BEFORE THE

RHODE ISLAND PUBLIC UTILITY COMMISSION

EXHIBIT
TO ACCOMPANY THE

PREPARED REBUTTAL TESTIMONY

OF

PAULINE M. AHERN, CRRA
PRINCIPAL
AUS CONSULTANTS

CONCERNING

FAIR RATE OF RETURN

RE: UNITED WATER RHODE ISLAND, INC.

March 2014

United Water Rhode Island, Inc.
Example of the Inadequacy of
DCF Return Rate Related to Book Value
When Market Value Exceeds Book Value

Line No.		Based on Mr. Kahal's Water Proxy Group (a) Market Value		(b) Book Value	
1.	Per Share	$ 28.900	(1)	$ 15.110	(2)
2.	DCF Cost Rate	9.25%	(3)	9.25%	(3)
3.	Return in Dollars	$ 2.673		$ 1.398	
4.	Dividends	$ 0.867	(4)	$ 0.867	(4)
5.	Growth in Dollars	$ 1.806		$ 0.531	
6.	Return on Market Value (5)	9.25%		4.84%	
7.	Rate of Growth on Market Value (6)	6.25%		1.84%	

Notes:
(1) Month-end prices from Standard & Poor's Stock Guide, July-December 2013.
(2) Derived from page 34 of Schedule PMA-8 Rebuttal.
(3) From Schedule MIK-4, page 1 of 5.
(4) Dividends per share based upon a 3.00% adjusted dividend yield. $0.867 = $28.900 * 3.00%.
(5) Line 3 / market value per share (line 1 column (a)).
(6) Line 6 - dividend yield (9.25% - 3.00% = 6.25%).

United Water Rhode Island, Inc.
Corrected Common Equity Cost Rate Through Use
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)

	1	2	3	4	5	6
Mr. Kahal's Water Utility Group	Value Line Adjusted Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate (3)	ECAPM Cost Rate (4)	Indicated Common Equity Cost Rate (5)
American States Water Co.	0.65	7.09 %	4.44 %	9.05 %	9.67 %	
American Water Works Co., Inc.	0.65	7.09	4.44	9.05	9.67	
Aqua America, Inc.	0.60	7.09	4.44	8.69	9.40	
California Water Service Group	0.60	7.09	4.44	8.69	9.40	
Connecticut Water Service, Inc.	0.75	7.09	4.44	9.76	10.20	
Middlesex Water Company	0.75	7.09	4.44	9.76	10.20	
SJW Corporation	0.85	7.09	4.44	10.47	10.73	
York Water Company	0.70	7.09	4.44	9.40	9.93	
Average	0.69			9.36 %	9.90 %	9.63 %

See page 23 of Exhibit PMA-8 for notes.

NEW

REGULATORY

FINANCE

Roger A. Morin, PhD

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The model is analogous to the standard CAPM, but with the return on a minimum risk portfolio that is unrelated to market returns, R_Z, replacing the risk-free rate, R_F. The model has been empirically tested by Black, Jensen, and Scholes (1972), who find a flatter than predicted SML, consistent with the model and other researchers' findings. An updated version of the Black-Jensen-Scholes study is available in Brealey, Myers, and Allen (2006) and reaches similar conclusions.

The zero-beta CAPM cannot be literally employed to estimate the cost of capital, since the zero-beta portfolio is a statistical construct difficult to replicate. Attempts to estimate the model are formally equivalent to estimating the constants, a and b, in Equation 6-2. A practical alternative is to employ the Empirical CAPM, to which we now turn.

6.3 Empirical CAPM

As discussed in the previous section, several finance scholars have developed refined and expanded versions of the standard CAPM by relaxing the constraints imposed on the CAPM, such as dividend yield, size, and skewness effects. These enhanced CAPMs typically produce a risk-return relationship that is flatter than the CAPM prediction in keeping with the actual observed risk-return relationship. The ECAPM makes use of these empirical findings. The ECAPM estimates the cost of capital with the equation:

$$K = R_F + \acute{\alpha} + \beta \times (MRP - \acute{\alpha}) \qquad (6\text{-}5)$$

where $\acute{\alpha}$ is the "alpha" of the risk-return line, a constant, and the other symbols are defined as before. All the potential vagaries of the CAPM are telescoped into the constant $\acute{\alpha}$, which must be estimated econometrically from market data. Table 6-2 summarizes[10] the empirical evidence on the magnitude of alpha.[11]

[10] The technique is formally applied by Litzenberger, Ramaswamy, and Sosin (1980) to public utilities in order to rectify the CAPM's basic shortcomings. Not only do they summarize the criticisms of the CAPM insofar as they affect public utilities, but they also describe the econometric intricacies involved and the methods of circumventing the statistical problems. Essentially, the average monthly returns over a lengthy time period on a large cross-section of securities grouped into portfolios are related to their corresponding betas by statistical regression techniques; that is, Equation 6-5 is estimated from market data. The utility's beta value is substituted into the equation to produce the cost of equity figure. Their own results demonstrate how the standard CAPM underestimates the cost of equity capital of public utilities because of utilities' high dividend yield and return skewness.

[11] Adapted from Vilbert (2004).

TABLE 6-2
EMPIRICAL EVIDENCE ON THE ALPHA FACTOR

Author	Range of alpha
Fischer (1993)	−3.6% to 3.6%
Fischer, Jensen and Scholes (1972)	−9.61% to 12.24%
Fama and McBeth (1972)	4.08% to 9.36%
Fama and French (1992)	10.08% to 13.56%
Litzenberger and Ramaswamy (1979)	5.32% to 8.17%
Litzenberger, Ramaswamy and Sosin (1980)	1.63% to 5.04%
Pettengill, Sundaram and Mathur (1995)	4.6%
Morin (1989)	2.0%

For an alpha in the range of 1%–2% and for reasonable values of the market risk premium and the risk-free rate, Equation 6-5 reduces to the following more pragmatic form:

$$K = R_F + 0.25\ (R_M - R_F) + 0.75\ \beta(R_M - R_F) \qquad (6\text{-}6)$$

Over reasonable values of the risk-free rate and the market risk premium, Equation 6-6 produces results that are indistinguishable from the ECAPM of Equation 6-5.[12]

An alpha range of 1%–2% is somewhat lower than that estimated empirically. The use of a lower value for alpha leads to a lower estimate of the cost of capital for low-beta stocks such as regulated utilities. This is because the use of a long-term risk-free rate rather than a short-term risk-free rate already incorporates some of the desired effect of using the ECAPM. That is, the

[12] Typical of the empirical evidence on the validity of the CAPM is a study by Morin (1989) who found that the relationship between the expected return on a security and beta over the period 1926–1984 was given by:

$$\text{Return} = 0.0829 + 0.0520\ \beta$$

Given that the risk-free rate over the estimation period was approximately 6% and that the market risk premium was 8% during the period of study, the intercept of the observed relationship between return and beta exceeds the risk-free rate by about 2%, or 1/4 of 8%, and that the slope of the relationship is close to 3/4 of 8%. Therefore, the empirical evidence suggests that the expected return on a security is related to its risk by the following approximation:

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

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

$$K = R_F + 0.25(R_M - R_F) + 0.75\beta(R_M - R_F)$$

long-term risk-free rate version of the CAPM has a higher intercept and a flatter slope than the short-term risk-free version which has been tested. Thus, it is reasonable to apply a conservative alpha adjustment. Moreover, the lowering of the tax burden on capital gains and dividend income enacted in 2002 may have decreased the required return for taxable investors, steepening the slope of the ECAPM risk-return trade-off and bring it closer to the CAPM predicted returns.[13]

To illustrate the application of the ECAPM, assume a risk-free rate of 5%, a market risk premium of 7%, and a beta of 0.80. The Empirical CAPM equation (6-6) above yields a cost of equity estimate of 11.0% as follows:

$$K = 5\% + 0.25\ (12\% - 5\%) + 0.75 \times 0.80\ (12\% - 5\%)$$

$$= 5.0\% + 1.8\% + 4.2\%$$

$$= 11.0\%$$

As an alternative to specifying alpha, see Example 6-1.

Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend, an ECAPM analysis results in double-counting. This argument is erroneous. Fundamentally, the ECAPM is not an adjustment, increase or decrease, in beta. This is obvious from the fact that the expected return on high beta securities is actually lower than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks. Even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to Figure 6-1, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary. Moreover, recall from Chapter 3 that the use of adjusted betas compensates for interest rate sensitivity of utility stocks not captured by unadjusted betas.

[13] The lowering of the tax burden on capital gains and dividend income has no impact as far as non-taxable institutional investors (pension funds, 401K, and mutual funds) are concerned, and such investors engage in very large amounts of trading on security markets. It is quite plausible that taxable retail investors are relatively inactive traders and that large non-taxable investors have a substantial influence on capital markets.

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The Capital Asset Pricing Model: Theory and Evidence

Eugene F. Fama and Kenneth R. French

The capital asset pricing model (CAPM) of William Sharpe (1964) and John Lintner (1965) marks the birth of asset pricing theory (resulting in a Nobel Prize for Sharpe in 1990). Four decades later, the CAPM is still widely used in applications, such as estimating the cost of capital for firms and evaluating the performance of managed portfolios. It is the centerpiece of MBA investment courses. Indeed, it is often the only asset pricing model taught in these courses.[1]

The attraction of the CAPM is that it offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor—poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model. For example, the CAPM says that the risk of a stock should be measured relative to a comprehensive "market portfolio" that in principle can include not just traded financial assets, but also consumer durables, real estate and human capital. Even if we take a narrow view of the model and limit its purview to traded financial assets, is it

[1] Although every asset pricing model is a capital asset pricing model, the finance profession reserves the acronym CAPM for the specific model of Sharpe (1964), Lintner (1965) and Black (1972) discussed here. Thus, throughout the paper we refer to the Sharpe-Lintner-Black model as the CAPM.

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legitimate to limit further the market portfolio to U.S. common stocks (a typical choice), or should the market be expanded to include bonds, and other financial assets, perhaps around the world? In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid.

We begin by outlining the logic of the CAPM, focusing on its predictions about risk and expected return. We then review the history of empirical work and what it says about shortcomings of the CAPM that pose challenges to be explained by alternative models.

The Logic of the CAPM

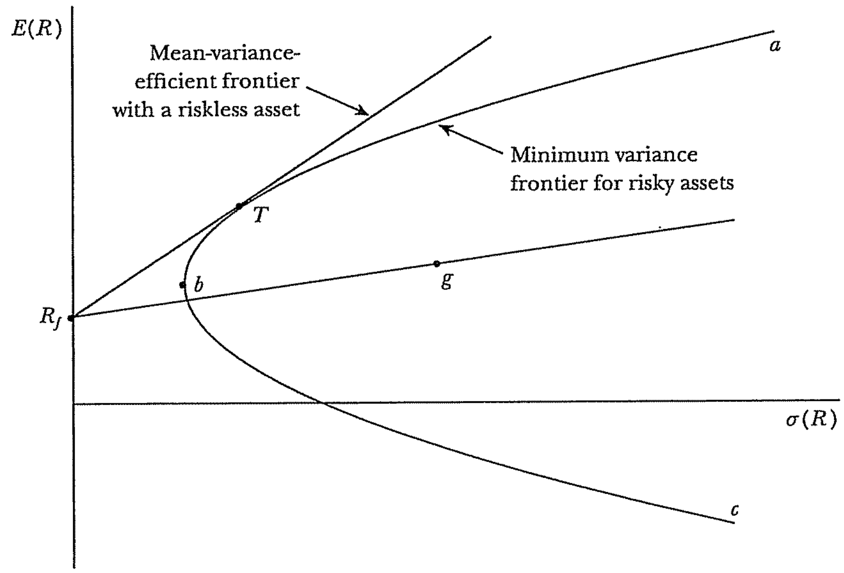
The CAPM builds on the model of portfolio choice developed by Harry Markowitz (1959). In Markowitz's model, an investor selects a portfolio at time $t - 1$ that produces a stochastic return at t. The model assumes investors are risk averse and, when choosing among portfolios, they care only about the mean and variance of their one-period investment return. As a result, investors choose "mean-variance-efficient" portfolios, in the sense that the portfolios 1) minimize the variance of portfolio return, given expected return, and 2) maximize expected return, given variance. Thus, the Markowitz approach is often called a "mean-variance model."

The portfolio model provides an algebraic condition on asset weights in mean-variance-efficient portfolios. The CAPM turns this algebraic statement into a testable prediction about the relation between risk and expected return by identifying a portfolio that must be efficient if asset prices are to clear the market of all assets.

Sharpe (1964) and Lintner (1965) add two key assumptions to the Markowitz model to identify a portfolio that must be mean-variance-efficient. The first assumption is *complete agreement*: given market clearing asset prices at $t - 1$, investors agree on the joint distribution of asset returns from $t - 1$ to t. And this distribution is the true one—that is, it is the distribution from which the returns we use to test the model are drawn. The second assumption is that there is *borrowing and lending at a risk-free rate*, which is the same for all investors and does not depend on the amount borrowed or lent.

Figure 1 describes portfolio opportunities and tells the CAPM story. The horizontal axis shows portfolio risk, measured by the standard deviation of portfolio return; the vertical axis shows expected return. The curve *abc*, which is called the minimum variance frontier, traces combinations of expected return and risk for portfolios of risky assets that minimize return variance at different levels of expected return. (These portfolios do not include risk-free borrowing and lending.) The tradeoff between risk and expected return for minimum variance portfolios is apparent. For example, an investor who wants a high expected return, perhaps at point *a*, must accept high volatility. At point *T*, the investor can have an interme-

Figure 1
Investment Opportunities



diate expected return with lower volatility. If there is no risk-free borrowing or lending, only portfolios above *b* along *abc* are mean-variance-efficient, since these portfolios also maximize expected return, given their return variances.

Adding risk-free borrowing and lending turns the efficient set into a straight line. Consider a portfolio that invests the proportion x of portfolio funds in a risk-free security and $1 - x$ in some portfolio g. If all funds are invested in the risk-free security—that is, they are loaned at the risk-free rate of interest—the result is the point R_f in Figure 1, a portfolio with zero variance and a risk-free rate of return. Combinations of risk-free lending and positive investment in g plot on the straight line between R_f and g. Points to the right of g on the line represent borrowing at the risk-free rate, with the proceeds from the borrowing used to increase investment in portfolio g. In short, portfolios that combine risk-free lending or borrowing with some risky portfolio g plot along a straight line from R_f through g in Figure 1.[2]

[2] Formally, the return, expected return and standard deviation of return on portfolios of the risk-free asset f and a risky portfolio g vary with x, the proportion of portfolio funds invested in f, as

$$R_p = xR_f + (1 - x)R_g,$$

$$E(R_p) = xR_f + (1 - x)E(R_g),$$

$$\sigma(R_p) = (1 - x)\sigma(R_g),\ x \leq 1.0,$$

which together imply that the portfolios plot along the line from R_f through g in Figure 1.

To obtain the mean-variance-efficient portfolios available with risk-free borrowing and lending, one swings a line from R_f in Figure 1 up and to the left as far as possible, to the tangency portfolio T. We can then see that all efficient portfolios are combinations of the risk-free asset (either risk-free borrowing or lending) and a single risky tangency portfolio, T. This key result is Tobin's (1958) "separation theorem."

The punch line of the CAPM is now straightforward. With complete agreement about distributions of returns, all investors see the same opportunity set (Figure 1), and they combine the same risky tangency portfolio T with risk-free lending or borrowing. Since all investors hold the same portfolio T of risky assets, it must be the value-weight market portfolio of risky assets. Specifically, each risky asset's weight in the tangency portfolio, which we now call M (for the "market"), must be the total market value of all outstanding units of the asset divided by the total market value of all risky assets. In addition, the risk-free rate must be set (along with the prices of risky assets) to clear the market for risk-free borrowing and lending.

In short, the CAPM assumptions imply that the market portfolio M must be on the minimum variance frontier if the asset market is to clear. This means that the algebraic relation that holds for any minimum variance portfolio must hold for the market portfolio. Specifically, if there are N risky assets,

$$\text{(Minimum Variance Condition for } M) \quad E(R_i) = E(R_{ZM}) + [E(R_M) - E(R_{ZM})]\beta_{iM}, \; i = 1, \ldots, N.$$

In this equation, $E(R_i)$ is the expected return on asset i, and β_{iM}, the market beta of asset i, is the covariance of its return with the market return divided by the variance of the market return,

$$\text{(Market Beta)} \quad \beta_{iM} = \frac{\text{cov}(R_i, R_M)}{\sigma^2(R_M)}.$$

The first term on the right-hand side of the minimum variance condition, $E(R_{ZM})$, is the expected return on assets that have market betas equal to zero, which means their returns are uncorrelated with the market return. The second term is a risk premium—the market beta of asset i, β_{iM}, times the premium per unit of beta, which is the expected market return, $E(R_M)$, minus $E(R_{ZM})$.

Since the market beta of asset i is also the slope in the regression of its return on the market return, a common (and correct) interpretation of beta is that it measures the sensitivity of the asset's return to variation in the market return. But there is another interpretation of beta more in line with the spirit of the portfolio model that underlies the CAPM. The risk of the market portfolio, as measured by the variance of its return (the denominator of β_{iM}), is a weighted average of the covariance risks of the assets in M (the numerators of β_{iM} for different assets).

Thus, β_{iM} is the covariance risk of asset i in M measured relative to the average covariance risk of assets, which is just the variance of the market return.[3] In economic terms, β_{iM} is proportional to the risk each dollar invested in asset i contributes to the market portfolio.

The last step in the development of the Sharpe-Lintner model is to use the assumption of risk-free borrowing and lending to nail down $E(R_{ZM})$, the expected return on zero-beta assets. A risky asset's return is uncorrelated with the market return—its beta is zero—when the average of the asset's covariances with the returns on other assets just offsets the variance of the asset's return. Such a risky asset is riskless in the market portfolio in the sense that it contributes nothing to the variance of the market return.

When there is risk-free borrowing and lending, the expected return on assets that are uncorrelated with the market return, $E(R_{ZM})$, must equal the risk-free rate, R_f. The relation between expected return and beta then becomes the familiar Sharpe-Lintner CAPM equation,

$$\text{(Sharpe-Lintner CAPM)} \quad E(R_i) = R_f + [E(R_M) - R_f]\beta_{iM}, \; i = 1, \ldots, N.$$

In words, the expected return on any asset i is the risk-free interest rate, R_f, plus a risk premium, which is the asset's market beta, β_{iM}, times the premium per unit of beta risk, $E(R_M) - R_f$.

Unrestricted risk-free borrowing and lending is an unrealistic assumption. Fischer Black (1972) develops a version of the CAPM without risk-free borrowing or lending. He shows that the CAPM's key result—that the market portfolio is mean-variance-efficient—can be obtained by instead allowing unrestricted short sales of risky assets. In brief, back in Figure 1, if there is no risk-free asset, investors select portfolios from along the mean-variance-efficient frontier from a to b. Market clearing prices imply that when one weights the efficient portfolios chosen by investors by their (positive) shares of aggregate invested wealth, the resulting portfolio is the market portfolio. The market portfolio is thus a portfolio of the efficient portfolios chosen by investors. With unrestricted short selling of risky assets, portfolios made up of efficient portfolios are themselves efficient. Thus, the market portfolio is efficient, which means that the minimum variance condition for M given above holds, and it is the expected return-risk relation of the Black CAPM.

The relations between expected return and market beta of the Black and Sharpe-Lintner versions of the CAPM differ only in terms of what each says about $E(R_{ZM})$, the expected return on assets uncorrelated with the market. The Black version says only that $E(R_{ZM})$ must be less than the expected market return, so the

[3] Formally, if x_{iM} is the weight of asset i in the market portfolio, then the variance of the portfolio's return is

$$\sigma^2(R_M) = Cov(R_M, R_M) = Cov\left(\sum_{i=1}^{N} x_{iM}R_i, R_M\right) = \sum_{i=1}^{N} x_{iM}Cov(R_i, R_M).$$

premium for beta is positive. In contrast, in the Sharpe-Lintner version of the model, $E(R_{ZM})$ must be the risk-free interest rate, R_f, and the premium per unit of beta risk is $E(R_M) - R_f$.

The assumption that short selling is unrestricted is as unrealistic as unrestricted risk-free borrowing and lending. If there is no risk-free asset and short sales of risky assets are not allowed, mean-variance investors still choose efficient portfolios—points above *b* on the *abc* curve in Figure 1. But when there is no short selling of risky assets and no risk-free asset, the algebra of portfolio efficiency says that portfolios made up of efficient portfolios are not typically efficient. This means that the market portfolio, which is a portfolio of the efficient portfolios chosen by investors, is not typically efficient. And the CAPM relation between expected return and market beta is lost. This does not rule out predictions about expected return and betas with respect to other efficient portfolios—if theory can specify portfolios that must be efficient if the market is to clear. But so far this has proven impossible.

In short, the familiar CAPM equation relating expected asset returns to their market betas is just an application to the market portfolio of the relation between expected return and portfolio beta that holds in any mean-variance-efficient portfolio. The efficiency of the market portfolio is based on many unrealistic assumptions, including complete agreement and either unrestricted risk-free borrowing and lending or unrestricted short selling of risky assets. But all interesting models involve unrealistic simplifications, which is why they must be tested against data.

Early Empirical Tests

Tests of the CAPM are based on three implications of the relation between expected return and market beta implied by the model. First, expected returns on all assets are linearly related to their betas, and no other variable has marginal explanatory power. Second, the beta premium is positive, meaning that the expected return on the market portfolio exceeds the expected return on assets whose returns are uncorrelated with the market return. Third, in the Sharpe-Lintner version of the model, assets uncorrelated with the market have expected returns equal to the risk-free interest rate, and the beta premium is the expected market return minus the risk-free rate. Most tests of these predictions use either cross-section or time-series regressions. Both approaches date to early tests of the model.

Tests on Risk Premiums

The early cross-section regression tests focus on the Sharpe-Lintner model's predictions about the intercept and slope in the relation between expected return and market beta. The approach is to regress a cross-section of average asset returns on estimates of asset betas. The model predicts that the intercept in these regressions is the risk-free interest rate, R_f, and the coefficient on beta is the expected return on the market in excess of the risk-free rate, $E(R_M) - R_f$.

