Ritter, a Professor of Finance at the University of Florida, identified the use of historical stock and bond return data to estimate a forward-looking equity risk

premium as one of the "Biggest Mistakes" taught by the finance profession.[30] His argument is based on the theory behind the equity risk premium, the excessive results produced by historical returns, and the previously-discussed errors of such as survivorship bias in historical data.

Q. PLEASE EVALUATE THE DCF-BASED EQUITY RISK PREMIUM USED BY DR. VANDER WEIDE.

A. In his DCF-based CAPM, Dr. Vander Weide has employed an equity risk premium of 8.58% which he estimated by applying a DCF model to the S&P 500 and subtracting the risk-free rate of interest. Dr. Vander Weide estimates an expected market return of 13.8% using an S&P 500 growth rate of 11.17%.

Q. PLEASE EVALUATE THE EXPECTED MARKET RETURNS.

A. An expected market return of 13.8% is out of line with historic norms and is inconsistent with current market conditions. The primary reason is that the expected growth rate of 11.17% is clearly excessive and inconsistent with economic and earnings growth in the U.S. The average historic compounded return on large company stocks in the U.S. has been 10.4% according to the 2007 *SBBI Yearbook*. To suggest that investors are going to expect a return that is over 300 basis points above this is not logical. This is especially so given current market conditions. As discussed above, at the present time stock prices (relative to earnings) are high and interest rates are low. Major stock market upswings which produce above average returns tend to occur when stock prices are low and

[30] Jay Ritter, "The Biggest Mistakes We Teach," Journal of Financial Research (Summer 2002).

interest rates are high. Thus, historic norms and current market conditions do not suggest above average stock returns. Consistent with this observation, the financial forecasters in the February 13, 2007 Federal Reserve Bank of Philadelphia survey expect a market return of 7.50% over the next ten years. In addition, the CFOs surveyed by Duke University and *CFO Magazine* have an expected market return of 8.12%.

Q. WHAT ARE THE ERRORS IN DR. VANDER WEIDE'S S&P 500 DCF MODEL THAT LED TO THE EXCESSIVE PROJECTED MARKET RETURN OF 13.8%?

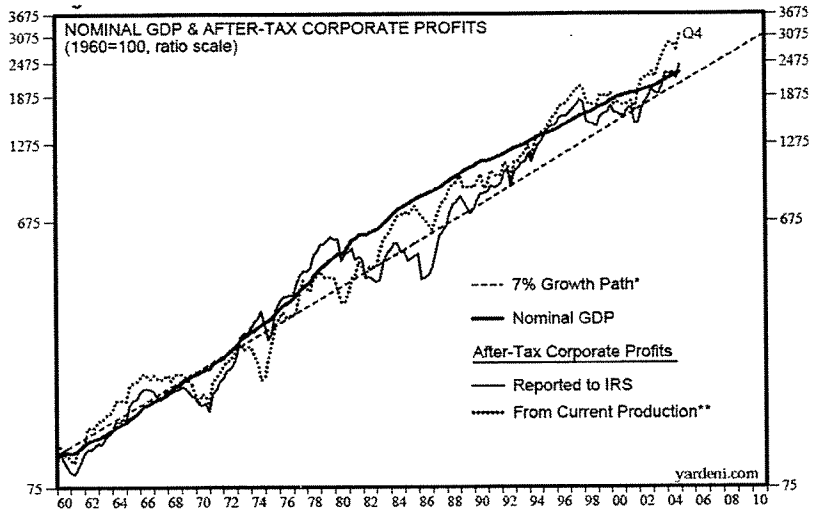
A. Dr. Vander Weide has made the same errors in his S&P 500 DCF model that he made in applying the DCF model to the water and gas company groups. Namely, he has (1) made an inappropriate adjustment to his dividend yields to reflect the quarterly payment of dividends, (2) relied on the upwardly-biased forecasted EPS growth rate forecasts of Wall Street analysts in determining a growth rate measure for his DCF models, and (3) adjusted his DCF results for flotation costs. Of these errors, the most significant is the DCF growth rate.

Q. PLEASE DISCUSS DR. VANDER WEIDE'S S&P 500 DCF GROWTH RATE.

A. Dr. Vander Weide's S&P 500 growth rate of 11.17% which represents the average projected EPS growth rate of Wall Street analysts for companies in the S&P 500. Previously in my testimony, in my critique of his DCF results, I presented evidence on the upwards bias in the projections. Furthermore, these growth rates are inconsistent

with economic and earnings growth in the U.S. The long-term economic and earnings growth rate in the U.S. has only been about 7%. Edward Yardeni, a well-known Wall Street economist, calls this the "7% Solution" to growth in the U.S. The graph below comes from his analysis of GNP and profit growth since 1960.

The 7% Solution
Nominal GNP and Profit Growth since 1960



* Compounded monthly to yield 7% annually.
** Includes Inventory Valuation Adjustment and Capital Consumption Adjustment.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Source: Edward Yardeni, Strategists Handbook, Oak Associates, April 2005

As further evidence of the long-term growth rate in the U.S., I have performed a study of the growth in nominal GNP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page 1 of Exhibit_(JRW-9) and a summary is given in the table below.

GNP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GNP	7.26%
S&P 500 Stock Price Appreciation	7.19%
S&P 500 EPS	7.38%
S&P 500 DPS	5.67%
Average	6.88%

These results offer compelling evidence that a long-run growth rate of about 7% is appropriate for companies in the U.S. Dr. Vander Weide's long-run projected EPS growth rate is clearly not realistic. His 11.17% EPS growth rate suggests that companies in the U.S. would be expected to (1) significantly increase their growth rate of EPS in the future, and (2) maintain that growth indefinitely in an economy that is expected to growth at a little more than one half of his projected growth rates. Such a scenario lacks rational economic reasoning.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.