Two problems in these tests quickly became apparent. First, estimates of beta

for individual assets are imprecise, creating a measurement error problem when they are used to explain average returns. Second, the regression residuals have common sources of variation, such as industry effects in average returns. Positive correlation in the residuals produces downward bias in the usual ordinary least squares estimates of the standard errors of the cross-section regression slopes.

To improve the precision of estimated betas, researchers such as Blume (1970), Friend and Blume (1970) and Black, Jensen and Scholes (1972) work with portfolios, rather than individual securities. Since expected returns and market betas combine in the same way in portfolios, if the CAPM explains security returns it also explains portfolio returns.[4] Estimates of beta for diversified portfolios are more precise than estimates for individual securities. Thus, using portfolios in cross-section regressions of average returns on betas reduces the critical errors in variables problem. Grouping, however, shrinks the range of betas and reduces statistical power. To mitigate this problem, researchers sort securities on beta when forming portfolios; the first portfolio contains securities with the lowest betas, and so on, up to the last portfolio with the highest beta assets. This sorting procedure is now standard in empirical tests.

Fama and MacBeth (1973) propose a method for addressing the inference problem caused by correlation of the residuals in cross-section regressions. Instead of estimating a single cross-section regression of average monthly returns on betas, they estimate month-by-month cross-section regressions of monthly returns on betas. The times-series means of the monthly slopes and intercepts, along with the standard errors of the means, are then used to test whether the average premium for beta is positive and whether the average return on assets uncorrelated with the market is equal to the average risk-free interest rate. In this approach, the standard errors of the average intercept and slope are determined by the month-to-month variation in the regression coefficients, which fully captures the effects of residual correlation on variation in the regression coefficients, but sidesteps the problem of actually estimating the correlations. The residual correlations are, in effect, captured via repeated sampling of the regression coefficients. This approach also becomes standard in the literature.

Jensen (1968) was the first to note that the Sharpe-Lintner version of the

[4] Formally, if x_{ip}, $i = 1, \ldots, N$, are the weights for assets in some portfolio p, the expected return and market beta for the portfolio are related to the expected returns and betas of assets as

$$E(R_p) = \sum_{i=1}^{N} x_{ip} E(R_i), \text{ and } \beta_{pM} = \sum_{i=1}^{N} x_{ip} \beta_{pM}.$$

Thus, the CAPM relation between expected return and beta,

$$E(R_i) = E(R_f) + [E(R_M) - E(R_f)]\beta_{iM},$$

holds when asset i is a portfolio, as well as when i is an individual security.

relation between expected return and market beta also implies a time-series regression test. The Sharpe-Lintner CAPM says that the expected value of an asset's excess return (the asset's return minus the risk-free interest rate, $R_{it} - R_{ft}$) is completely explained by its expected CAPM risk premium (its beta times the expected value of $R_{Mt} - R_{ft}$). This implies that "Jensen's alpha," the intercept term in the time-series regression,

$$\text{(Time-Series Regression)} \quad R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \varepsilon_{it},$$

is zero for each asset.

The early tests firmly reject the Sharpe-Lintner version of the CAPM. There is a positive relation between beta and average return, but it is too "flat." Recall that, in cross-section regressions, the Sharpe-Lintner model predicts that the intercept is the risk-free rate and the coefficient on beta is the expected market return in excess of the risk-free rate, $E(R_M) - R_f$. The regressions consistently find that the intercept is greater than the average risk-free rate (typically proxied as the return on a one-month Treasury bill), and the coefficient on beta is less than the average excess market return (proxied as the average return on a portfolio of U.S. common stocks minus the Treasury bill rate). This is true in the early tests, such as Douglas (1968), Black, Jensen and Scholes (1972), Miller and Scholes (1972), Blume and Friend (1973) and Fama and MacBeth (1973), as well as in more recent cross-section regression tests, like Fama and French (1992).

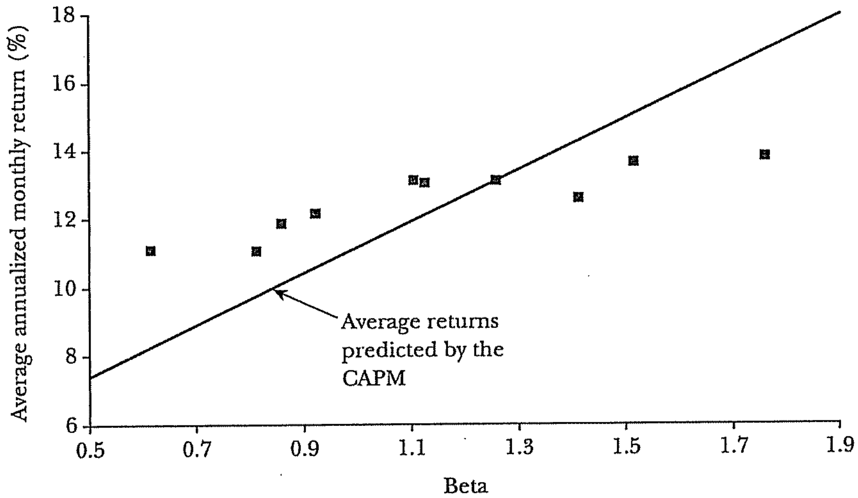
The evidence that the relation between beta and average return is too flat is confirmed in time-series tests, such as Friend and Blume (1970), Black, Jensen and Scholes (1972) and Stambaugh (1982). The intercepts in time-series regressions of excess asset returns on the excess market return are positive for assets with low betas and negative for assets with high betas.

Figure 2 provides an updated example of the evidence. In December of each year, we estimate a preranking beta for every NYSE (1928–2003), AMEX (1963–2003) and NASDAQ (1972–2003) stock in the CRSP (Center for Research in Security Prices of the University of Chicago) database, using two to five years (as available) of prior monthly returns.[5] We then form ten value-weight portfolios based on these preranking betas and compute their returns for the next twelve months. We repeat this process for each year from 1928 to 2003. The result is 912 monthly returns on ten beta-sorted portfolios. Figure 2 plots each portfolio's average return against its postranking beta, estimated by regressing its monthly returns for 1928–2003 on the return on the CRSP value-weight portfolio of U.S. common stocks.

The Sharpe-Lintner CAPM predicts that the portfolios plot along a straight

[5] To be included in the sample for year t, a security must have market equity data (price times shares outstanding) for December of $t - 1$, and CRSP must classify it as ordinary common equity. Thus, we exclude securities such as American Depository Receipts (ADRs) and Real Estate Investment Trusts (REITs).

Figure 2
Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on Prior Beta, 1928–2003



line, with an intercept equal to the risk-free rate, R_f, and a slope equal to the expected excess return on the market, $E(R_M) - R_f$. We use the average one-month Treasury bill rate and the average excess CRSP market return for 1928–2003 to estimate the predicted line in Figure 2. Confirming earlier evidence, the relation between beta and average return for the ten portfolios is much flatter than the Sharpe-Lintner CAPM predicts. The returns on the low beta portfolios are too high, and the returns on the high beta portfolios are too low. For example, the predicted return on the portfolio with the lowest beta is 8.3 percent per year; the actual return is 11.1 percent. The predicted return on the portfolio with the highest beta is 16.8 percent per year; the actual is 13.7 percent.

Although the observed premium per unit of beta is lower than the Sharpe-Lintner model predicts, the relation between average return and beta in Figure 2 is roughly linear. This is consistent with the Black version of the CAPM, which predicts only that the beta premium is positive. Even this less restrictive model, however, eventually succumbs to the data.

Testing Whether Market Betas Explain Expected Returns

The Sharpe-Lintner and Black versions of the CAPM share the prediction that the market portfolio is mean-variance-efficient. This implies that differences in expected return across securities and portfolios are entirely explained by differences in market beta; other variables should add nothing to the explanation of expected return. This prediction plays a prominent role in tests of the CAPM. In the early work, the weapon of choice is cross-section regressions.

In the framework of Fama and MacBeth (1973), one simply adds predetermined explanatory variables to the month-by-month cross-section regressions of

returns on beta. If all differences in expected return are explained by beta, the average slopes on the additional variables should not be reliably different from zero. Clearly, the trick in the cross-section regression approach is to choose specific additional variables likely to expose any problems of the CAPM prediction that, because the market portfolio is efficient, market betas suffice to explain expected asset returns.

For example, in Fama and MacBeth (1973) the additional variables are squared market betas (to test the prediction that the relation between expected return and beta is linear) and residual variances from regressions of returns on the market return (to test the prediction that market beta is the only measure of risk needed to explain expected returns). These variables do not add to the explanation of average returns provided by beta. Thus, the results of Fama and MacBeth (1973) are consistent with the hypothesis that their market proxy—an equal-weight portfolio of NYSE stocks—is on the minimum variance frontier.

The hypothesis that market betas completely explain expected returns can also be tested using time-series regressions. In the time-series regression described above (the excess return on asset i regressed on the excess market return), the intercept is the difference between the asset's average excess return and the excess return predicted by the Sharpe-Lintner model, that is, beta times the average excess market return. If the model holds, there is no way to group assets into portfolios whose intercepts are reliably different from zero. For example, the intercepts for a portfolio of stocks with high ratios of earnings to price and a portfolio of stocks with low earning-price ratios should both be zero. Thus, to test the hypothesis that market betas suffice to explain expected returns, one estimates the time-series regression for a set of assets (or portfolios) and then jointly tests the vector of regression intercepts against zero. The trick in this approach is to choose the left-hand-side assets (or portfolios) in a way likely to expose any shortcoming of the CAPM prediction that market betas suffice to explain expected asset returns.

In early applications, researchers use a variety of tests to determine whether the intercepts in a set of time-series regressions are all zero. The tests have the same asymptotic properties, but there is controversy about which has the best small sample properties. Gibbons, Ross and Shanken (1989) settle the debate by providing an F-test on the intercepts that has exact small-sample properties. They also show that the test has a simple economic interpretation. In effect, the test constructs a candidate for the tangency portfolio T in Figure 1 by optimally combining the market proxy and the left-hand-side assets of the time-series regressions. The estimator then tests whether the efficient set provided by the combination of this tangency portfolio and the risk-free asset is reliably superior to the one obtained by combining the risk-free asset with the market proxy alone. In other words, the Gibbons, Ross and Shanken statistic tests whether the market proxy is the tangency portfolio in the set of portfolios that can be constructed by combining the market portfolio with the specific assets used as dependent variables in the time-series regressions.

Enlightened by this insight of Gibbons, Ross and Shanken (1989), one can see

a similar interpretation of the cross-section regression test of whether market betas suffice to explain expected returns. In this case, the test is whether the additional explanatory variables in a cross-section regression identify patterns in the returns on the left-hand-side assets that are not explained by the assets' market betas. This amounts to testing whether the market proxy is on the minimum variance frontier that can be constructed using the market proxy and the left-hand-side assets included in the tests.

An important lesson from this discussion is that time-series and cross-section regressions do not, strictly speaking, test the CAPM. What is literally tested is whether a specific proxy for the market portfolio (typically a portfolio of U.S. common stocks) is efficient in the set of portfolios that can be constructed from it and the left-hand-side assets used in the test. One might conclude from this that the CAPM has never been tested, and prospects for testing it are not good because 1) the set of left-hand-side assets does not include all marketable assets, and 2) data for the true market portfolio of all assets are likely beyond reach (Roll, 1977; more on this later). But this criticism can be leveled at tests of any economic model when the tests are less than exhaustive or when they use proxies for the variables called for by the model.

The bottom line from the early cross-section regression tests of the CAPM, such as Fama and MacBeth (1973), and the early time-series regression tests, like Gibbons (1982) and Stambaugh (1982), is that standard market proxies seem to be on the minimum variance frontier. That is, the central predictions of the Black version of the CAPM, that market betas suffice to explain expected returns and that the risk premium for beta is positive, seem to hold. But the more specific prediction of the Sharpe-Lintner CAPM that the premium per unit of beta is the expected market return minus the risk-free interest rate is consistently rejected.

The success of the Black version of the CAPM in early tests produced a consensus that the model is a good description of expected returns. These early results, coupled with the model's simplicity and intuitive appeal, pushed the CAPM to the forefront of finance.

Recent Tests

Starting in the late 1970s, empirical work appears that challenges even the Black version of the CAPM. Specifically, evidence mounts that much of the variation in expected return is unrelated to market beta.

The first blow is Basu's (1977) evidence that when common stocks are sorted on earnings-price ratios, future returns on high E/P stocks are higher than predicted by the CAPM. Banz (1981) documents a size effect: when stocks are sorted on market capitalization (price times shares outstanding), average returns on small stocks are higher than predicted by the CAPM. Bhandari (1988) finds that high debt-equity ratios (book value of debt over the market value of equity, a measure of leverage) are associated with returns that are too high relative to their market betas.

Finally, Statman (1980) and Rosenberg, Reid and Lanstein (1985) document that stocks with high book-to-market equity ratios (B/M, the ratio of the book value of a common stock to its market value) have high average returns that are not captured by their betas.

There is a theme in the contradictions of the CAPM summarized above. Ratios involving stock prices have information about expected returns missed by market betas. On reflection, this is not surprising. A stock's price depends not only on the expected cash flows it will provide, but also on the expected returns that discount expected cash flows back to the present. Thus, in principle, the cross-section of prices has information about the cross-section of expected returns. (A high expected return implies a high discount rate and a low price.) The cross-section of stock prices is, however, arbitrarily affected by differences in scale (or units). But with a judicious choice of scaling variable X, the ratio X/P can reveal differences in the cross-section of expected stock returns. Such ratios are thus prime candidates to expose shortcomings of asset pricing models—in the case of the CAPM, shortcomings of the prediction that market betas suffice to explain expected returns (Ball, 1978). The contradictions of the CAPM summarized above suggest that earnings-price, debt-equity and book-to-market ratios indeed play this role.

Fama and French (1992) update and synthesize the evidence on the empirical failures of the CAPM. Using the cross-section regression approach, they confirm that size, earnings-price, debt-equity and book-to-market ratios add to the explanation of expected stock returns provided by market beta. Fama and French (1996) reach the same conclusion using the time-series regression approach applied to portfolios of stocks sorted on price ratios. They also find that different price ratios have much the same information about expected returns. This is not surprising given that price is the common driving force in the price ratios, and the numerators are just scaling variables used to extract the information in price about expected returns.

Fama and French (1992) also confirm the evidence (Reinganum, 1981; Stambaugh, 1982; Lakonishok and Shapiro, 1986) that the relation between average return and beta for common stocks is even flatter after the sample periods used in the early empirical work on the CAPM. The estimate of the beta premium is, however, clouded by statistical uncertainty (a large standard error). Kothari, Shanken and Sloan (1995) try to resuscitate the Sharpe-Lintner CAPM by arguing that the weak relation between average return and beta is just a chance result. But the strong evidence that other variables capture variation in expected return missed by beta makes this argument irrelevant. If betas do not suffice to explain expected returns, the market portfolio is not efficient, and the CAPM is dead in its tracks. Evidence on the size of the market premium can neither save the model nor further doom it.

The synthesis of the evidence on the empirical problems of the CAPM provided by Fama and French (1992) serves as a catalyst, marking the point when it is generally acknowledged that the CAPM has potentially fatal problems. Research then turns to explanations.

One possibility is that the CAPM's problems are spurious, the result of data dredging—publication-hungry researchers scouring the data and unearthing contradictions that occur in specific samples as a result of chance. A standard response to this concern is to test for similar findings in other samples. Chan, Hamao and Lakonishok (1991) find a strong relation between book-to-market equity (B/M) and average return for Japanese stocks. Capaul, Rowley and Sharpe (1993) observe a similar B/M effect in four European stock markets and in Japan. Fama and French (1998) find that the price ratios that produce problems for the CAPM in U.S. data show up in the same way in the stock returns of twelve non-U.S. major markets, and they are present in emerging market returns. This evidence suggests that the contradictions of the CAPM associated with price ratios are not sample specific.

Explanations: Irrational Pricing or Risk

Among those who conclude that the empirical failures of the CAPM are fatal, two stories emerge. On one side are the behavioralists. Their view is based on evidence that stocks with high ratios of book value to market price are typically firms that have fallen on bad times, while low B/M is associated with growth firms (Lakonishok, Shleifer and Vishny, 1994; Fama and French, 1995). The behavioralists argue that sorting firms on book-to-market ratios exposes investor overreaction to good and bad times. Investors overextrapolate past performance, resulting in stock prices that are too high for growth (low B/M) firms and too low for distressed (high B/M, so-called value) firms. When the overreaction is eventually corrected, the result is high returns for value stocks and low returns for growth stocks. Proponents of this view include DeBondt and Thaler (1987), Lakonishok, Shleifer and Vishny (1994) and Haugen (1995).

The second story for explaining the empirical contradictions of the CAPM is that they point to the need for a more complicated asset pricing model. The CAPM is based on many unrealistic assumptions. For example, the assumption that investors care only about the mean and variance of one-period portfolio returns is extreme. It is reasonable that investors also care about how their portfolio return covaries with labor income and future investment opportunities, so a portfolio's return variance misses important dimensions of risk. If so, market beta is not a complete description of an asset's risk, and we should not be surprised to find that differences in expected return are not completely explained by differences in beta. In this view, the search should turn to asset pricing models that do a better job explaining average returns.

Merton's (1973) intertemporal capital asset pricing model (ICAPM) is a natural extension of the CAPM. The ICAPM begins with a different assumption about investor objectives. In the CAPM, investors care only about the wealth their portfolio produces at the end of the current period. In the ICAPM, investors are concerned not only with their end-of-period payoff, but also with the opportunities

they will have to consume or invest the payoff. Thus, when choosing a portfolio at time $t - 1$, ICAPM investors consider how their wealth at t might vary with future *state variables*, including labor income, the prices of consumption goods and the nature of portfolio opportunities at t, and expectations about the labor income, consumption and investment opportunities to be available after t.

Like CAPM investors, ICAPM investors prefer high expected return and low return variance. But ICAPM investors are also concerned with the covariances of portfolio returns with state variables. As a result, optimal portfolios are "multifactor efficient," which means they have the largest possible expected returns, given their return variances and the covariances of their returns with the relevant state variables.

Fama (1996) shows that the ICAPM generalizes the logic of the CAPM. That is, if there is risk-free borrowing and lending or if short sales of risky assets are allowed, market clearing prices imply that the market portfolio is multifactor efficient. Moreover, multifactor efficiency implies a relation between expected return and beta risks, but it requires additional betas, along with a market beta, to explain expected returns.

An ideal implementation of the ICAPM would specify the state variables that affect expected returns. Fama and French (1993) take a more indirect approach, perhaps more in the spirit of Ross's (1976) arbitrage pricing theory. They argue that though size and book-to-market equity are not themselves state variables, the higher average returns on small stocks and high book-to-market stocks reflect unidentified state variables that produce undiversifiable risks (covariances) in returns that are not captured by the market return and are priced separately from market betas. In support of this claim, they show that the returns on the stocks of small firms covary more with one another than with returns on the stocks of large firms, and returns on high book-to-market (value) stocks covary more with one another than with returns on low book-to-market (growth) stocks. Fama and French (1995) show that there are similar size and book-to-market patterns in the covariation of fundamentals like earnings and sales.

Based on this evidence, Fama and French (1993, 1996) propose a three-factor model for expected returns,

$$\text{(Three-Factor Model)} \quad E(R_{it}) - R_{ft} = \beta_{iM}[E(R_{Mt}) - R_{ft}] + \beta_{is}E(SMB_t) + \beta_{ih}E(HML_t).$$

In this equation, SMB_t (small minus big) is the difference between the returns on diversified portfolios of small and big stocks, HML_t (high minus low) is the difference between the returns on diversified portfolios of high and low B/M stocks, and the betas are slopes in the multiple regression of $R_{it} - R_{ft}$ on $R_{Mt} - R_{ft}$, SMB_t and HML_t.

For perspective, the average value of the market premium $R_{Mt} - R_{ft}$ for 1927–2003 is 8.3 percent per year, which is 3.5 standard errors from zero. The

average values of SMB_t, and HML_t are 3.6 percent and 5.0 percent per year, and they are 2.1 and 3.1 standard errors from zero. All three premiums are volatile, with annual standard deviations of 21.0 percent ($R_{Mt} - R_{ft}$), 14.6 percent (SMB_t) and 14.2 percent (HML_t) per year. Although the average values of the premiums are large, high volatility implies substantial uncertainty about the true expected premiums.

One implication of the expected return equation of the three-factor model is that the intercept α_i in the time-series regression,

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{is}SMB_t + \beta_{ih}HML_t + \varepsilon_{it},$$

is zero for all assets i. Using this criterion, Fama and French (1993, 1996) find that the model captures much of the variation in average return for portfolios formed on size, book-to-market equity and other price ratios that cause problems for the CAPM. Fama and French (1998) show that an international version of the model performs better than an international CAPM in describing average returns on portfolios formed on scaled price variables for stocks in 13 major markets.

The three-factor model is now widely used in empirical research that requires a model of expected returns. Estimates of α_i from the time-series regression above are used to calibrate how rapidly stock prices respond to new information (for example, Loughran and Ritter, 1995; Mitchell and Stafford, 2000). They are also used to measure the special information of portfolio managers, for example, in Carhart's (1997) study of mutual fund performance. Among practitioners like Ibbotson Associates, the model is offered as an alternative to the CAPM for estimating the cost of equity capital.

From a theoretical perspective, the main shortcoming of the three-factor model is its empirical motivation. The small-minus-big (SMB) and high-minus-low (HML) explanatory returns are not motivated by predictions about state variables of concern to investors. Instead they are brute force constructs meant to capture the patterns uncovered by previous work on how average stock returns vary with size and the book-to-market equity ratio.

But this concern is not fatal. The ICAPM does not require that the additional portfolios used along with the market portfolio to explain expected returns "mimic" the relevant state variables. In both the ICAPM and the arbitrage pricing theory, it suffices that the additional portfolios are well diversified (in the terminology of Fama, 1996, they are multifactor minimum variance) and that they are sufficiently different from the market portfolio to capture covariation in returns and variation in expected returns missed by the market portfolio. Thus, adding diversified portfolios that capture covariation in returns and variation in average returns left unexplained by the market is in the spirit of both the ICAPM and the Ross's arbitrage pricing theory.

The behavioralists are not impressed by the evidence for a risk-based explanation of the failures of the CAPM. They typically concede that the three-factor model captures covariation in returns missed by the market return and that it picks

up much of the size and value effects in average returns left unexplained by the CAPM. But their view is that the average return premium associated with the model's book-to-market factor—which does the heavy lifting in the improvements to the CAPM—is itself the result of investor overreaction that happens to be correlated across firms in a way that just looks like a risk story. In short, in the behavioral view, the market tries to set CAPM prices, and violations of the CAPM are due to mispricing.

The conflict between the behavioral irrational pricing story and the rational risk story for the empirical failures of the CAPM leaves us at a timeworn impasse. Fama (1970) emphasizes that the hypothesis that prices properly reflect available information must be tested in the context of a model of expected returns, like the CAPM. Intuitively, to test whether prices are rational, one must take a stand on what the market is trying to do in setting prices—that is, what is risk and what is the relation between expected return and risk? When tests reject the CAPM, one cannot say whether the problem is its assumption that prices are rational (the behavioral view) or violations of other assumptions that are also necessary to produce the CAPM (our position).

Fortunately, for some applications, the way one uses the three-factor model does not depend on one's view about whether its average return premiums are the rational result of underlying state variable risks, the result of irrational investor behavior or sample specific results of chance. For example, when measuring the response of stock prices to new information or when evaluating the performance of managed portfolios, one wants to account for known patterns in returns and average returns for the period examined, whatever their source. Similarly, when estimating the cost of equity capital, one might be unconcerned with whether expected return premiums are rational or irrational since they are in either case part of the opportunity cost of equity capital (Stein, 1996). But the cost of capital is forward looking, so if the premiums are sample specific they are irrelevant.

The three-factor model is hardly a panacea. Its most serious problem is the momentum effect of Jegadeesh and Titman (1993). Stocks that do well relative to the market over the last three to twelve months tend to continue to do well for the next few months, and stocks that do poorly continue to do poorly. This momentum effect is distinct from the value effect captured by book-to-market equity and other price ratios. Moreover, the momentum effect is left unexplained by the three-factor model, as well as by the CAPM. Following Carhart (1997), one response is to add a momentum factor (the difference between the returns on diversified portfolios of short-term winners and losers) to the three-factor model. This step is again legitimate in applications where the goal is to abstract from known patterns in average returns to uncover information-specific or manager-specific effects. But since the momentum effect is short-lived, it is largely irrelevant for estimates of the cost of equity capital.

Another strand of research points to problems in both the three-factor model and the CAPM. Frankel and Lee (1998), Dechow, Hutton and Sloan (1999), Piotroski (2000) and others show that in portfolios formed on price ratios like

book-to-market equity, stocks with higher expected cash flows have higher average returns that are not captured by the three-factor model or the CAPM. The authors interpret their results as evidence that stock prices are irrational, in the sense that they do not reflect available information about expected profitability.

In truth, however, one can't tell whether the problem is bad pricing or a bad asset pricing model. A stock's price can always be expressed as the present value of expected future cash flows discounted at the expected return on the stock (Campbell and Shiller, 1989; Vuolteenaho, 2002). It follows that if two stocks have the same price, the one with higher expected cash flows must have a higher expected return. This holds true whether pricing is rational or irrational. Thus, when one observes a positive relation between expected cash flows and expected returns that is left unexplained by the CAPM or the three-factor model, one can't tell whether it is the result of irrational pricing or a misspecified asset pricing model.

The Market Proxy Problem

Roll (1977) argues that the CAPM has never been tested and probably never will be. The problem is that the market portfolio at the heart of the model is theoretically and empirically elusive. It is not theoretically clear which assets (for example, human capital) can legitimately be excluded from the market portfolio, and data availability substantially limits the assets that are included. As a result, tests of the CAPM are forced to use proxies for the market portfolio, in effect testing whether the proxies are on the minimum variance frontier. Roll argues that because the tests use proxies, not the true market portfolio, we learn nothing about the CAPM.

We are more pragmatic. The relation between expected return and market beta of the CAPM is just the minimum variance condition that holds in any efficient portfolio, applied to the market portfolio. Thus, if we can find a market proxy that is on the minimum variance frontier, it can be used to describe differences in expected returns, and we would be happy to use it for this purpose. The strong rejections of the CAPM described above, however, say that researchers have not uncovered a reasonable market proxy that is close to the minimum variance frontier. If researchers are constrained to reasonable proxies, we doubt they ever will.

Our pessimism is fueled by several empirical results. Stambaugh (1982) tests the CAPM using a range of market portfolios that include, in addition to U.S. common stocks, corporate and government bonds, preferred stocks, real estate and other consumer durables. He finds that tests of the CAPM are not sensitive to expanding the market proxy beyond common stocks, basically because the volatility of expanded market returns is dominated by the volatility of stock returns.

One need not be convinced by Stambaugh's (1982) results since his market proxies are limited to U.S. assets. If international capital markets are open and asset prices conform to an international version of the CAPM, the market portfolio

should include international assets. Fama and French (1998) find, however, that betas for a global stock market portfolio cannot explain the high average returns observed around the world on stocks with high book-to-market or high earnings-price ratios.

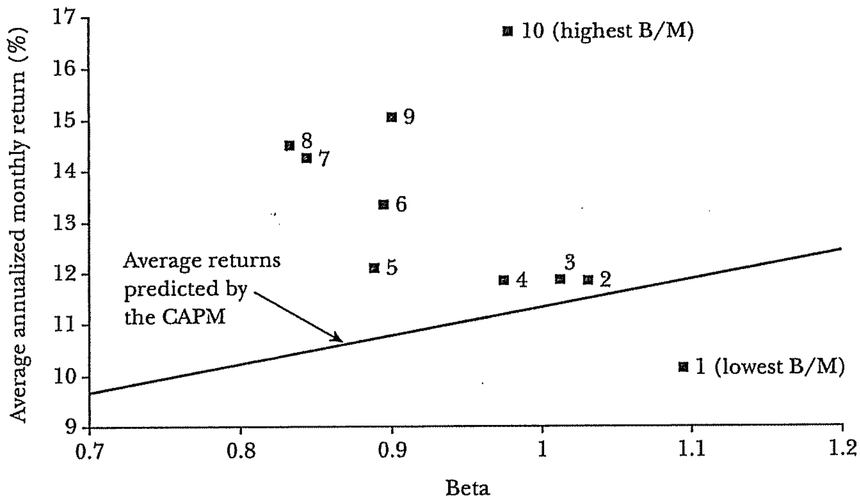
A major problem for the CAPM is that portfolios formed by sorting stocks on price ratios produce a wide range of average returns, but the average returns are not positively related to market betas (Lakonishok, Shleifer and Vishny, 1994; Fama and French, 1996, 1998). The problem is illustrated in Figure 3, which shows average returns and betas (calculated with respect to the CRSP value-weight portfolio of NYSE, AMEX and NASDAQ stocks) for July 1963 to December 2003 for ten portfolios of U.S. stocks formed annually on sorted values of the book-to-market equity ratio (B/M).[6]

Average returns on the B/M portfolios increase almost monotonically, from 10.1 percent per year for the lowest B/M group (portfolio 1) to an impressive 16.7 percent for the highest (portfolio 10). But the positive relation between beta and average return predicted by the CAPM is notably absent. For example, the portfolio with the lowest book-to-market ratio has the highest beta but the lowest average return. The estimated beta for the portfolio with the highest book-to-market ratio and the highest average return is only 0.98. With an average annualized value of the riskfree interest rate, R_f, of 5.8 percent and an average annualized market premium, $R_M - R_f$, of 11.3 percent, the Sharpe-Lintner CAPM predicts an average return of 11.8 percent for the lowest B/M portfolio and 11.2 percent for the highest, far from the observed values, 10.1 and 16.7 percent. For the Sharpe-Lintner model to "work" on these portfolios, their market betas must change dramatically, from 1.09 to 0.78 for the lowest B/M portfolio and from 0.98 to 1.98 for the highest. We judge it unlikely that alternative proxies for the market portfolio will produce betas and a market premium that can explain the average returns on these portfolios.

It is always possible that researchers will redeem the CAPM by finding a reasonable proxy for the market portfolio that is on the minimum variance frontier. We emphasize, however, that this possibility cannot be used to justify the way the CAPM is currently applied. The problem is that applications typically use the same

[6] Stock return data are from CRSP, and book equity data are from Compustat and the Moody's Industrials, Transportation, Utilities and Financials manuals. Stocks are allocated to ten portfolios at the end of June of each year t (1963 to 2003) using the ratio of book equity for the fiscal year ending in calendar year $t - 1$, divided by market equity at the end of December of $t - 1$. Book equity is the book value of stockholders' equity, plus balance sheet deferred taxes and investment tax credit (if available), minus the book value of preferred stock. Depending on availability, we use the redemption, liquidation or par value (in that order) to estimate the book value of preferred stock. Stockholders' equity is the value reported by Moody's or Compustat, if it is available. If not, we measure stockholders' equity as the book value of common equity plus the par value of preferred stock or the book value of assets minus total liabilities (in that order). The portfolios for year t include NYSE (1963–2003), AMEX (1963–2003) and NASDAQ (1972–2003) stocks with positive book equity in $t - 1$ and market equity (from CRSP) for December of $t - 1$ and June of t. The portfolios exclude securities CRSP does not classify as ordinary common equity. The breakpoints for year t use only securities that are on the NYSE in June of year t.

Figure 3
Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on B/M, 1963–2003



market proxies, like the value-weight portfolio of U.S. stocks, that lead to rejections of the model in empirical tests. The contradictions of the CAPM observed when such proxies are used in tests of the model show up as bad estimates of expected returns in applications; for example, estimates of the cost of equity capital that are too low (relative to historical average returns) for small stocks and for stocks with high book-to-market equity ratios. In short, if a market proxy does not work in tests of the CAPM, it does not work in applications.

Conclusions

The version of the CAPM developed by Sharpe (1964) and Lintner (1965) has never been an empirical success. In the early empirical work, the Black (1972) version of the model, which can accommodate a flatter tradeoff of average return for market beta, has some success. But in the late 1970s, research begins to uncover variables like size, various price ratios and momentum that add to the explanation of average returns provided by beta. The problems are serious enough to invalidate most applications of the CAPM.

For example, finance textbooks often recommend using the Sharpe-Lintner CAPM risk-return relation to estimate the cost of equity capital. The prescription is to estimate a stock's market beta and combine it with the risk-free interest rate and the average market risk premium to produce an estimate of the cost of equity. The typical market portfolio in these exercises includes just U.S. common stocks. But empirical work, old and new, tells us that the relation between beta and average return is flatter than predicted by the Sharpe-Lintner version of the CAPM. As a

result, CAPM estimates of the cost of equity for high beta stocks are too high (relative to historical average returns) and estimates for low beta stocks are too low (Friend and Blume, 1970). Similarly, if the high average returns on value stocks (with high book-to-market ratios) imply high expected returns, CAPM cost of equity estimates for such stocks are too low.[7]

The CAPM is also often used to measure the performance of mutual funds and other managed portfolios. The approach, dating to Jensen (1968), is to estimate the CAPM time-series regression for a portfolio and use the intercept (Jensen's alpha) to measure abnormal performance. The problem is that, because of the empirical failings of the CAPM, even passively managed stock portfolios produce abnormal returns if their investment strategies involve tilts toward CAPM problems (Elton, Gruber, Das and Hlavka, 1993). For example, funds that concentrate on low beta stocks, small stocks or value stocks will tend to produce positive abnormal returns relative to the predictions of the Sharpe-Lintner CAPM, even when the fund managers have no special talent for picking winners.

The CAPM, like Markowitz's (1952, 1959) portfolio model on which it is built, is nevertheless a theoretical tour de force. We continue to teach the CAPM as an introduction to the fundamental concepts of portfolio theory and asset pricing, to be built on by more complicated models like Merton's (1973) ICAPM. But we also warn students that despite its seductive simplicity, the CAPM's empirical problems probably invalidate its use in applications.

■ *We gratefully acknowledge the comments of John Cochrane, George Constantinides, Richard Leftwich, Andrei Shleifer, René Stulz and Timothy Taylor.*

[7] The problems are compounded by the large standard errors of estimates of the market premium and of betas for individual stocks, which probably suffice to make CAPM estimates of the cost of equity rather meaningless, even if the CAPM holds (Fama and French, 1997; Pastor and Stambaugh, 1999). For example, using the U.S. Treasury bill rate as the risk-free interest rate and the CRSP value-weight portfolio of publicly traded U.S. common stocks, the average value of the equity premium $R_{Mt} - R_{ft}$ for 1927–2003 is 8.3 percent per year, with a standard error of 2.4 percent. The two standard error range thus runs from 3.5 percent to 13.1 percent, which is sufficient to make most projects appear either profitable or unprofitable. This problem is, however, hardly special to the CAPM. For example, expected returns in all versions of Merton's (1973) ICAPM include a market beta and the expected market premium. Also, as noted earlier the expected values of the size and book-to-market premiums in the Fama-French three-factor model are also estimated with substantial error.

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ORIGINAL ARTICLE

New approach to estimating the cost of common equity capital for public utilities

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Abstract The regulatory process for setting public utilities' allowed rate of return on common equity has generally used the Gordon DCF, CAPM and Risk Premium specifications to estimate the cost of common equity. Despite the widely known problems with these models, there has been little movement to adopt more recently developed asset pricing models to provide additional evidence for estimating the cost of capital. This paper presents, validates empirically and applies a general yet simple consumption-based asset pricing specification to model the risk-return relationship for stocks and estimate the cost of common equity for public utilities. The model is not necessarily superior to other models in its practical results, yet these results do indicate that it should be used to provide additional estimates of the cost of common equity. Additionally, the model raises doubts as to whether assets such as utility stocks are a consumption (business cycle) hedge.

Keywords Public utilities · Cost of capital · GARCH · Consumption asset pricing model

JEL Classification G12 · L94 · L95

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1 Introduction

Following electricity deregulation with the National Energy Policy Act of 1992, the estimation of the cost of common equity capital remains a critical component of the utility rate-of-return regulatory process. Since the cost of common equity is not observable in capital markets, it must be inferred from asset pricing models. The models that are commonly applied in regulatory proceedings are the Gordon (1974) Discounted Cash Flow (DCF), the Capital Asset Pricing (CAPM) and Risk Premium Models. There are other tools used to estimate the cost of common equity such as comparable earnings or earnings-to-price ratios, but they are not asset pricing models. The empirical literature on the CAPM is vast {Fama and French (2004)} and the CAPM is used by a number of US regulatory jurisdictions. The DCF model has not been empirically tested to the same extent as the CAPM, yet it is considered by many US regulatory jurisdictions.

The purpose of this paper is to present, test empirically and apply a recently developed general consumption-based asset pricing model that estimates the risk-return relationship directly from asset pricing data and, when estimated with recently developed time series methods, produces a prediction of the equity risk premium that is driven by its predicted volatility. The predicted risk premium is then added to a risk-free rate of return to provide an estimate of the cost of common equity. We predict two forms of the equity risk premium with the model, the risk premium net of the risk-free rate and the equity-to-debt risk premium (equity risk premium net of the relevant bond yield for the company's stock). Either can be applied to predict the common equity cost of capital for a public utility. Although the model is tested and applied to public utilities for rate of return regulation, it can be used to estimate the cost of capital for any stock. Section 2 reviews the asset pricing models typically used in public utility rate cases and the generalized consumption asset pricing model we propose to estimate the cost of common equity. Section 3 discusses the data and the empirical testing of the consumption asset pricing model. Section 4 reviews the application of the model and compares it with the DCF and CAPM results. Section 5 is the conclusion.

2 DCF, CAPM and consumption asset pricing model

2.1 DCF and CAPM approaches

The standard DCF model frequently used in estimative the cost rate of common equity in regulatory proceedings is defined by the following equation:

$$k = D_0 (1 + g) / P_0 + g,$$

where k is the expected return on common equity; D_0 is the current dividend per share; g is the expected dividend per share growth rate; and P_0 is the current market price.

The DCF was developed by Gordon (1974) specifically for regulatory purposes. Underlying the DCF model is the theory that the present value of an expected future stream of net cash flows during the investment holding period can be determined

by discounting those cash flows at the cost of capital, or the investors' capitalization rate. DCF theory indicates that an investor buys a stock for an expected total return rate which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate) over the investment holding period. Mathematically, the expected dividend yield ($D_0(1 + g)/P_0$) on market price plus an expected growth rate equals the capitalization rate, i.e., the expected return on common equity.

The standard DCF contains several restrictive assumptions, the most contentious of which during utility cost of capital proceedings is typically that dividends per share (DPS), book value per share (BVPS), earnings per share (EPS) as well as market price grow at the same rate in perpetuity. There is also considerable contention over the proper proxy for g, prospective or historical growth in DPS, BVPS, EPS and market price and over what time period. In addition, although the standard DCF described above is a single stage annual growth model, there is considerable discussion over the use of multiple stage growth models during regulatory proceedings. Some analysts use the discrete version and others use the continuous version of the DCF model. Solving these models for k, the cost of common equity, results in differing equations to solve for k. The equation above is from the discrete version. The continuous version uses the current dividend yield and is not adjusted by g, which results in a lower estimate for k. Because of these and other restrictive assumptions that require numerous subjective judgments in application, it is often difficult for regulatory commissions to reconcile the frequently large disparities in rates of return on common equity recommended by various parties in a public utility rate case.

The CAPM model is defined by the following equation:

$$k = R_f + \beta \left(R_m - R_f\right),$$

where k is the expected return on common equity; R_f is the expected risk-free rate of return; β is the expected beta; and R_m is the expected market return.

CAPM theory defines risk as the co-variability of a security's returns with the market's returns or β, also known as systematic or market risk, with the market beta being defined as 1.0. Because CAPM theory assumes that all investors hold perfectly diversified portfolios, they are presumed to be exposed only to systematic risk and the market (according to the model) will not reward them a risk premium for unsystematic or non-market risk. In other words, the CAPM presumes that investors require compensation only for systematic or market risks which are due to macroeconomic and other events that affect the returns on all assets. Mathematically, the CAPM is applied by adding a forward-looking risk-free rate of return to an expected market equity risk premium adjusted proportionately by the expected beta to reflect the systematic risk.

As with the DCF, there is considerable contention during regulatory cost of capital proceedings as to the proper proxies for all components of the CAPM: the R_f, the R_m, as well as β. In addition, the CAPM assumption that the market will only reward investors for systematic or market risk is extremely restrictive when estimating the expected return on common equity for a single asset such as a single jurisdictional regulated operating utility. Additionally, this assumption requires that the investor have a perfectly diversified portfolio, that is, one with no unsystematic risk. Since

this assumption is not applicable, estimating the cost of common equity capital for a single utility's common equity undoubtedly will not reflect the risk actually faced by the imperfectly diversified investor.

As will be discussed in the next section, our application of the risk premium approach, the consumption asset pricing model and GARCH[1] rest on minimal assumptions and restrictions and therefore requires considerably less judgment in its application.

2.2 Risk premium approach, consumption asset pricing models, and GARCH

A widely used model to estimate the cost of common equity capital for public utilities is the risk premium approach. This approach often estimates the expected rate of return as the long-term historic mean of the realized risk premium above an historic yield plus the current yield of the relevant bond applicable to a specific utility or peer group of utilities. Litigants in public utility rate proceedings debate the choice of inputs to estimate the risk premium as well as how far back to reach into history to collect data for calculating an average that is representative of a forward-looking premium.

It is surprising that, as popular as the risk premium method is in public utility rate cases, the intuitively appealing general consumption-based asset pricing model, with its minimal assumptions and strong theoretical foundation, has not been applied to estimate the cost of common equity capital for public utilities. The model provides projections of the conditional expected risk premium on an asset based on its relation to its predicted conditional volatility. This model generalizes the well known special case asset pricing models such as the Merton (1973) intertemporal capital asset pricing model, Campbell (1993) intertemporal asset pricing model, and the habit-persistence model of Campbell and Cochrane (1999), which are special cases of the general model. The relation of the model to their specialized cases can be found in Cochrane (2006) and Cochrane (2007). The approach of consumption asset pricing models is to make investment decisions that maximize investors' utility from the consumption that they ultimately desire, not returns.

Even if the model is not used to project directly the expected risk premium, it can, at a minimum, be used to verify that the risk premia data chosen for estimating the cost of capital is empirically validated by fitting the model well. The model can be used to predict the equity risk premia net of the risk-free rate (equity risk premium) or to predict the equity-to-debt risk premium for a firm. We perform both of these empirical tests in this paper. The general consumption-based asset pricing model developed in Michelfelder and Pilotte (2011) and based on Cochrane (2004) provides the relationship of the ex ante risk premium to an asset's own volatility in return:

$$E_t[R_{i,t+1}] - R_{f,t} = -\frac{vol_t[M_{t+1}]}{E_t\left[M_{t+1}\right]} vol_t[R_{i,t+1}] corr_t[M_{t+1}, R_{i,t+1}]. \quad (1)$$

[1] GARCH refers to the generalized autoregressive conditional heteroskedasticity regression model which is discussed below.

where vol_t is the conditional volatility, $corr_t$ is the conditional correlation, and M_{t+1} is the stochastic discount factor (SDF).

The SDF is the intertemporal marginal rate of substitution in consumption, or, $M_{t+1} = \beta \frac{U_{c,t+1}}{U_{c,t}}$, where the U_c's are the marginal utilities of consumption in the next period, $t+1$, and the current period, t, and β is the discount factor for period t to $t+1$. Equation 1 shows that the algebraic sign of the relation between the expected risk premium and the conditional volatility of an asset's risk premium is determined by the correlation between the asset's return and the SDF. That is, the direction of the relation between the asset return and the ratio of intertemporal marginal utilities in consumption inversely determines the relation between the expected risk premium and conditional volatility. When the correlation is equal to negative one, the asset's conditional expected risk premium is perfectly positively correlated with its conditional volatility. A positive relation between the conditionally expected risk premium and volatility obtains when $-1 < corr_t < 0$. A negative relation obtains when $0 < corr_t < 1$. For an asset that represents a perfect hedge against shocks to the marginal utility of consumption, with $corr_t = 1$, there will be a perfect negative correlation between the conditionally expected risk premium and its volatility.[2] Therefore, estimates of the relation between the first two conditional moments of a public utility stock's returns provide a direct test of the effectiveness of a public utility stock, or any asset, as a consumption hedging asset. In Eq. 1, $vol_t[M_{t+1}]/E_t[M_{t+1}]$ is the slope of the mean-variance frontier. If this slope changes over time, the estimated relation between the stock's risk and return will vary over time. This model can also be viewed simplistically as the projected expected risk premium as a function of its own projected risk, given information available at time t.

Note that the model allows for the expected risk premium to be negative if the asset hedges shocks to the marginal utility of consumption. Investors are willing to accept an expected rate of return lower than the risk-free rate of return if the pattern of volatility is such that returns are expected to rise with expected reductions in consumption. Simply, investors are willing to *pay* a premium for a higher level of returns volatility that has the desired pattern of returns. These desired returns patterns have a tendency to offset drops in consumption. Therefore, this model shows that investors may not be averse to volatility, but rather to the timing of expected changes in returns.

Summarizing, several conclusions can be drawn from the general model of asset pricing. First, the sign of the relation between a stock's risk premium and conditional volatility depends on the extent to which the stock serves as an intertemporal hedge against shocks to the marginal utility of consumption. Second, the relation between stock risk and return may be time-varying depending on changes in the slope of the mean-variance frontier. Third, hedging assets have desired patterns of volatility that result in expected rates of return that are less than the risk-free rate. We do not expect

[2] A hedging asset is one that has a positive increase in returns that is coincident with a positive shock in the ratio of intertemporal marginal utilities of consumption. Note that if we assume a concave utility function in consumption, as consumption declines, the marginal utility of consumption rises relative to last period marginal utility. If we think of a decline in consumption as a contraction in the business cycle, the hedging asset delivers positive changes in returns when the business cycle is moving into a contraction, and therefore the asset is a business cycle hedge.

that public utility stocks serve as a hedging asset as they are not viewed as defensive stocks (they do not rise in value during downturns in the stock market) due to asymmetric regulation and returns as discussed in detail in Kolbe and Tye (1990). Under asymmetric regulation, utility regulators have a tendency to allow the return on equity to fall below the allowed return during downturns in the business cycle and to reduce the return should it rise above the allowed return during expansions. Therefore we expect that the parameter estimates of the return-risk relationship to be positive as utility stocks are hypothesized to not be hedges.

We use the GARCH model to estimate the general asset pricing model since the GARCH model accommodates ARCH effects that improve the efficiency of the parameter estimates. It also provides a volatility forecasting model for the conditional volatility of the asset's risk premium. The conditional volatility projection is used, in turn to predict the expected risk premium. We also use the GARCH-in-Mean model (GARCH-M) since it specifies that the conditional expected risk premium is a linear function of its conditional volatility. There is a vast body of literature that estimates asset pricing models with the GARCH and GARCH-M methods and therefore we will not attempt to summarize them here.

The GARCH-M model was initially developed and tested by Engle et al. (1987) to estimate the relationship between US Treasury and corporate bond risk premia and their expected volatilities. The GARCH-M model is specified as:

$$R_{t+1} - R_{f,t+1} = \alpha\sigma_{t+1}^2 + \varepsilon_{t+1} \tag{2}$$

$$\sigma_{t+1}^2 = \beta_0 + \beta_1\sigma_t^2 + \beta_2\varepsilon_t^2 + \eta_{t+1} \tag{3}$$

$$\varepsilon_t \,|\psi_{t-1} \sim T(0, \sigma_t^2) \tag{4}$$

where R_{t+1} is the expected total return on the public utility stock index or individual utility stock; $R_{f,t+1}$ is the risk-free rate of return or the yield on an index of public utility bonds of a specified bond rating for the equity-to-debt premium; σ_{t+1}^2 is the conditional or predicted variance of the risk premium that is conditioned on past information (ψ_{t-1}); and ε_t is the error term that is conditional on ψ_{t-1}.

The conditional distribution of the error term is specified as the non-unitary variance T-distribution due to the thick-tailed distribution of the risk premia data. If the error distribution is thick-tailed, using an approximating distribution that accommodates thick tails improves the efficiency of the estimates. The parameter, α, is the return-to-risk coefficient as specified in Eq. 1 as:

$$\alpha = -\frac{vol_t[M_{t+1}]}{E_t\left[M_{t+1}\right]} corr_t[M_{t+1}, R_{i,t+1}] \tag{5}$$

Note that the coefficient will be positive if the conditional correlation between the SDF and the asset return is negative, indicating that the stock is not a hedging asset. Recall that the SDF is the ratio of intertemporal marginal utilities. Assuming a concave utility function, an upward shock in the ratio implies falling consumption, therefore an associated rise (positive correlation) in the return (R_i) would offset the reduction

in consumption, thereby causing the sign of α to be negative. The parameter, α, is also the ratio of risk premium to variance, or, the Sharpe ratio.

The intercept in Eq. 2 is restricted to zero as specified by the general asset pricing model specification. The restriction on the intercept equal to zero has been found to be robust in producing consistently positive and significant relationships between equity risk premia and risk in GARCH-M models. This is discussed in Lanne and Saikkonen (2006) and Lanne and Luoto (2007). We have found the same results in our modeling in this paper, although we have excluded these results for brevity (available upon request). Therefore we specify the prior assumption that the intercept or the "excess" return, i.e., the return not associated with risk to be equal to zero and drop the intercept from the model.

The consumption asset pricing model is estimated in the empirical section of the paper and applied in the applications section of the paper. The model is tested to (1) determine if equity-to-debt risk premium indices for utilities of differing risk specified by differing bond ratings are validated by the asset pricing model and therefore have some empirical support for risk premium prediction and application to utility cost of capital estimation, (2) determine whether equity risk premia can be predicted and fit the model and therefore be used to estimate the cost of common equity, (3) empirically test the consumption asset pricing model, and (4) ascertain whether utility stocks are assets that hedge shocks to the marginal utility of consumption.

If utility stocks are hedging assets then the cost of common equity should reflect a downward adjustment to a specified risk-free rate to reflect investors' preferences for a hedge and the compensation that they are willing to pay for it.

3 Data and empirical results

We use portfolios as represented by public utility stock and bond indices to estimate the conditional return-risk relationship for the equity-to-debt premium. The equity-to-debt risk premium data employed for estimating Eq. 1 with the GARCH-M conditional return-risk regressions are monthly total returns on the Standard and Poor's Public Utilities Stock Index (utility portfolio), and the monthly Moody's Public Utility Aa, A, and Baa yields for the debt cost. We also obtained equity risk premia for the utility portfolio using the Fama-French specified risk-free rate of return, which is the holding period return on a 1-month US Treasury Bill. The data range from January 1928 to December 2007 with 960 observations. The return-risk relationships for the equity-to-debt premia are risk-differentiated by their own bond rating.

As a check, we also estimate Eq. 1 with the GARCH-M for large common stock returns using the monthly Ibbotson Large Company Common Stocks Portfolio total returns and the Ibbotson US Long-Term Government income returns as the risk-free rate. Additionally, as another check, we do the same for the University of Chicago's Center for Research in Security Prices value-weighted stock index (CRSP) using the Fama-French risk-free rate. This is the Fama-French specification of the market equity risk premium. The data range from January 1926 to December 2007 with 984 observations for the Large Company Common Stock estimation and the data ranges

Table 1 Descriptive statistics: public utility and large company common stocks equity-to-debt and equity risk premia

Utility bond rating	Mean	Std. Dev.	Skewness	Kurtosis	JB
Aa	0.0037	0.0568	0.0744	10.07	2,001.2***
A	0.0035	0.0568	0.0632	10.06	1,991.8***
Baa	0.0031	0.0568	0.0375	10.02	1,973.6***
Ibbotson					
Large common stocks	0.0054	0.0554	0.4300	12.84	3,954.7***
CRSP value-weighted stock index	0.0062	0.0544	0.2309	10.92	2,519.1***

The public utility equity-to-debt risk premia monthly time series is from January 1928 to December 2007 with 960 observations. The equity risk premium monthly time series for the Large Common Stocks and the CRSP index are January 1926 to December 2007 with 984 observations, and January 1926 to December 2007 with 984 observations, respectively. The public utility stocks equity-to-debt risk premia are calculated as the total return on the S&P Public Utilities Index of stocks minus the Moody's Public Utility Aa, A, and Baa Indices yields to maturity. The Large Company Common Stock equity risk premia are the monthly total returns on the Ibbotson Large Company Common Stocks Portfolio minus the Ibbotson Long-Term US Government Bonds Portfolio income yield. The CRSP equity risk premia, or the Fama-French market risk premia are the CRSP total returns on the value-weighted equity index minus the 1-month holding period return on a 1 month Treasury Bill. The Jarque-Bera (JB) statistic is a goodness-of-fit measure of the departure of the distribution of a data series from normality, based on the levels of skewness and excess kurtosis. The JB statistic is χ^2 distributed with 2° of freedom. *** Significant at 0.01 level, one-tailed test

from January 1928 to January 2007 with 960 observations (same as the utilities) for the CRSP estimation.

Table 1 displays the descriptive statistics for these data. We have estimated the mean, standard deviation, skewness and kurtosis parameters, as well as the Jarque-Bera (JB) statistic to test the distribution of the data. The means of the utility equity-to-debt risk premia fall as the risk (bond rating) declines. This is consistent with the notion that larger yields are subtracted from stock returns the lower the bond rating. Intertemporally, there is an inverse relationship between risk premia and interest rates (See Brigham et al. (1985) and Harris et al. (2003)). The mean for risk premia will have a tendency to be larger during low interest rate periods.

Not surprisingly, large company common stocks have the highest mean risk premia as the majority of these firms are not rate-of-return regulated firms with a ceiling on their ROE's close to their cost of capital. Interestingly, the standard deviations of the utility stock returns are similar and slightly higher than large company common stocks. Skewness coefficients are small and positive except for Ibbotson large company common stock returns and CRSP returns that have large positive skewness. This suggests that large unregulated stocks have a tendency to have more and larger positive shocks in returns than do utilities that are rate of return regulated. The kurtosis values show that all of the risk premia are thick-tail distributed. This is also found in the significant JB statistics that test the null hypothesis that the data are normally distributed. The null hypothesis is rejected for all assets. The high kurtosis, low skewness, and significant JB statistics show that the risk premia data are substantially thick-tailed, except for non-utility stocks that are both skewed and thick-tailed. Therefore, robust estimation methods are required to produce efficient regression estimates with non-normal data. Additionally, although not shown but available upon request, the serial correlation and

ARCH Lagrange Multiplier tests show that residuals from OLS regressions of risk premia on volatilities follow an ARCH process. Therefore, the GARCH-M method will improve the efficiency of the estimates. We specify the regression error distribution as a non-unitary variance T-distribution so that thick-tails could be accommodated in the estimation and therefore produce increasingly efficient parameter estimates.

We used maximum likelihood estimation with the likelihood function specified with the non-unitary-variance T-distribution as the approximating distribution of the residuals to accommodate the thick-tailed nature of the error distribution. The equations are estimated as a system using the Marquardt iterative optimization algorithm. The chosen software for estimating the model was EViews© version 6.0 (2007).

Table 2 shows the GARCH-M estimations for the consumption asset pricing Eq. 1. We have estimated Eq. 1 for the utility equity risk premia using the Fama-French risk-free rate in addition to the equity-to-debt risk premia risk-differentiated by bond ratings and the two measures of the market equity risk premium. The chosen measure of volatility is the variance of risk premium (in contrast to other such measures such as the standard deviation or the log of variance. Although these results are not shown for brevity, they are robust to these other measures of volatility). The slope, which is the predicted return-to-predicted risk coefficient and Sharpe ratio, is positive and significant at the 99% level for all assets except the utility stock returns with Baa bonds, which is significant at the 95% level. Given that all slopes are positive, public utility stocks are not found to hedge shocks to the marginal utility of consumption. Note that the reward-to-risk slope rises as bond rating rises. This suggests that lower risk utility stocks provide a higher incremental risk-premium for an increase in conditional volatility. This is consistent with other studies that find that lower risk assets, such as shorter maturity bonds, have higher Sharpe Ratios than long-term bonds and stocks. See Pilotte and Sterbenz (2006) and Michelfelder and Pilotte (2011).

The variance equation shows that all GARCH coefficients (β's) are significant at the 1% level and the sums of β_1 and β_2 are close to, but less than 1.0, indicating that the residuals of the risk premium equation follow a GARCH process and that the persistence of a volatility shock on returns and stock prices for utility stocks is temporary. The estimates of the non-unitary variance T-distribution degrees of freedom parameter are low and statistically significant, indicating that the residuals are well approximated by the T. Similar values for the log-likelihood functions (Log-L) show that each of the regressions has a similar goodness-of-fit. Chi-squared distributed likelihood ratio tests (not shown but available upon request) that compare the goodness of fit among the T and normal specifications of the likelihood function of the GARCH-M regressions show that the T has a significantly better fit than the normal distribution.

The GARCH-M results for the large company common stocks portfolio are similar to those of the utility stocks. Not surprisingly, large company common stocks do not hedge shocks to the marginal utility of consumption and volatility shocks temporarily affect their valuations. The exception is that the return-risk slope is substantially higher than utility stock slopes. This is partially due to the risk-free nature of the risk-free rates used with the non-utility equity risk premia compared to the

Table 2 Estimation of return-risk relation: public utility and large company common stocks

Utility bond rating	α	β_0	β_1	β_2	Log-L	T dist. D.F.
Aa	1.5183***	0.0000**	0.8791***	0.1031***	1,604.4	9.9254***
	(0.5308)	(0.0000)	(0.0230)	(0.0219)		(3.0272)
A	1.4536***	0.0000**	0.8790***	0.1033***	1,605.0	9.9381***
	(0.5308)	(0.0000)	(0.0230)	(0.0220)		(3.0408)
Baa	1.3318**	0.0000**	0.8789***	0.1040***	1,605.2	10.0***
	(0.5303)	(0.0000)	(0.0229)	(0.0220)		(3.0540)
Fama-French R_f	2.1428***	0.0000**	0.8811***	0.0979***	1,601.0	9.8773***
	(0.5318)	(0.0000)	(0.0232)	(0.0212)		(2.9700)
Ibbotson						
Large company common stocks	2.7753***	0.0001***	0.8381***	0.1186***	1,620.8	8.8457***
	(0.5513)	(0.0000)	(0.0269)	(0.0332)		(2.1613)
CRSP value-weighted stock index	3.3873***	0.0001***	0.8330***	0.1149***	1,598.9	8.8571***
	(0.5673)	(0.0000)	(0.0270)	(0.0358)		(1.9505)

The results below are the GARCH-in-Mean regressions for the risk premium ($R_{t+1} - R_{f,t+1}$) on the conditional variance of the risk premium (σ^2_{t+1}) in the mean equation. The intercept in the mean equation is restricted to be equal to zero. The public utility equity-to-debt risk premia monthly time series is from January 1928 to December 2007 with 960 observations. The equity risk premium monthly time series for the Large Company Common Stocks and the CRSP index are January 1926 to December 2007 with 984 observations, and January 1926 to December 2007 with 984 observations, respectively. The public utility stocks equity-to-debt risk premia are calculated as the total return on the S&P Public Utilities Index of stocks minus the Moody's Public Utility Aa, A, and Baa Indices yields to maturity. The Large Company Common Stock equity risk premia are the monthly total returns on the Ibbotson Large Company Common Stocks Portfolio minus the Ibbotson Long-Term US Government Bonds Portfolio income yield. The CRSP equity risk premia, or the Fama-French market risk premia are the CRSP total returns on the value-weighted equity index minus the 1-month holding period return on a 1 month Treasury Bill. The estimated model is:

$$R_{t+1} - R_{f,t+1} = \alpha\sigma^2_{t+1} + \varepsilon_{t+1} \quad \text{where } \alpha = -\frac{vol_t[M_{t+1}]}{E_t[M_{t+1}]} corr_t[M_{t+1}, R_{i,t+1}]$$

$$\sigma^2_{t+1} = \beta_0 + \beta_1\sigma^2_t + \beta_2\varepsilon^2_t + \eta_{t+1}$$

The conditional distribution of the error term is the non-unitary variance T-distribution to accommodate the kurtosis of the risk premia and error term. Standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tail tests

utility bond yields that reflect risk. The utility stocks slope value of 2.1428 using the Fama-French risk-free rate is closer to the higher CRSP value of 3.3873 that is also based on the Fama-French risk-free rate. This is inconsistent with previous results herein and in other papers that find that Sharpe Ratios are lower for higher risk assets unless this finding can be interpreted as utility stocks having more risk than non-regulated stocks. The standard deviations on Table 1 suggest that utility stock return volatilities are as high as the stock returns of non-regulated firms. However, similar model estimates of portfolios of common stocks yield unstable results, such as negative as well as positive return-risk slopes when the intercept is not restricted to zero. See Campbell (1987), Glosten et al. (1993), Harvey (2001), and Whitelaw (1994).

Stock market results are highly sensitive to empirical model specification. Many studies do not consider the impact of a zero-intercept prior restriction on the stability of their results. This simple innovation has led to more consistent results in modeling stock market risk-return relationships, and therefore we have included it in this paper.

The estimation of the consumption asset pricing model for utility stock equity-debt risk premia shows that the use of bond-rating risk-differentiated risk premia are validated as their risk-return relationships are well-fitted by theoretical and empirical models of risk and return. Therefore, these data impound good representations of the risk and reward relationship.

One concern is the intertemporal stability of the alphas. Figure 1 plots the utility stock portfolio alpha (using the Fama-French R_f to calculate the premium) and its standard error for 240 month rolling regressions of the model estimated with GARCH-M in the same manner as described above to review the intertemporal stability of the alpha. A 20-year period was used for each estimation to trade off timeliness with sufficient observation of up and down stock market regimes and business cycles. This resulted in 720 estimated alphas from 1947 to 2007. The results show that the utility alpha is stable to the extent that the algebraic sign is always positive and generally significant, therefore the nature of utility stocks are assets that are not and have never been hedges during the second half of the twentieth century up to the present. The value of the alpha does change substantially. The mean of the alpha is 4.40 with a range from -0.11 (insignificantly different from 0) to 11.66. As a comparison, the alpha for the CRSP value-weighted stock index was also estimated with rolling regressions in the same manner and for the same time period. Figure 2 is a plot of the CRSP alpha and standard error. Note that the general stock market alpha is similar to that of utility stocks. They are all positive and almost all statistically significant and follow a strikingly similar cycle. Figure 3 plots both the utility and stock market alphas and demonstrates the similarity. The correlation coefficient between the utility and stock market alphas is 0.88. Recalling that the alpha is a Sharpe Ratio, we see that return to risk ratio does change substantially. This is consistent with the results in Pilotte and Sterbenz (2006).

One other interesting observation is that the standard errors of the alphas are highly stable over the study period and are very similar in magnitude regardless of the size of the corresponding alpha. Whereas the alpha follows a cyclical pattern, the volatility in alpha is highly stationary around a constant, long-run mean.

The GARCH-M model estimations of the consumption asset pricing model were specified with variance as the measure of volatility. We also performed the same model estimations with alternative specifications of volatility such as the standard deviation and the log of variance and the results were not sensitive to this specification.

4 Application

We apply the model in this section to compare the cost of common equity capital estimates with the DCF and CAPM models. Using EViews© Version 6.0, we estimated the model coefficients (α, $\beta' s$) over rolling 24 month periods ending December 2008.

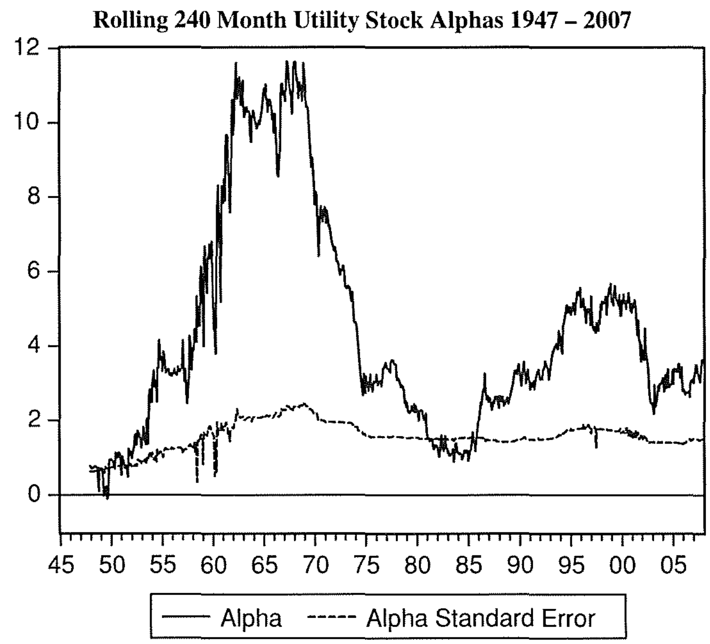


Fig. 1 Rolling 240 month utility stock alphas 1947–2007

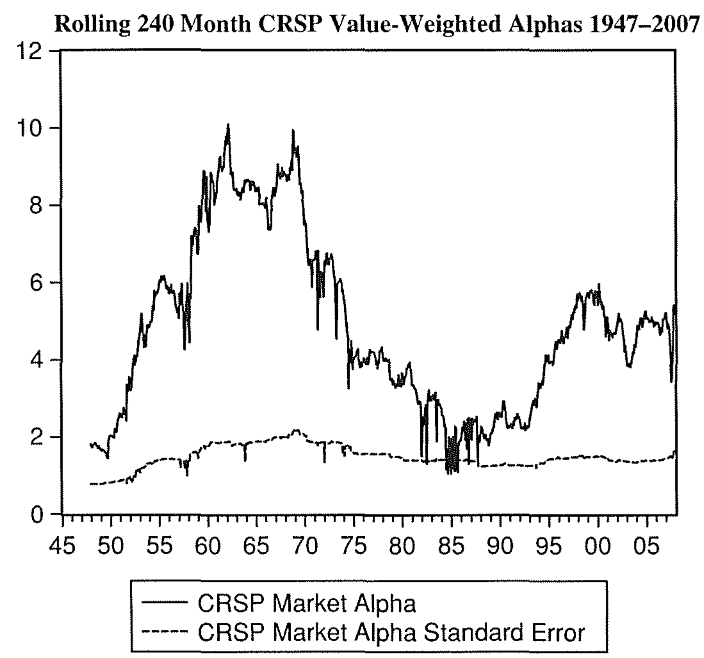


Fig. 2 Rolling 240 month CRSP value-weighted alphas 1947–2007

We repeated the estimation over 5, 10, 15, 20 and 79 year periods.[3] Predicted monthly variances (σ_{t+1}^2) were generated from these estimations to produce predicted risk premiums that were calculated by multiplying the predicted variance by the "α" slope

[3] We did not include the results of the 10 and 15 year estimations to abbreviate the amount of empirical results presented since they added no material insights beyond those already presented.

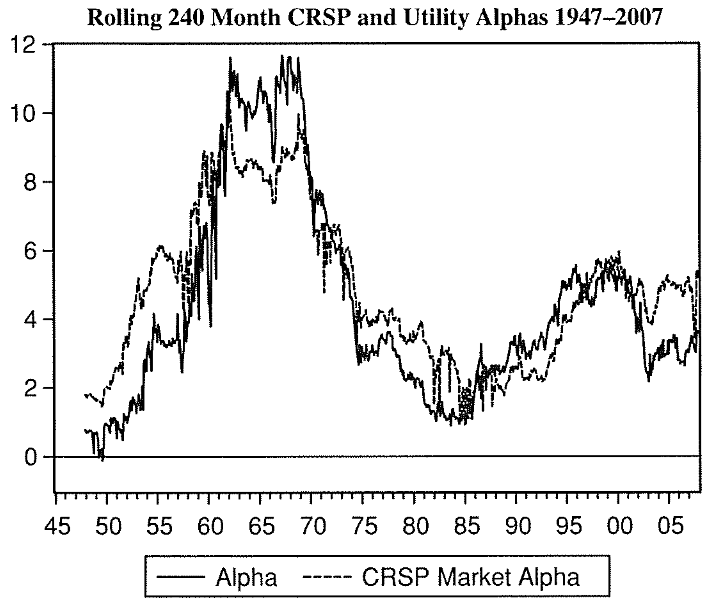


Fig. 3 Rolling 240 month CRSP and utility alphas 1947–2007

Table 3 Estimates of expected risk premia

	Mean (%)		Range (%)		Standard deviation (%)	
	Average	Spot	Average	Spot	Average	Spot
Ibbotson Associates data						
79-years	9.59	5.76	8.74–9.96	2.62–22.60	0.32	5.24
20-years	6.77	6.94	4.99–8.50	2.24–28.95	0.95	6.88
5-years	4.20	10.25	−98.49–11.62	−100.00–39.65	22.00	26.61
S&P Utility Index						
79-years	5.28	2.90	4.30–5.28	1.65–8.15	0.32	1.60
20-years	3.93	3.51	2.78–5.03	2.18–6.88	0.57	1.11
5-years	31.82	326.63	7.77–156.97	6.12–6465.74	31.47	1283.51

coefficient. To test the stability of the predicted risk premia over time, the predicted risk premia were calculated using either the predicted variance over each entire time period or the last monthly (spot) predicted variance. Table 3 presents the mean predicted risk premia, the range of predicted premia and the standard deviations for each time period. It is clear from the results that the risk premia are more stable over the rolling 24 month period when calculated using the average predicted variance compared with using the spot variance. Secondly, the 20 and 79 year means are substantially more stable and reasonable in magnitude than the 5 year means.

Next, given the lessons from the analyses above, we apply the model to mechanically[4] estimate the cost of common equity for 8 utility companies using the model and

[4] The term "mechanically" in this context means that the resulting values have been developed in a consistent manner with the same inputs across all utility stocks but no subjective judgment was used to develop final values for each specific utility stock application.

the DCF and CAPM as comparisons. We also calculated the realized market return for comparison. Two publicly-traded electric, electric and gas combination, gas, and water utilities respectively were chosen for the application. The Gordon (1974) DCF and CAPM models are used in many utility regulatory jurisdictions in the US.

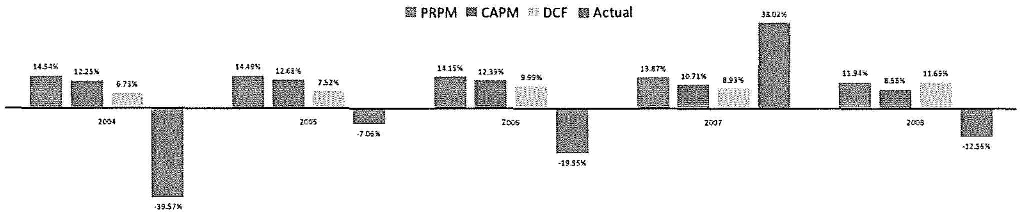
The DCF was applied using a dividend yield, D_0/P_0, derived by dividing the year-end indicated dividend per share (D_0) by the year-end spot market price (P_0). The dividend yield is grown by the year-end I/B/E/S five year projected earnings per share growth rate (g) to derive $D_0(1+g)/P_0$. The one-year predicted dividend yield is then added to the I/B/E/S five-year projected EPS growth rate to obtain the DCF estimate of the cost of common equity capital, k. This study was conducted for the 5 years ending 2008.

The CAPM was applied by multiplying the Value Line beta (β) available at year-end for each company by the long-term historic arithmetic mean market risk premium ($R_m - R_f$). $R_m - R_f$ is derived as the spread of the total return of large company common stocks over the income return on long-term government bonds from the Ibbotson SBBI 2009 Valuation Yearbook. The resulting company-specific market equity risk premium is then added to a projected consensus estimate of the yield on 30-year U.S. Treasury rate provided by Blue Chip Financial Forecasts as the risk-free rate (R_f) to obtain the CAPM result. This study was also conducted over the 5 years ending 2008.

Figures 4–11 show the histograms of the cost of common equity capital estimations for each of the eight public utility stocks and the realized market returns in the forthcoming year. The consumption asset pricing model appears to track more consistently with the CAPM than with the DCF which seems to produce generally lower values than the other methods. The consumption asset pricing model results are similar to the CAPM. The model and the CAPM compete as the best predictor of the rate of return on the book value of common equity (not shown but available upon request), but none of the expected returns were good predictors of market returns. That does not infer that they were not good predictors of *expected* market returns. These results are an initial indicator that the consumption asset pricing model provides reasonable and stable results. This paper does not suggest at this early juncture that the consumption asset pricing model is superior to the CAPM or DCF, although it is based on far less restrictive assumptions than these other models. For example, both the DCF and CAPM assume that markets are efficient. Many assume that the DCF requires that the market-to-book ratio to always equal one, whereas the long-term value for the Standard and Poor's 500 is equal to 2.34. The CAPM assumes that investors demand higher returns for higher volatility and that the minimum required return is the risk-free rate, whereas the consumption asset pricing model allows for investors to require returns less than the risk-free rate for stocks that may have relatively higher volatility but are hedging assets that have desirable return fluctuation patterns that offset downturns in the business cycle. Unlike the CAPM, the model prices the risk to which investors are actually exposed, whether it's systematic risk or not. Some investors are diversified and some are not; the model prices whatever risk to which the aggregate of investors of the specific stock is exposed.

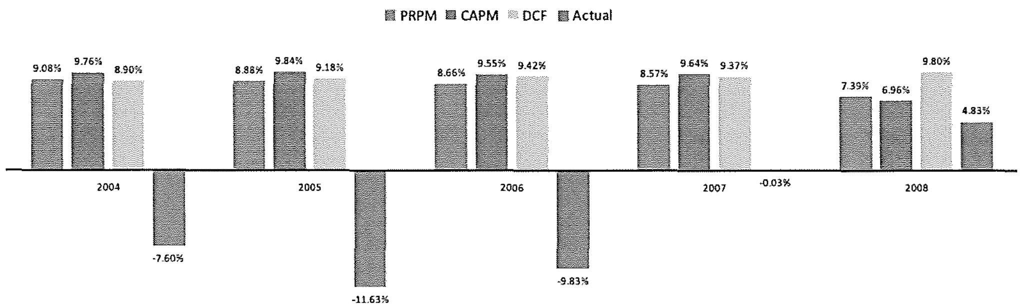
We find that the consumption asset pricing model should be used in combination with other cost of common equity pricing models as additional information in the devel-

Cost of Common Equity Results for Edison International Compared to Market Return*



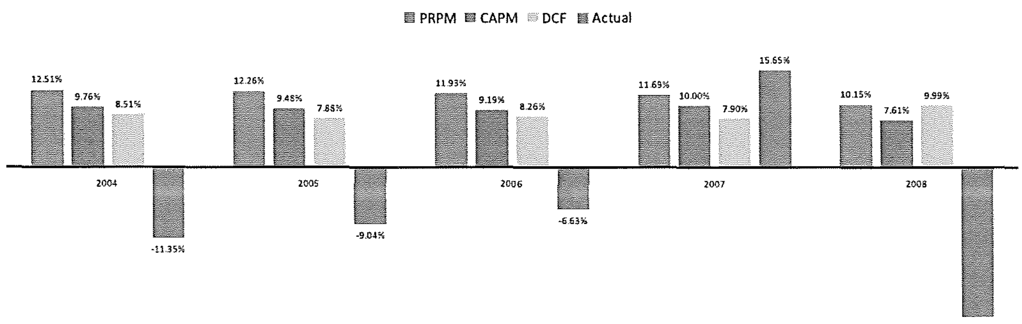
* Market returns calculated for the following years: 2005 -2009

Cost of Common Equity Results for Southern Company Compared to Market Return*



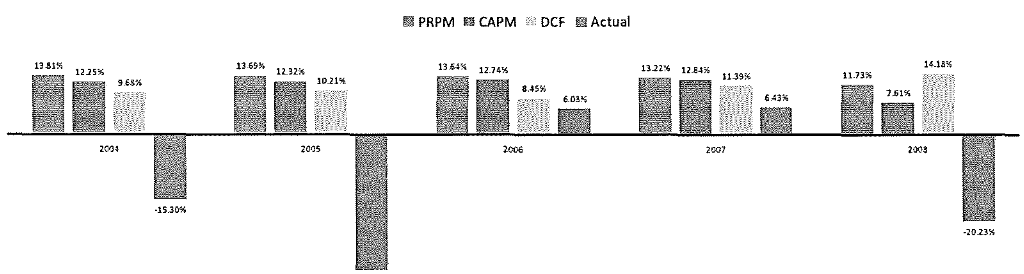
* Market returnscalculated for the following years: 2005 -2009

Cost of Common Equity Results for Consolidated Edison Compared to Market Return*



* Market returns calculated for the following years: 2005 - 2009

Cost of Common Equity Results for PG&E Corp Compared to Market Return*

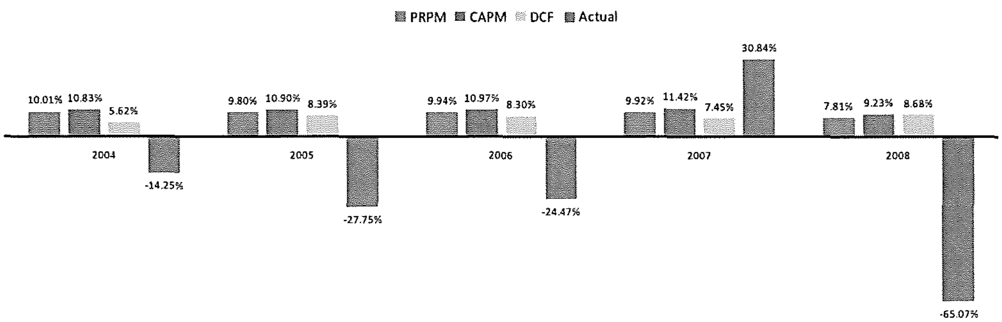


* Market returns calculated for the following years: 2005 -2009

Figs. 4–11 Comparison of the cost of common equity estimates and market

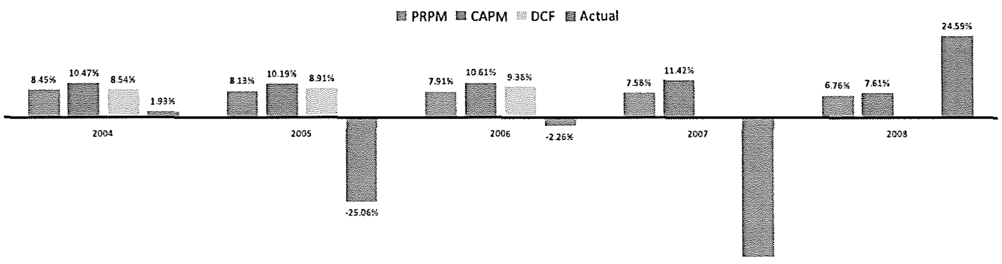
opment of a cost of common equity capital recommendation. Practitioners may find the modeling methods and the use of relatively advanced econometric methods rather cumbersome. The software for performing these estimations is readily available from EViews© and SAS©; two commonly available software packages at utilities, consult-

Cost of Common Equity Results for National Fuel Gas Co. Compared to Market Return*



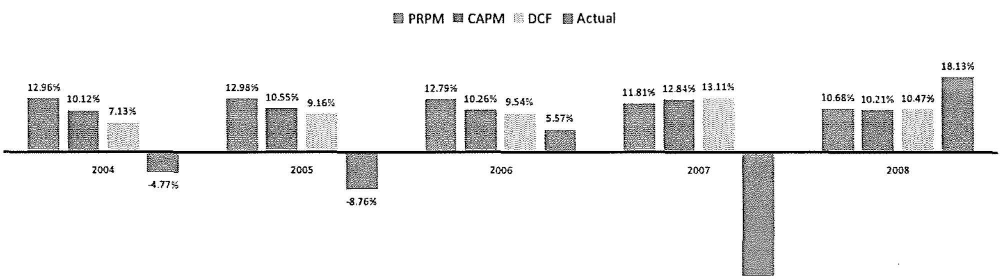
* Market returrnscalculated for the following years: 2005 -2009

Cost of Common Equity Results for Laclede Group Compared to Market Return*



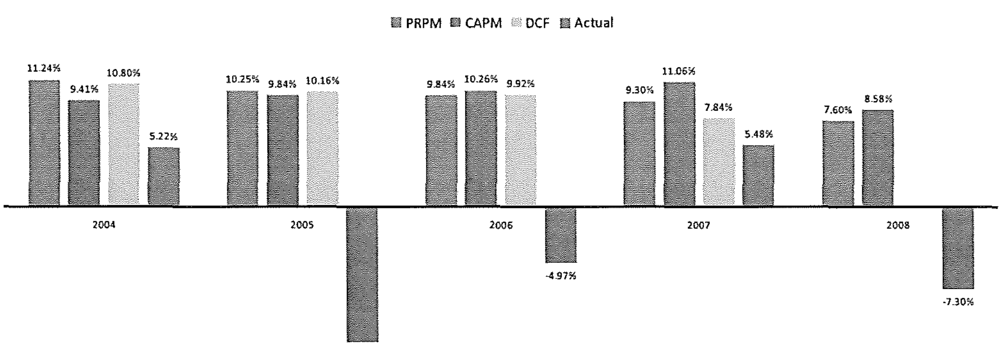
* Market returnscalculated for the following years: 2005-2009
Missing DCF Cost of Capital Estimates Due to Unavailable Growth Rate

Cost of Common Equity Results for California Water Service Group Compared to Market Return *



* Market returns calculated for the following years: 2005 -2009

Cost of Common Equity Results for Middlesex Water Company Compared to Market Return *



* Market returnscalculated for following years: 2005 -2009
Missing DCF Cost of Capital Estimate Due to Unavailable Growth Rate

Figs. 4–11 continued

ing firms and financial firms. Recent Ph.D. and M.S. holding members of research departments of investment and consulting firms have ready access to the model and methods discussed in this paper, although it will require years for these tools, like any "new" technology, to diffuse into standard use. Another problem is that the model requires a substantial time series history on stock returns data to develop stable estimates of risk premia This is problematic especially for the electric and gas utility industries that have consolidated with many mergers in the recent past. This problem can be addressed by developing and predicting the value-weighted risk premium of a portfolio of similar stocks such as electric utilities that have nuclear generating assets. The specific stock in question would be included in the returns index with a weight based on market capitalization that would go to 0 when the stock price history is no longer existent reaching back into the past.

5 Conclusion

The purpose of this paper is to introduce, test empirically and apply a general consumption based asset pricing model that is based on a minimum of assumptions and restrictions that can be used to predict the risk premium to be applied in estimating the cost of common equity for public utilities in regulatory proceedings. The results support the simple consumption-based asset pricing model that predicts the ex ante risk premium with a conditionally predicted volatility in risk premium. The estimates of the cost of common equity from the consumption asset pricing model compare well with rates of return on the book value of common equity and with the CAPM, although both the model and the CAPM results are substantially higher than the DCF. This is quite common in the practice of the cost of common equity in the utility industry. The results of the model are stable and consistent over time. Therefore the model should be considered as it provides additional evidence on the cost of common equity in general and specifically in public utility regulatory proceedings. Secondly, the use of bond-rated yields to predict risk differentiated equity-to-debt risk premia is supported by the empirical evidence and therefore should be applied in estimating the cost of common equity. Finally, the robust empirical evidence on the positive risk-return relationship also shows that utility stocks are not a consumption hedge and are not good hedging securities against contractions in the economy. The model and estimation methodology presented in this paper provide a relatively simple tool to determine whether any asset is a hedge to adverse changes in the business cycle through the level of consumption in the economy.

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Comparative Evaluation of the Predictive Risk Premium Model™, the Discounted Cash Flow Model and the Capital Asset Pricing Model for Estimating the Cost of Common Equity

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Abtract

The regulatory process for setting a utility's allowed rate of return on common equity has generally relied upon the Discounted Cash Flow Model and Capital Asset Pricing Model. Despite the widely known problems with these models, there has been little initiative to adopt more recently developed asset pricing models which have fewer limiting assumptions and require less subjective judgment. The December 2011 issue of the *Journal of Regulatory Economics* published the article "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities",[i] and introduced the Predictive Risk Premium Model™. The model is a general, yet simple, consumption-based asset pricing model of the risk / return relationship for common stocks which can be used to estimate the cost of common equity. The model produces stable, consistent and expectational results. This article presents in summary form exhaustive empirical testing of the PRPM™ for utilities by industry. The empirical testing confirms the *Journal of Regulatory Economics* article conclusion: the PRPM™ produces stable, consistent, and reasonable results for each of the electric, electric and gas, gas local distribution, and water utility industries.

Introduction

The lead article in the July 2008 issue of this *Journal*, "Integrating Renewables into the US Grid: Is it Sustainable," by Professors Peter Mark Jansson and Richard A. Michelfelder[ii], called for the reregulation of the electric utility industry and putting the planning of generation assets, whether renewable or not, back in the hands of the experts and those ultimately responsible for reliability, the electric utilities. During the last ten years or so, states have been backpedalling on deregulation and therefore methods for estimating the cost of common equity and the allowed rate of return have generated new interest as regulating rate of return is not going away as once thought.

The regulatory process for setting a public utility's allowed rate of return on common equity has generally relied upon the familiar Gordon Discounted Cash Flow Model (DCF) and Capital Asset Pricing Model (CAPM). Despite the widely known problems with these models, there has been little initiative to adopt more recently developed asset pricing models which have fewer limiting assumptions and require less subjective judgment than these traditional models. In December 2011, the article "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities",[iii] published in *The Journal of Regulatory Economics* introduced the Predictive Risk Premium Model™ (PRPM™). The PRPM™ is a general, yet simple, consumption-based asset pricing model of the risk / return relationship for common stocks which can be used to estimate the cost rate of common equity (ROE). The stability and consistency of the results of PRPM™

and the ex ante, i.e., expectational, nature of those results indicate that the model should be used to provide additional input into the process of determining an allowed rate of return on common equity for public utilities.

Since publication, more exhaustive empirical testing of the PRPM™ was conducted for the four utility industry groups which comprise the AUS Utility Reports©[iv] universe of publicly traded utilities: an electric utility group; a combination electric and natural gas distribution utility group; a natural gas distribution utility group; and, a water utility group. The empirical testing confirms the conclusion of the original *Journal of Regulatory Economics* article: the PRPM™ produces stable results which are consistent over time.

Development of the PRPM™

The cost rate of common equity is not directly observable in the capital markets and must be inferred using various financial models. The most commonly used cost of common equity models in the regulatory arena are the aforementioned DCF and the CAPM. Since these models are based upon many restrictive assumptions, they involve a significant amount of analyst subjectivity in their application, resulting in much debate over the application and results of these models.

The empirical approach to the PRPM™ is based upon the work of Robert F. Engle, Ph.D.[v] who shared the Nobel Prize in Economics in 2003 "for methods of analyzing economic *time series* with time-varying volatility (*ARCH*)"[vi], with "ARCH" standing for autoregressive conditional heteroskedasticity. In other

words, volatility (variance) changes over time and is related to itself from one period to the next, especially in financial markets. Engle discovered that the volatility (usually measured by variance) in prices and returns clusters over time. Therefore, volatility is highly predictable and can be used to predict future levels of risk. The theoretical asset pricing model was recently developed in the *Journal of Economics and Business* in December 2011 by Rutgers University professors Richard Michelfelder and Eugene Pilotte[vii].

In this study, the PRPM™ estimates the risk / return relationship directly using the outcomes of investors' historical pricing decisions and actual long-term U.S. Treasury security yields, with the predicted equity risk premium generated by the prediction of volatility, i.e., the risk, based upon the volatility of past equity risk premiums for the AUS Utility Reports universe of companies.

Estimation Method

The statistical details of the estimation method of the PRPM™ can be found in the original article in the *Journal of Regulatory Economics*, "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities". Essentially, there are two steps to the application of the PRPM™. First, predicted volatility, i.e., risk, is derived based upon previous volatility plus previous prediction error, because volatility is highly predictable and correlated over time. Second, the predicted volatility can then be used to generate the predicted equity risk premium (ERP) by multiplying it by the GARCH coefficient,

i.e., the slope of the predicted volatility. A risk-free rate is then added to the ERP to estimate the ROE, i.e., the market based cost of common equity.

Application of the PRPM™ to Publicly Traded Utility Companies

The PRPM™ was applied to the companies comprising the AUS Utility Reports©' utility industry groups: the electric, combination electric and natural gas distribution, natural gas distribution and water groups. The PRPM™ variances were calculated monthly for each individual utility beginning with the first available monthly data included for each individual utility in the University of Chicago Booth School of Business' Center for Research in Security Prices (CRSP®) and corresponding monthly long-term U.S. Treasury bond yields from Morningstar's *Ibbotson® SBBI® – 2012 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926-2011 (SBBI)* through 72 month ending periods, i.e., January 2006 through December 2011.

Using EViews© Version 7.2, the PRPM™ coefficients and predicted monthly variances were estimated as described in the *JRE* article for each time series of equity risk premiums. Consistent with the conclusion drawn in the *JRE* article, the predicted equity risk premiums were calculated using the averaged predicted volatilities (variances) over the entire time period for which CRSP data were available for each utility, multiplied by the GARCH, or slope, coefficient generated through EViews® for each time series. To calculate the PRPM™ cost rate of common equity for each utility, the average predicted utility specific equity risk premium through each month ending from January 2006 through December 2011 was then added to the projected consensus forecast of the expected yields

on 30-year U.S. Treasury bonds for the next six quarters by the reporting economists in the concurrent *Blue Chip Financial Forecasts (Blue Chip).*

The DCF was applied in a simple manner, using a dividend yield, D_0 / P_0, derived by dividing the month-end indicated dividend per share (D_0) by the month-end closing market price (P_0) for each utility. The dividend yield was then grown by the month-end I/B/E/S consensus five-year projected earnings per share (EPS) growth rate (g) to derive (D_0 (1 + g) / P_0). The one-month predicted dividend yield was then added to the concurrent month's I/B/E/S consensus five-year average projected EPS growth rate to obtain the DCF estimate of the cost of common equity capital, *k*. The DCF estimates were also calculated for each month from January 2006 through December 2011.

The CAPM was applied by multiplying *Value Line Inc.'s* beta (β)[viii], for each utility, by the long-term historical arithmetic mean market equity risk premium ($R_m - R_f$) through the previous year. ($R_m - R_f$) was derived as the spread of the total return of large company common stocks over the income return on long-term government bonds from the annual *SBBI Valuation Yearbooks* for the years ending 2005 through 2010. The resulting utility-specific equity risk premium was then added to the same projected consensus forecast of the expected yields on 30-year U.S. Treasury bonds for the next six quarters by the reporting economists in the concurrent *Blue Chip* discussed above, to obtain the CAPM estimate of the cost of common equity capital, *k*. The CAPM estimates were also calculated for each month from January 2006 through December 2011.

Finally, the results for each of the models, the PRPM™, DCF, and CAPM, were averaged for each utility group[ix]. Chart 1 presents the average PRPM™ results for each of the AUS Utility Reports© utility groups for each month from January 2006 through December 2011.

Chart 1

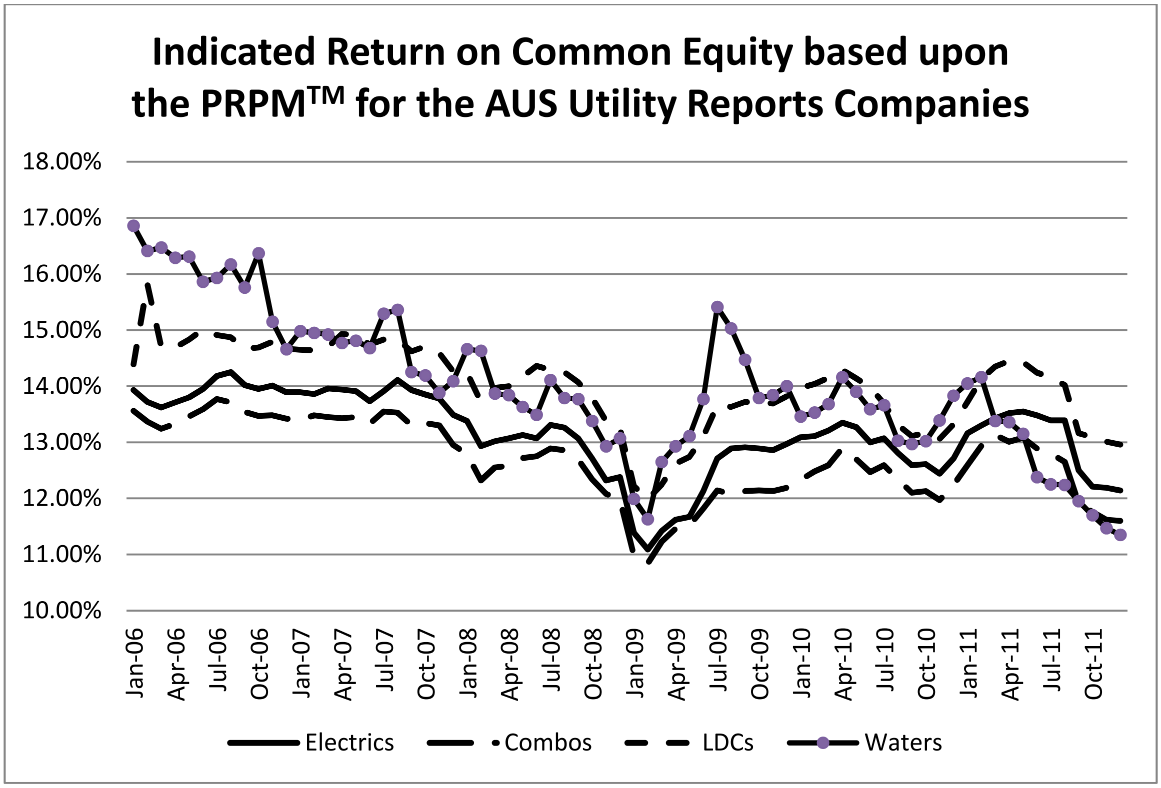


Chart 1 shows that indicated ROEs derived from the PRPM™ were stable for all utility groups until the global financial crisis of 2008 – 2009. During 2008 and 2009, the PRPM™ derived ROEs decline, which in the authors' opinion, was a result of a "flight to quality" by investors, i.e., the willingness of an investor to accept a lower, but more certain, return during financial downturns. Chart 1 also indicates that the PRPM™ derived ROEs for the electric, combination electric and natural gas distribution and natural gas distribution utility groups follow a

nearly identical pattern throughout the 72-month period, with the water utility group following a similar, but more volatile pattern.

Charts 2 through 5 present a comparison of the average PRPM™, DCF, and CAPM cost of common equity estimates for each AUS Utility Reports© utility industry group, i.e., the electric utility group; the combination electric and natural gas distribution utility group; the natural gas distribution utility group; and, the water utility group for each month from January 2006 through December 2011.

Chart 2

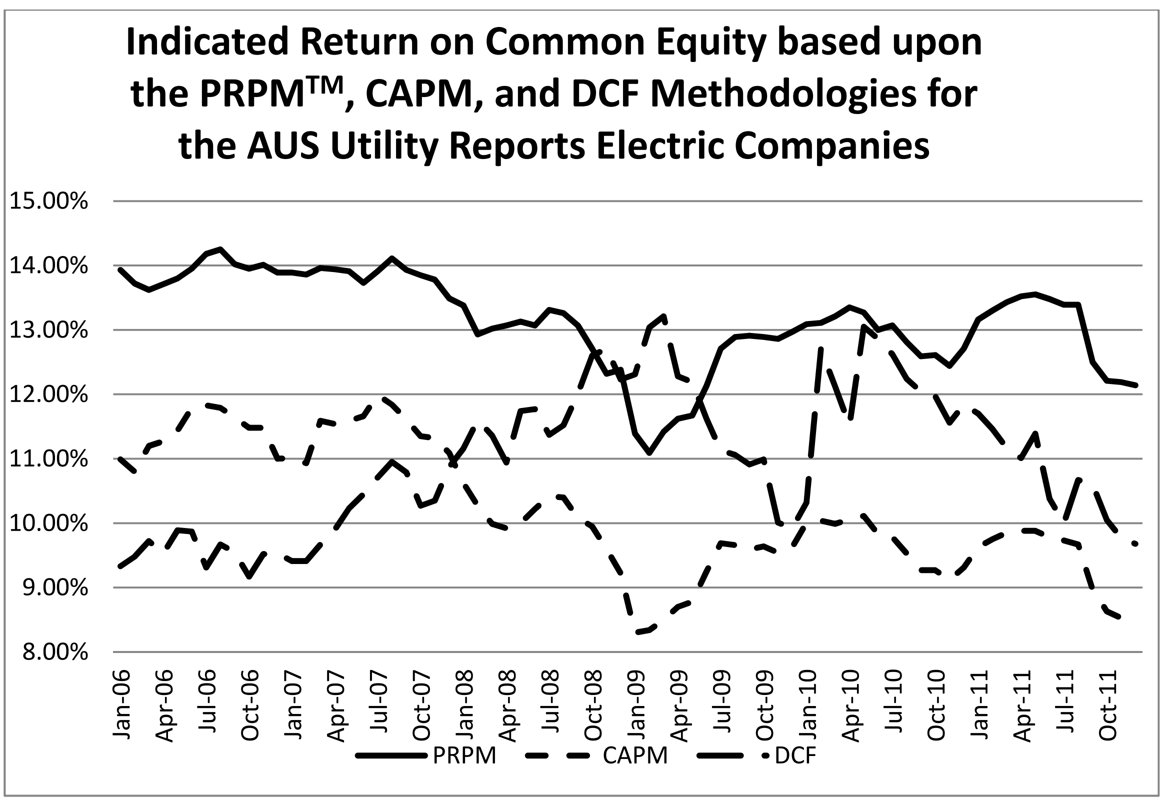


Chart 3

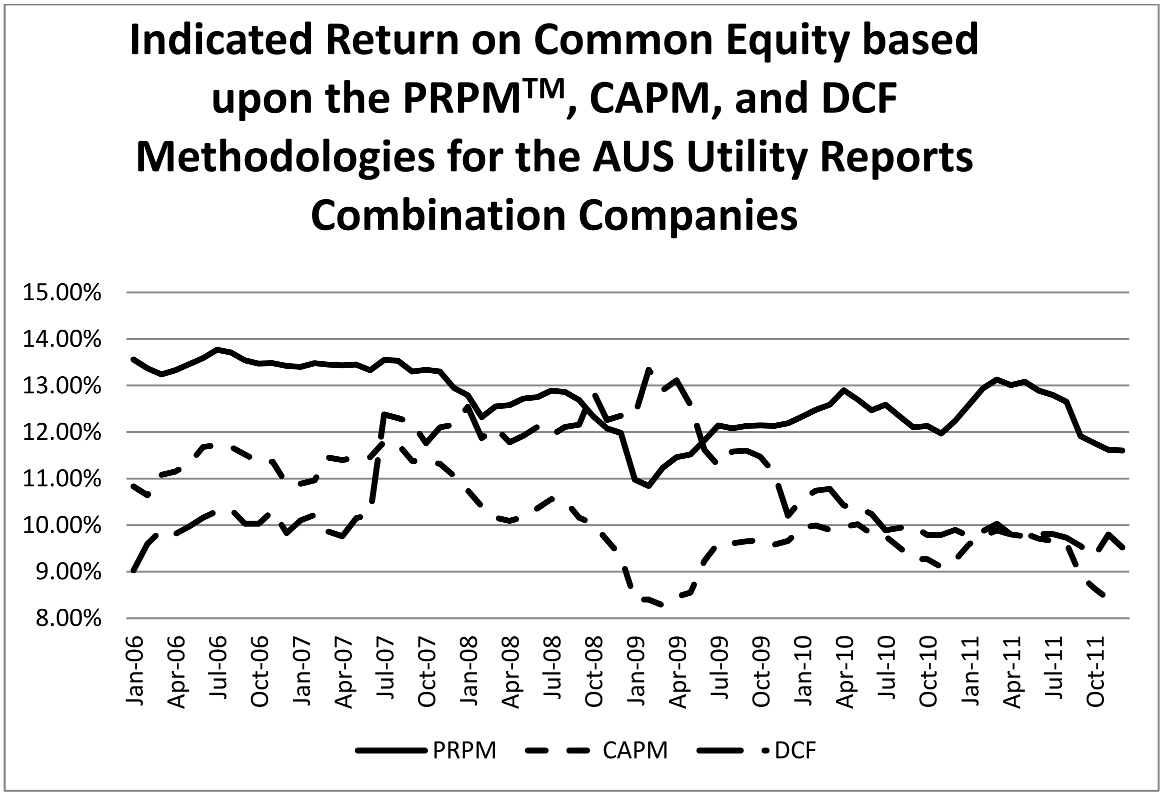


Chart 4

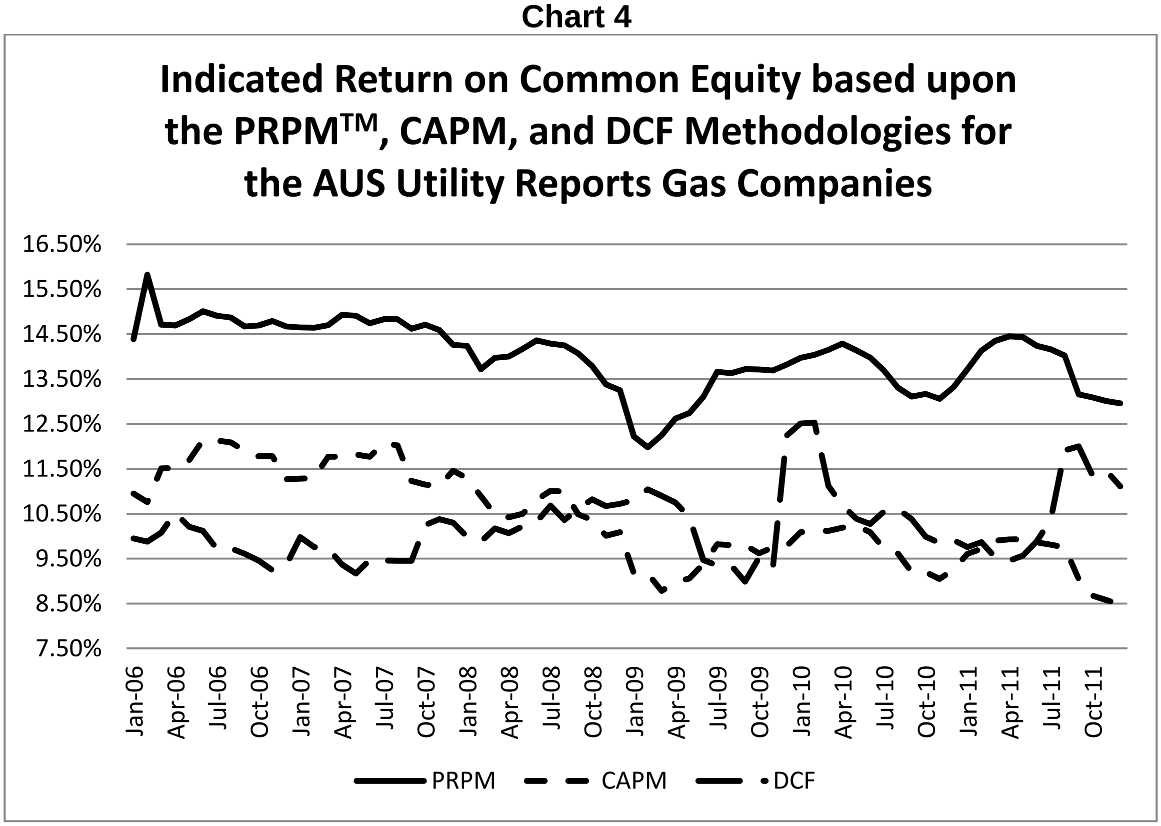
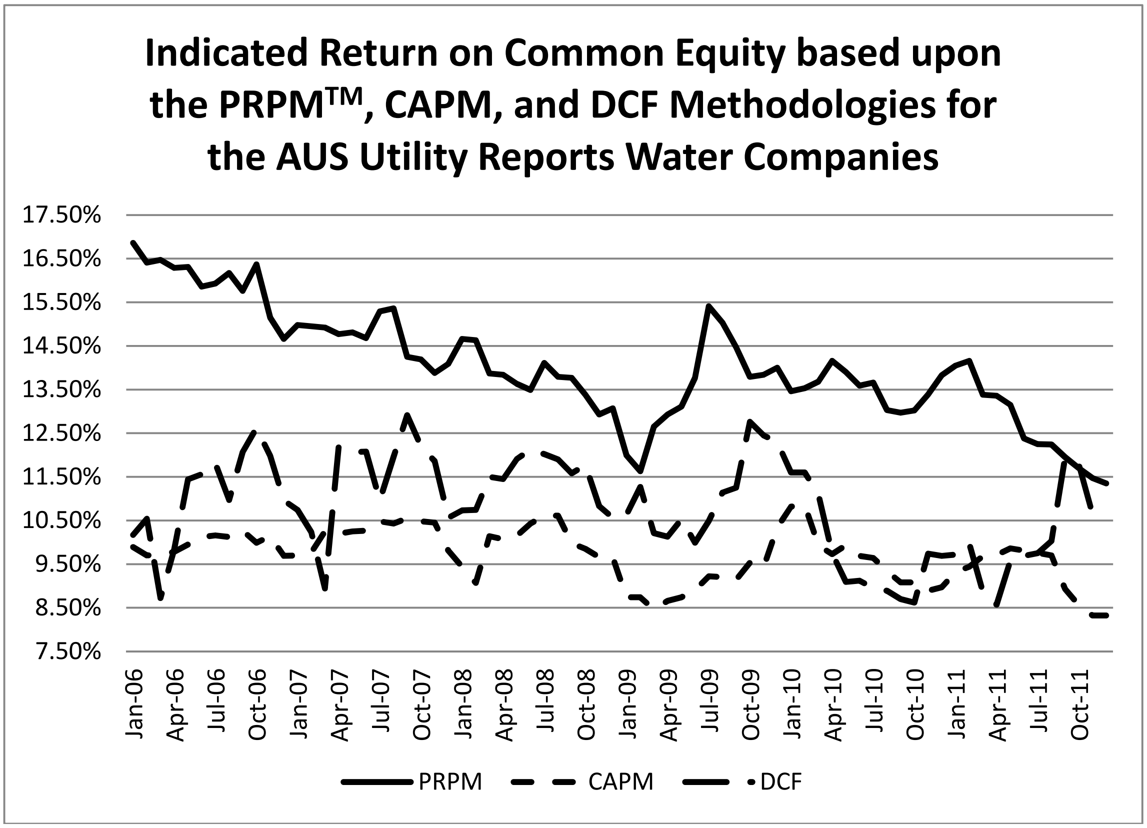


Chart 5



Charts 2 through 5 clearly show that, for the most part, the PRPM™ produces a higher average indicated ROE than both the DCF and CAPM. This is due to the fact that the PRPM™ prices <u>all</u> of the risk which investors actually face collectively. In contrast, the CAPM prices systematic risk (that investors face only if they have a perfectly diversified portfolio, which does not exist) and the DCF uses accounting, not market, based I/B/E/S consensus five-year projected EPS growth rates.

Conclusion

In the authors' opinion, the PRPM™ benefits ratemaking with an additional model to estimate ROE. To that end, the Principals of AUS Consultants have been including the PRPM™ in their rate of return testimonies and the model has been presented publicly in several venues.[x]

Its results are stable and consistent over time. It is not based upon restrictive assumptions, as are the DCF and CAPM. The PRPM™ is also not based upon an estimate of investor behavior, but rather, upon a statistical analysis of actual investor behavior by evaluating the results of that behavior, i.e., the volatility (variance) of historical equity risk premiums. In contrast, subjective decisions surround the choice of the inputs to both the DCF and CAPM, from the choice of the time period over which to measure the dividend yield for the DCF, the choice of the DCF growth rate (e.g., historical or projected, earnings per share or dividends per share, and the like), to the selection of the appropriate beta (e.g., adjusted or unadjusted), market equity risk premium (e.g., historical or projected) and the appropriate risk-free rate (e.g., historical or projected and/or long v. short term) for the CAPM. In addition, as previously discussed, the CAPM exclusively prices systematic risk. In contrast, the PRPM™ prices all of the risk actually faced collectively by investors, because the model does not assume that investors' portfolios are perfectly diversified containing no unsystematic risk.

In addition, the inputs to the PRPM™ are widely available. The GARCH coefficient is calculated with the relatively inexpensive EViews©, or other statistical, software, based upon the realized ERP, i.e., total returns minus the

risk-free rate. The only subjective decisions to be made when applying the PRPM™ relate to which risk-free rate to use, e.g., long-term or short-term, and over what time period to estimate the PRPM™ derived ROEs.

For all of these reasons, the authors conclude that the PRPM™ should be considered as appropriate additional evidence to measure the cost of common equity in regulatory rate setting for public utilities.

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[i] Ahern, Pauline M., Hanley, Frank J. and Michelfelder, Richard A., "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities," *Journal of Regulatory Economics* (2011) 40:261-278.

[ii] Jansson, Peter Mark, Michelfelder, Richard A., "Integrating Renewables into the US Grid: Is It Sustainable," The Electricity Journal (2008, July) 21: 9-21.

[iii] Ahern, Pauline M., Hanley, Frank J. and Michelfelder, Richard A., "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities," *Journal of Regulatory Economics* (2011) 40:261-278.

[iv] AUS Monthly Utility Reports is a monthly pocket reference book covering the electricity, combination electricity & natural gas distribution, natural gas distribution, and water companies which have publicly traded common stock. The monthly reports provide comprehensive information on key ratios and industry rankings based upon the financial statistics presented in the report.

[v] Professor Emeritus, University of California, San Diego and currently the Michael Armellino Professor in Management of Financial Services at New York University, Stern School of Business.

[vi] www.nobelprize.org.

[vii] Michelfelder, Richard, and Pilotte, Eugene, "Treasury Bond Risk and Return, the Implications for the Hedging of Consumption and Lessons for Asset Pricing," *Journal of Economics and Business* (2011) 63, 605-637.

[viii] Using a proprietary data base available at mid-March, June, September, and December at the end of each year, from 2006 – 2011 from Value Line, Inc.

[ix] The results shown in the accompanying charts represent AUS Utility group averages of only those utilities in each group for which it was possible to estimate all three models in any given month. For example, if ABC Utility did not have the I/B/E/S consensus growth rate necessary to calculate the DCF in a given month, that utility's PRPM™ and CAPM were not included in the group average for that month.

[x] Edison Electric Institute Cost of Capital Working Group (Webinar 10/12); NARUC Staff Subcommittee on Accounting & Finance (9/12 & 3/10); National Association of Water Companies Finance/Accounting/Taxation and Rates & Regulations Committees (3/12); NARUC Water Committee (2/12); Wall St. Utility Group (12/11); IN Utility Regulatory Commission Cost of Capital Task Force (9/10); Financial Research Inst. of the Univ. of Missouri Hot Topic Hotline Webinar (12/10); and Center for Research in Regulated Industries Annual Eastern Conference (5/10 & 5/09).

Author Biographies

Dr. Richard A. Michelfelder is Clinical Associate Professor of Finance at Rutgers University, School of Business, Camden. He earlier held a number of entrepreneurial and executive positions in the public utility industry, some of which the application of renewable and energy efficiency resources in utility planning and regulation. He was CEO and chairperson of the board of Quantum Consulting, Inc., a national energy efficiency and utility consulting firm, and Quantum Energy Services and Technologies, LLC, an energy services company that he co-founded. He also helped to co-found and build Comverge, Inc., currently one of the largest demand–response firms in the world that "IPOed" in 2006 on the NASDAQ. He was also an executive at Atlantic Energy, Inc. and Chief Economist at Associated Utilities Services, where he testified on the cost of capital for public utilities in a number of state jurisdictions and before the FERC. He holds a Ph.D. in Economics from Fordham University and has published numerous articles in academic journals.

Pauline M. Ahern is a Principal and Director with AUS Consultants located in Mount Laurel, New Jersey. She has served investor-owned and municipal utilities and authorities for nearly 25 years. A Certified Rate of Return Analyst (CRRA), she is responsible for the development of rate of return analyses, including the development of ratemaking capital structure ratios, senior capital cost rates and the cost rate of common equity and related issues for regulated public utilities. She has testified as an expert witness before 29 regulatory commissions in the U.S. and Canada. In addition, she supervises the production of the various AUS Utility Reports publications and maintains the benchmark index against which the American Gas Association's Mutual Fund performance is measured. She holds an MBA in finance from Rutgers University and a Bachelor of Arts Degree in Economics/Econometrics from Clark University. She has co-authored the article "A New Approach for Estimating the Equity Risk Premium for Public Utilities", co-authored with Frank J. Hanley and Richard A. Michelfelder, Ph.D. published *The Journal of Regulatory Economics* in December 2011.

Dylan W. D'Ascendis is Principal at AUS Consultants, located in Mt. Laurel, NJ. He is responsible for preparing fair rate of return studies for AUS Consultants' rate of return expert witnesses and assists in every aspect of the rate case procedural process. He is also a Certified Rate of Return Analyst (CRRA). Mr. D'Ascendis has testified before in rate cases in South Carolina and Pennsylvania relative to capital structure issues. Mr. D'Ascendis is the Editor of AUS Utility Reports and is responsible for the data collection and production of the AUS Monthly Utility Report, which provides comprehensive information on key ratios and industry rankings based upon financial statistics presented in the report for the electric, gas and water industries. He also assists in the calculation and production of the AGA Index, a market capitalization weighted index of the common stocks of the approximately 70 corporate members of the AGA. Mr. D'Ascendis also served as Research Assistant in the preparation of "New

Approach for Estimating the Cost of Common Equity Capital for Public Utilities" co-authored by AUS Consultants' colleagues Pauline M. Ahern, Frank J. Hanley and Richard A. Michelfelder, published in the *Journal of Regulatory Economics.* Mr. D'Ascendis is a member of the Society of Utility and Regulatory Financial Analysts and the National Association of Water Companies. He holds an M.B.A. in both Finance and International Business from Rutgers University and a Bachelor of Arts Degree in Economic History from the University of Pennsylvania.

Frank J. Hanley is a Principal of AUS Consultants located in Mt. Laurel, NJ. He joined the firm in 1971 as Vice President, was elected Senior Vice President in 1975, and President of the Utility Services Group in 1989. Mr. Hanley has testified on cost of capital and related financial issues in more than three hundred cases before thirty-three state regulatory commissions, the District of Columbia Public Service Commission, the Public Services Commission of the U.S. Virgin Islands, the Federal Energy Regulatory Commission, a U.S. District Court, a U.S. Bankruptcy Court and the U.S. Tax Court. He has represented a number of electric, natural gas distribution and transmission companies, oil pipeline companies, as well as steam heating, telephone, water and wastewater companies. Mr. Hanley is a graduate of Drexel University and is a Certified Rate of Return Analyst (CRRA). He is a member of the Society of Utility and Regulatory Financial Analysts. He is an Associate Member of the American Gas Association as well as a member of its Rate Committee; and an Associate Member of the Energy Association of Pennsylvania. Also, he is a member of the Executive Advisory Council of the Rutgers University School of Business at Camden as well as a member of the Advisory Council of New Mexico State University's Center for Public Utilities.

FINANCIAL QUARTERLY
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Comparable Earnings: New Life for an Old Precept

by
Frank J. Hanley
Pauline M. Ahern

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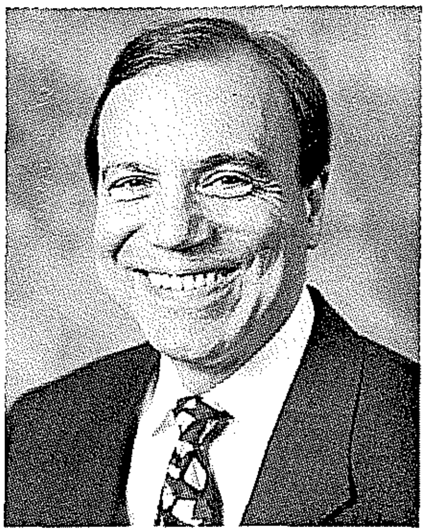
Comparable Earnings: New Life for an Old Precept

Accelerating deregulation has greatly increased the investment risk of natural gas utilities. As a result, the authors believe it more appropriate than ever to employ the comparable earnings model. We believe our application of the model overcomes the greatest traditional objection to it — lack of comparability of the selected non-utility proxy firms. Our illustration focuses on a target gas pipeline company with a beta of 0.96 — almost equal to the market's beta of 1.00.



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Pauline M. Ahern is a senior financial analyst with AUS Consultants — Utility Services Group. She has participated in many cost-of-capital studies. A former employee of the U.S. Department of the Treasury and the Federal Reserve Bank of Boston, she holds an MBA degree from Rutgers University and is a Certified Rate of Return Analyst.

Introduction

The comparable earnings model used to determine a common equity cost rate is deeply rooted in the standard of "corresponding risk" enunciated in the landmark *Bluefield* and *Hope* decisions of the U.S. Supreme Court.[1] With such solid grounding in the foundations of rate of return regulation, comparable earnings should be accepted as a principal model, along with the currently popular market-based models, provided that its most common criticism, non-comparability of the proxy companies, is overcome.

Our comparable earnings model overcomes the non-comparability issue of the non-utility firms selected as a proxy for the target utility, in this example, a gas pipeline company. We should note that in the absence of common stock prices for the target utility (as with a wholly-owned subsidiary), it is appropriate to use the average of a proxy group of similar risk gas pipeline companies whose common stocks are actively traded. As we will demonstrate, our selection process results in a group of domestic, non-utility firms that is comparable in total risk, the sum of business and financial risk, which reflects both non-diversifiable systematic, or market, risk as well as diversifiable unsystematic, or firm-specific, risk.

Embedded in the Landmark Decisions

As stated in *Bluefield* in 1922: "A public utility is entitled to such rates as will permit it to earn a return ... on investments in other business undertakings which are attended by corresponding risks and uncertainties ..."

In addition, the court stated in *Hope* in 1944: "By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks."

Thus, the "corresponding risk" precept of *Bluefield* and *Hope* predates the use of such market-based cost-of-equity models as the Discounted Cash Flow (DCF) and Capital Asset Pricing (CAPM), which were developed later and are currently popular in rate-base/rate-of-return regulation. Consequently, the comparable earnings model has a longer regulatory and judicial history. However, it has far greater relevance now than ever before in its history because significant deregulation has substantially increased natural gas utilities' investment risk to a level similar to that of non-utility firms. As a result, it is

Comparable Earnings *from page 4*

more important than ever to look to similar-risk non-utility firms for insight into common equity cost rate, especially in view of the deficiencies inherent in the currently popular market-based cost of common equity models, particularly the DCF model.

Despite the fact that the landmark decisions are still regarded as having set the standards for determining a fair rate of return, the comparable earnings model has experienced decreased usage by expert witnesses, as well as less regulatory acceptance over the years. We believe the decline in the popularity of the comparable earnings model, in large measure, is attributable to the difficulty of selecting non-utility proxy firms that regulators will accept as comparable to the target utility. Regulatory acceptance is difficult to gain when the selection process is arbitrary. Our application of the model is objective and consistent with fundamental financial tenets.

Principles of Comparable Earnings

Regulation is a substitute for the competition of the marketplace. Moreover, regulated public utilities compete in the capital markets with all firms, including unregulated non-utilities. The comparable earnings model is based upon the opportunity cost principle; i.e., that the true cost of an investment is the return that could have been earned on the next best available alternative investment of similar risk. Consequently, the comparable earnings model is consistent with regulatory and financial principles, as it is a surrogate for the competition of the marketplace, and investors seek the greatest available rate of return for bearing similar risk.

The selection of comparable firms is the most difficult step in applying the comparable earnings model, as noted by Phillips[2] as well as by Bonbright, Danielsen and Kamerschen.[3] The selection of non-utility proxy firms should result in a sufficiently broad-based group in order to minimize the effect of company-specific aberrations. However, if the selection process is arbitrary, it likely would result in a proxy group that is too broad-based, such as the Standard & Poor's 500 Composite Index or the Value Line Industrial Composite. The use of such groups would require subjective adjustments to the comparable earnings results to reflect risk differences between the group(s) and the target utility, a gas pipeline company in this example.

Authors' Selection Criteria

We base the selection of comparable non-utility firms on market-based, objective, quantitative measures of risk resulting from market prices that subsume investors' assessments of all elements of risk. Thus, our approach is based upon the principle of risk and return; namely, that firms of comparable risk should be expected to earn comparable returns. It is also consistent with the "corresponding risk" standard established in *Bluefield* and *Hope*. We measure total investment risk as the sum of non-diversifiable systematic and diversifiable unsystematic risk. We use the unadjusted beta as a measure of systematic risk and the standard error of the estimate (residual standard error) as a measure of unsystematic risk. Both the unadjusted beta and the residual standard error are derived from a regression of the target utility's security returns relative to the market's returns, which takes the general form:

$$r_{it} = a_i + b_i\, r_{mt} + e_{it}$$

where:

r_{it} = *t*th observation of the *i*th utility's rate of return

r_{mt} = *t*th observation of the market's rate of return

e_{it} = *t*th random error term

a_i = constant least-squares regression coefficient

b_i = least-squares regression slope coefficient, the unadjusted beta.

As shown by Francis,[4] the total variation or risk of a firm's return, Var (r_i), comes from two sources:

Var (r_i) = total risk of *i*th asset

= var$(a_i + b_i r_m + e)$ substituting $(a_i + b_i r_m + e)$ for r_i

= var$(b_i r_m)$ + var (e) since var$(a_i) = 0$

= b_i^2 var(r_m) + var (e) since var$(b_i r_m) = b_i^2$ var(r_m)

= systematic + unsystematic risk

Francis[5] also notes: "The term $\sigma^2(r_i|r_m)$ is called the *residual variance around the regression line* in statistical terms or *unsystematic risk* in capital market theory language. $\sigma^2\,(r_i|r_m)$ = ... = var (e). The residual variance is the squared standard error in regression language, a measure of unsystematic risk." Application of these criteria results in a group of non-utility firms whose average total investment risk is indeed comparable to that of the target gas pipeline.

As a measure of systematic risk, we use the Value Line unadjusted beta. Beta measures the extent to which market-wide or macro-economic events affect a firm's stock price. We use the unadjusted beta of the target utility as a starting point because it results from the regression of the target utility's security returns relative to the market's returns. Thus, the resulting standard deviation of beta relates to the unadjusted beta. We use the standard deviation of the unadjusted beta to determine the range around it as the selection criterion based on systematic risk.

We use the residual standard error of the regression as a measure of unsystematic risk. The residual standard error reflects the extent to which events specific to the firm's operations affect a firm's stock price. Thus, it is a measure of diversifiable, unsystematic, firm-specific risk.

An Illustration of Authors' Approach

Step One: We begin our approach by establishing the selection criteria as a range of both unadjusted beta and residual standard error of the target gas

continued on page 6

Comparable Earnings *from page 5*

pipeline company.

As shown in table 1, our target gas pipeline company has a Value Line unadjusted beta of 0.90, whose standard deviation is 0.1250. The selection criterion range of unadjusted beta is the unadjusted beta plus (+) and minus (-) three of its standard deviations. By using three standard deviations, 99.73 percent of the comparable unadjusted betas is captured.

Three standard deviations of the target utility's unadjusted beta equals 0.38 (0.1250 x 3 = 0.3750, rounded to 0.38). Consequently, the range of unadjusted betas to be used as a selection criteria is 0.52 - 1.28 (0.52 = 0.90 - 0.38) and (1.28 = 0.90 + 0.38).

Likewise, the selection criterion range of residual standard error equals the residual standard error plus (+) and minus (-) three of its standard deviations. The standard deviation of the residual standard error is defined as: $\sigma/\sqrt{2N}$.

As also shown in table 1, the target gas pipeline company has a residual standard error of 3.7867. According to the above formula, the standard deviation of the residual standard error would be 0.1664 ($0.1664 = 3.7867/\sqrt{2(259)} = 3.7867/22.7596$, where 259 = N, the number of weekly price change observations over a period of five years). Three standard deviations of the target utility's residual standard error would be 0.4992 (0.1664 x 3 = .4992). Consequently, the range of residual standard errors to be used as a selection criterion is 3.2875 - 4.2859 (3.2875 = 3.7867 - 0.4992) and (4.2859 = 3.7867 + 0.4992).

Step Two: The step one criteria are applied to Value Line's data base of nearly 4,000 firms for which Value Line derives unadjusted betas and residual standard errors on a weekly basis. All firms with unadjusted betas and residual standard errors within the criteria ranges are then selected.

Step Three: In the regulatory ratemaking environment, authorized common equity return rates are applied to a book-value rate base. Thus, the earnings rates on book common equity, or net worth, of competitive, non-utility firms are highly relevant provided those firms are indeed comparable in total risk to the target gas pipeline. The use of the return rates of other utilities has no relevance because their allowed, and hence subsequently achieved, earnings rates are dependent upon the regulatory

table 1

Summary of the Comparable Earnings Analysis for the Proxy Group of 248 Non-Utility Companies Comparable in Total Risk to the Target Gas Pipeline Company[1]

	1	2	3	4	5	6	7	8
			residual	rate of return on net worth				
	adj. beta	unadj. beta	standard error	3-year average[2]	4-year average[2]	5-year average[2]	5-year projected[3]	
average for the proxy group of 248 non-utility companies comparable in total risk to the target gas pipeline company	0.97	0.92	3.7705					
target gas pipeline company	0.96	0.90[4]	3.7867					
median				11.7%	12.0%	12.6%	15.5%	
average of the median historical returns					12.1%			
conclusion[5]								13.8%

[1]The criteria for selection of the non-utility group was that the non-utility companies be domestic and included in *Value Line Investment Survey*. The non-utility group was selected based on an unadjusted beta range of 0.52 to 1.28 and a residual standard error range of 3.2875 to 4.2859.
[2]Ending 1992.
[3]1996-1998/1997-1999.
[4]The average standard deviation of the target gas pipeline company's unadjusted beta is 0.1250.
[5]Equal weight given to both the average of the 3-, 4- and 5-year historical medians (12.1%) and 5-year projected median rate of return on net worth (15.5%). Thus, 13.8% = (12.1% + 15.5% / 2).
Source: Value Line Inc., March 15, 1994
Value Line Investment Survey

Comparable Earnings *from page 6*

process. Consequently, we believe all utilities must be eliminated to avoid circularity. Moreover, we believe non-domestic firms must be eliminated because their reporting methods differ significantly from U.S. firms.

Step Four: We then eliminated those firms for which Value Line does not publish a "Ratings & Report" in *Value Line Investment Survey* so that the historical and projected returns on net worth[6] are from a consistent source. We use historical returns on net worth for the most recent five years, as well as those projected three to five years into the future. We believe it is logical to evaluate both historical and projected return rates because it is reasonable to assume that investors avail themselves of both when they are available from widely disseminated information services, such as Value Line Inc. The use of Value Line's return rates on net worth understates the common equity return rates for two reasons. First, preferred stock is included in net worth. Second, the net worth return rates are as of the end of each period. Thus, the use of average common equity return rates would yield higher results.

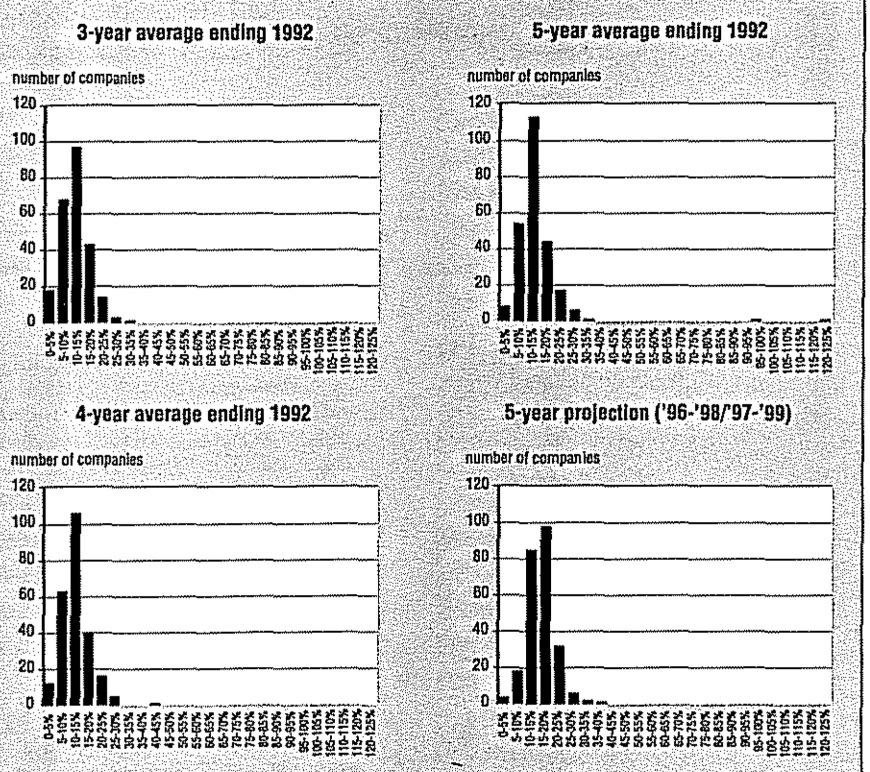
Step Five: Median returns based on the historical average three, four and five years ending 1992 and projected 1996-1998 or 1997-1999 rates of return on net worth are then determined as shown in columns 4 through 7 of table 1. The median is used due to the wide variations and skewness in rates of return on net worth for the non-utility firms as evidenced by the frequency distributions of those returns as shown in illustration 1.

However, we show the average unadjusted beta, 0.92, and residual standard error, 3.7705, for the proxy group in columns 2 and 3 of table 1 because their frequency distributions are not significantly skewed, as shown in illustration 2.

Step Six: Our conclusion of a com-

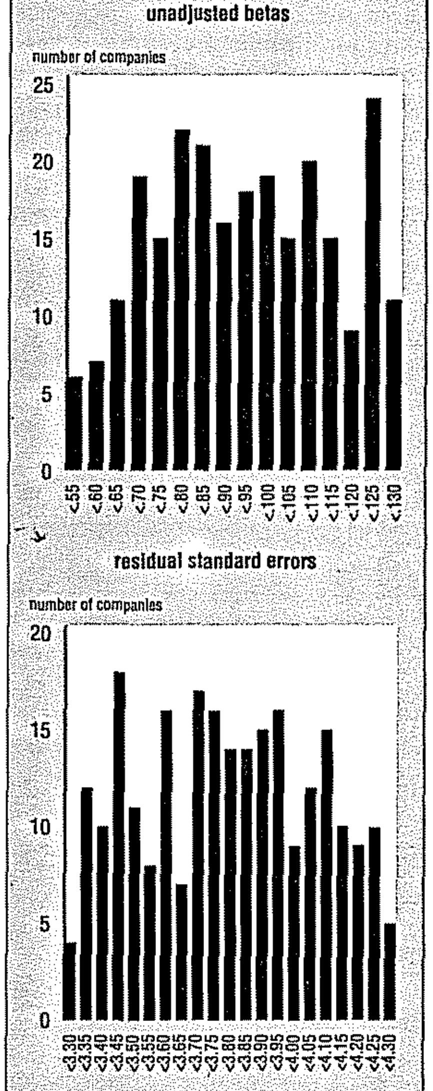
continued on page 8

Illustration 1
Rates of Return on Net Worth for the Proxy Group of 248 Non-Utility Companies[1]



[1]Comparable to target gas pipeline

Illustration 2
Unadjusted Betas and Residual Standard Errors for the Proxy Group of 248 Non-Utility Companies[1]



[1]Comparable to target gas pipeline

Comparable Earnings *from page 7*

parable earnings cost rate is based upon the mid-point of the average of the median three-, four- and five-year historical rates of return on net worth of 12.1 percent as shown in column 5 and the median projected 1996-1998/1997-1999 rate of return on net worth of 15.5 percent as shown in column 7 of table 1. As shown in column 8, it is 13.8 percent.

Summary

Our comparable earnings approach demonstrates that it is possible to select a proxy group of non-utility firms that is comparable in total risk to a target utility. In our example, the 13.8 percent comparable earnings cost rate is very conservative as it is an expected achieved rate on book common equity (a regulatory allowed rate should be greater) and because it is based on end-of-period net worth. A similar rate on average net worth would be about 20 to 40 basis points higher (i.e., 14.0 to 14.2 percent) and still understate the appropriate regulatory allowed rate of return on book common equity.

Our selection criteria are based upon measures of systematic and unsystematic risk, specifically unadjusted beta and residual standard error. They provide the basis for the objective selection of comparable non-utility firms. Our selection criteria rely on changes in market prices over approximately five years. We compare the aggregate total risk, or the sum of systematic and unsystematic risk, which reflects investors' aggregate assessment of both business and financial risk. Thus, no adjustments are necessary to the proxy group results to compensate for the differences in business risk and financial risk, such as accounting practices and debt/equity ratios. Moreover, it is inappropriate to attempt a comparison of the target utility with any individual firm, or subset of firms, in the proxy group because only the average firm of the group is relevant.

Because the comparable earnings model is firmly anchored in the "corresponding risk" precept established in the landmark court decisions, it is worthy of consideration as a principal model for use in estimating the cost rate of common equity capital of a regulated utility. Our approach to the comparable earnings model produces a proxy group that is indeed comparable in total risk because the selection process is objective and quantitative. It therefore overcomes criticism linked to arbitrary selection processes.

All cost-of-common-equity models, including the DCF and CAPM, are fraught with deficiencies, usually stemming from the many necessary but unrealistic assumptions that underlie them. The effects of the deficiencies of individual models can be mitigated by using more than one model when estimating a utility's common equity cost rate. Therefore, when the non-comparability issue is overcome, the comparable earnings model deserves to receive the same consideration as a primary model, as do the currently popular market-based models. ■

[1]*Bluefield Water Works Improvement Co. v. Public Service Commission*. 262 U.S. 679 (1922) and *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 519 (1944).

[2]Charles F. Phillips Jr., The Regulation of Public Utilities: Theory and Practice, Public Utilities Reports Inc., 1988, p. 379

[3]James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utilities Rates, 2nd edition, Public Utilities Reports Inc. 1988, p. 329

[4]Jack Clark Francis, Investments: Analysis and Management, 3rd edition, McGraw-Hill Book Co., 1980, p. 363

[5]Id., p. 548

[6]Returns on net worth must be used when relying on Value Line data because returns on book common equity for non-utility firms are not available from Value Line

Report Lists Pipeline, Storage Projects

More than $9 billion worth of projects to expand the nation's natural gas pipeline network are in various stages of development, according to an A.G.A. report. These projects involve nearly 8,000 miles of new pipelines and capacity additions to existing lines and represent 15.3 billion cubic feet (Bcf) per day of new pipeline capacity.

During 1993 and early 1994, construction on 3,100 miles of pipeline was completed or under way, at a cost of nearly $4 billion, says A.G.A. These projects are adding 5.4 Bcf in daily delivery capacity nationwide.

Among the projects completed in 1993 were Pacific Gas Transmission Co.'s 805 miles of looping that allows increased deliveries of Canadian gas to the West Coast; Northwest Pipeline Corp.'s addition of 433 million cubic feet of daily capacity for customers in the Pacific Northwest and Rocky Mountain areas; and the 156-mile Empire State Pipeline in New York.

In addition, major construction projects were started on the systems of Texas Eastern Transmission Corp. and Algonquin Gas Transmission Co. — both subsidiaries of Panhandle Eastern Corp. — and along Florida Gas Transmission Co.'s pipeline.

The report goes on to discuss another $5 billion in proposed projects, which, if completed, will add nearly 5,000 miles of pipeline and 9.8 Bcf per day in capacity, much of it serving Florida and West Coast markets.

A.G.A. also identifies 47 storage projects and says that if all of them are built, existing storage capacity will increase by more than 500 Bcf, or 15 percent.

For a copy of *New Pipeline Construction: Status Report 1993-94* (#F00103), call A.G.A. at (703) 841-8490. Price per copy is $6 for employees of member companies and associates and $12 for other customers.

United Water Rhode Island, Inc.
Brief Summary of Common Equity Cost Rate

No.	Principal Methods	Proxy Group of Nine Water Companies	
1.	Discounted Cash Flow Model (DCF) (1)	8.48	%
2.	Risk Premium Model (RPM) (2)	11.33	
3.	Capital Asset Pricing Model (CAPM) (3)	9.36	
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	10.67	
5.	Indicated Common Equity Cost Rate before Adjustment for Business Risks	10.00	%
7	Business Risk Adjustment (5)	0.55	
8.	Recommended Common Equity Cost Rate	10.55	%

Notes: (1) From page 2 of this Schedule.
(2) From page 12 of this Schedule.
(3) From page 22 of this Schedule.
(4) From page 24 of this Schedule.
(5) Business risk adjustment to reflect United Water Rhode Island, Inc.'s greater business risk due to its small size relative to the proxy group as detailed in Ms. Ahern's accompanying direct testimony.

United Water Rhode Island, Inc.
Indicated Common Equity Cost Rate Using the Discounted Cash Flow Model for
the Proxy Group of Nine Water Companies

	1	2	3	4	5	6	7	8
Proxy Group of Nine Water Companies	Average Dividend Yield (1)	Value Line Projected Five Year Growth in EPS (2)	Reuters Mean Consensus Projected Five Year Growth Rate in EPS	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth in EPS (3)	Adjusted Dividend Yield (4)	Indicated Common Equity Cost Rate (5)
American States Water Co.	2.87 %	7.00 %	1.00 %	2.00 %	1.00 %	2.75 %	2.91 %	5.66 %
American Water Works Co., Inc.	2.69	8.50	8.90	7.20	6.90	7.88	2.80	10.68
Aqua America, Inc.	2.56	10.00	7.40	5.60	5.80	7.20	2.65	9.85
Artesian Resources Corp.	3.64	NA	NA	NA	4.00	4.00	3.71	7.71
California Water Service Group	2.84	7.00	NA	6.00	6.00	6.33	2.93	9.26
Connecticut Water Service, Inc.	2.90	6.50	NA	5.00	5.00	5.50	2.98	8.48
Middlesex Water Company	3.61	4.00	NA	NA	2.70	3.35	3.67	7.02
SJW Corporation	2.57	7.50	NA	NA	14.00	10.75	2.71	13.46
York Water Company	2.66	6.50	NA	NA	4.90	5.70	2.74	8.44
Average								8.95 %
Median								8.48 %

NA= Not Available
NMF = Not Meaningful Figure

Notes:

(1) Indicated dividend at 02/04/2014 divided by the average closing price of the last 60 trading days ending 02/04/2014 for each company.
(2) From pages 3 through 11 of this Schedule.
(3) Average of columns 2 through 5 excluding negative growth rates.
(4) This reflects a growth rate component equal to one-half the conclusion of growth rate (from column 6) x column 1 to reflect the periodic payment of dividends (Gordon Model) as opposed to the continuous payment. Thus, for American States Water Co. , 2.87% x (1+(1/2 x 2.75%)) = 2.91%.
(5) Column 6 + column 7.

Source of Information:

Value Line Investment Survey
www.reuters.com Downloaded on 02/05/2014
www.zacks.com Downloaded on 02/05/2014
www.yahoo.com Downloaded on 02/05/2014

AMER. STATES WATER NYSE-AWR

RECENT PRICE 28.15 | P/E RATIO 18.5 (Trailing: 17.9 Median: 22.0) | RELATIVE P/E RATIO 0.99 | DIV'D YLD 3.1% | VALUE LINE

TIMELINESS 3 Lowered 8/16/13
SAFETY 2 Raised 7/20/12
TECHNICAL 1 Raised 1/10/14
BETA .65 (1.00 = Market)

High:	14.5	14.5	13.4	17.3	21.9	23.1	21.0	19.4	19.8	18.2	24.1	33.1
Low:	10.1	10.8	10.4	12.2	15.1	16.8	13.5	14.9	15.6	15.3	17.0	24.0

Target Price Range 2016 | 2017 | 2018

2016-18 PROJECTIONS

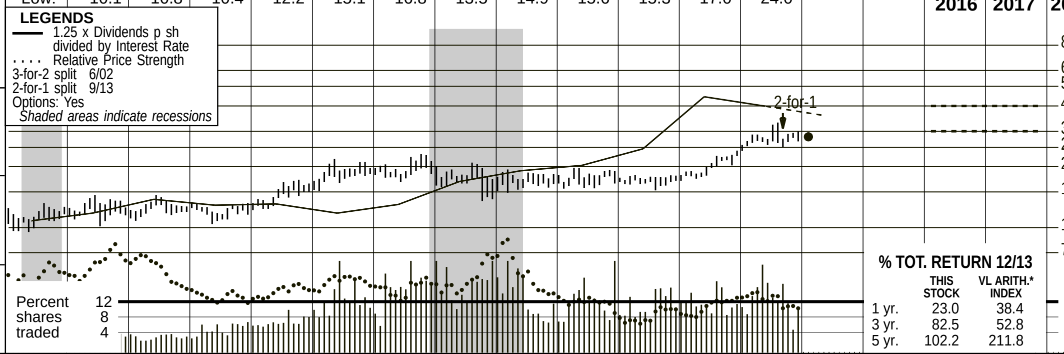
	Price	Gain	Ann'l Total Return
High	40	(+40%)	12%
Low	30	(+5%)	5%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	2	1	0	0	1	0
Options	0	0	1	4	4	0	0	0	0
to Sell	0	0	0	5	5	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	93	98	72
to Sell	59	70	90
Hld's(000)	24964	24268	23953



% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	23.0	38.4
3 yr.	82.5	52.8
5 yr.	102.2	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
5.72	5.51	6.45	6.08	6.53	6.89	6.99	6.81	7.03	7.88	8.75	9.21	9.74	10.71	11.12	12.12	*12.20*	*12.50*	Revenues per sh	*13.50*
.92	1.02	1.13	1.10	1.26	1.27	1.04	1.11	1.32	1.45	1.65	1.69	1.70	2.11	2.13	2.48	*2.50*	*2.65*	"Cash Flow" per sh	*2.95*
.52	.54	.60	.64	.67	.67	.39	.53	.66	.67	.81	.78	.81	1.11	1.12	1.41	*1.55*	*1.60*	Earnings per sh A	*1.80*
.42	.42	.43	.43	.43	.44	.44	.44	.45	.46	.48	.50	.51	.52	.55	.64	.76	*.84*	Div'd Decl'd per sh B■	*1.00*
1.29	1.56	2.15	1.51	1.59	1.34	1.88	2.51	2.12	1.95	1.45	2.23	2.09	2.12	2.13	1.77	*2.30*	*2.25*	Cap'l Spending per sh	*2.50*
5.62	5.74	5.91	6.37	6.61	7.02	6.98	7.51	7.86	8.32	8.77	8.97	9.70	10.13	10.84	11.80	*12.55*	*13.25*	Book Value per sh	*16.25*
26.87	26.87	26.87	30.24	30.24	30.36	30.42	33.50	33.60	34.10	34.46	34.60	37.06	37.26	37.70	38.53	*39.00*	*40.00*	Common Shs Outst'g C	*43.00*
14.5	15.5	17.1	15.9	16.7	18.3	31.9	23.2	21.9	27.7	24.0	22.6	21.2	15.7	15.4	14.3	*18.4*		Avg Ann'l P/E Ratio	*19.5*
.84	.81	.97	1.03	.86	1.00	1.82	1.23	1.17	1.50	1.27	1.36	1.41	1.00	.97	.91	*1.03*		Relative P/E Ratio	*1.30*
5.5%	5.0%	4.2%	4.2%	3.9%	3.6%	3.5%	3.6%	3.1%	2.5%	2.5%	2.9%	2.9%	3.0%	3.2%	3.1%	2.7%		Avg Ann'l Div'd Yield	*3.1%*

CAPITAL STRUCTURE as of 9/30/13
Total Debt $335.5 mill. **Due in 5 Yrs** $10.6 mill.
LT Debt $332.1 mill. **LT Interest** $16.0 mill.
(LT interest earned: 5.2x: total interest coverage: 4.9x) (41% of Cap'l)
Leases, Uncapitalized: Annual rentals $3.0 mill.
Pension Assets-12/12 $107.6 mill. **Oblig.** $163.2 mill.
Pfd Stock None.

Common Stock 38,717,549 shs. **as of 11/1/13**

MARKET CAP: $1.1 billion (Mid Cap)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
212.7	228.0	236.2	268.6	301.4	318.7	361.0	398.9	419.3	466.9	*475*	*500*	Revenues ($mill)	*580*
11.9	16.5	22.5	23.1	28.0	26.8	29.5	41.4	42.0	54.1	*59.0*	*63.0*	Net Profit ($mill)	*77.0*
43.5%	37.4%	47.0%	40.5%	42.6%	37.8%	38.9%	43.2%	41.7%	39.9%	*38.0%*	*40.0%*	Income Tax Rate	*40.0%*
- -	- -	- -	12.2%	8.5%	6.9%	3.2%	5.8%	2.0%	2.5%	*2.5%*	*2.5%*	AFUDC % to Net Profit	*2.5%*
52.0%	47.7%	50.4%	48.6%	46.9%	46.2%	45.9%	44.3%	45.4%	42.2%	*40.5%*	*40.0%*	Long-Term Debt Ratio	*41.0%*
48.0%	52.3%	49.6%	51.4%	53.1%	53.8%	54.1%	55.7%	54.6%	57.8%	*59.5%*	*60.0%*	Common Equity Ratio	*59.0%*
442.3	480.4	532.5	551.6	569.4	577.0	665.0	677.4	749.1	787.0	*825*	*880*	Total Capital ($mill)	*1200*
602.3	664.2	713.2	750.6	776.4	825.3	866.4	855.0	896.5	917.8	*975*	*1000*	Net Plant ($mill)	*1100*
4.6%	5.2%	5.4%	6.0%	6.7%	6.4%	5.9%	7.6%	7.1%	8.3%	*8.0%*	*8.0%*	Return on Total Cap'l	*7.5%*
5.6%	6.6%	8.5%	8.1%	9.3%	8.6%	8.2%	11.0%	10.3%	11.9%	*12.0%*	*12.5%*	Return on Shr. Equity	*11.5%*
5.6%	6.6%	8.5%	8.1%	9.3%	8.6%	8.2%	11.0%	10.3%	11.9%	*12.0%*	*12.5%*	Return on Com Equity	*11.5%*
NMF	1.0%	2.8%	2.7%	3.9%	3.1%	3.2%	5.8%	5.3%	6.6%	*6.0%*	*6.0%*	Retained to Com Eq	*5.0%*
113%	84%	67%	67%	58%	64%	61%	47%	49%	45%	*49%*	*53%*	All Div'ds to Net Prof	*56%*

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	1.3	23.5	26.2
Other	164.3	160.5	176.4
Current Assets	165.6	184.0	202.6
Accts Payable	37.9	40.6	62.9
Debt Due	.3	3.3	3.4
Other	66.2	49.8	49.4
Current Liab.	104.4	93.7	115.7
Fix. Chg. Cov.	401%	442%	*450%*

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	5.5%	7.5%	*3.0%*
"Cash Flow"	6.5%	9.0%	*4.5%*
Earnings	6.5%	11.5%	*7.0%*
Dividends	3.0%	4.5%	*10.0%*
Book Value	5.0%	5.5%	*7.0%*

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	88.4	95.5	111.3	103.7	398.9
2011	94.3	109.8	119.9	95.3	419.3
2012	107.6	114.3	133.5	111.5	466.9
2013	110.5	120.7	130.9	*112.9*	*475*
2014	*115*	*125*	*140*	*120*	*500*

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.23	.24	.31	.33	1.11
2011	.19	.34	.42	.17	1.12
2012	.27	.40	.49	.26	1.41
2013	.35	.43	.53	*.24*	*1.55*
2014	*.33*	*.42*	*.55*	*.30*	*1.60*

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.13	.13	.13	.13	.52
2011	.13	.14	.14	.14	.55
2012	.14	.14	.1775	.1775	.64
2013	.1775	.1775	.2025	.2025	.76
2014					

BUSINESS: American States Water Co. operates as a holding company. Through its principal subsidiary, Golden State Water Company, it supplies water to more than 250,000 customers in 75 communities in 10 counties. Service areas include the greater metropolitan areas of Los Angeles and Orange Counties. The company also provides electric utility services to nearly 23,250 customers in the city of Big Bear Lake and in areas of San Bernardino County. Sold Chaparral City Water of Arizona (6/11). Has 728 employees. Officers & directors own 2.9% of common stock (4/12 Proxy). Chairman: Lloyd Ross. President & CEO: Robert J. Sprowls. Inc: CA. Addr: 630 East Foothill Boulevard, San Dimas, CA 91773. Tel: 909-394-3600. Internet: www.aswater.com.

American States Water's core water utility business probably just completed a highly profitable 2013. Through the September quarter, Golden Gate Water's contribution to share net rose a whopping 28%. This occurred despite higher administrative and purchased water costs and a smaller contribution from the company's nonutility business. These expenses were more than offset by increased revenue resulting from the implementation of higher rates.

We are relatively bullish on American States' nonutility business. The company runs the water systems at nine U.S. military bases through its ASUS subsidiary. There is ongoing debate on Wall Street regarding the future growth in this sector. Some feel that the company's earnings peaked in 2012 when they contributed almost $0.40 a share to the bottom line. We are on the other side of this argument. American States' long experience in running these operations will enable it to win more bids from army bases through 2016-2018, in our opinion. Currently, the utility is involved in the bidding for 10 installations that are looking to outsource these operations. Indeed, annual profits from this sector could grow to as high as $0.50 a share over the next three- to five-year period.

Finances are healthy. Internally generated funds should be sufficient to cover American States' construction budget for the foreseeable future. As a result, we think that the strong equity-to-total capital ratio should remain at a very solid 57%. Reflecting this is the company's Financial Strength rating of an A, the highest grade of any water utility.

The company's long-term dividend growth prospects are robust as well. The equity's yield is close to the norm for the water utility group. However, its dividend growth prospects of 9% through 2016-2018 are significantly above the industry average. Thus, investors currently don't have to pay as high a premium for the stock as they had to in the past. And, while the nonutility operations have lowered the company's earnings predictability compared to its peers, we think the stock is still attractive on a risk-return basis.

James A. Flood — *January 17, 2014*

(A) Primary earnings. Excludes nonrecurring gains/(losses): '04, 7¢; '05, 13¢; '06, 3¢; '08, (14¢); '10, (23¢) '11, 10¢. Next earnings report due early February. Quarterly egs. may not add due to rounding.
(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for splits.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	75
Earnings Predictability	90

AMERICAN WATER NYSE-AWK

RECENT PRICE 41.71 | P/E RATIO 18.1 (Trailing: 20.5 / Median: NMF) | RELATIVE P/E RATIO 0.97 | DIV'D YLD 2.8% | VALUE LINE

TIMELINESS 3 Raised 10/4/13
SAFETY 3 New 7/25/08
TECHNICAL 3 Lowered 8/9/13
BETA .65 (1.00 = Market)

2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	65	(+55%)	17%
Low	45	(+10%)	5%

Insider Decisions

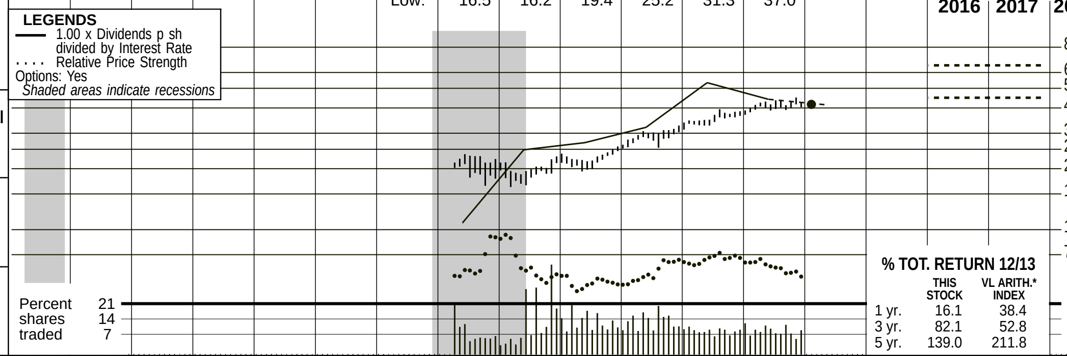
	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	0	0	0	0	0
Options	0	8	0	3	0	0	0	0	0
to Sell	0	8	0	3	0	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	191	165	197
to Sell	186	209	176
Hld's(000)	145912	144834	144172

	2008	2009	2010	2011	2012	2013
High:	23.7	23.0	25.8	32.8	39.4	45.1
Low:	16.5	16.2	19.4	25.2	31.3	37.0

Target Price Range 2016 | 2017 | 2018



% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	16.1	38.4
3 yr.	82.1	52.8
5 yr.	139.0	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006^E	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
--	--	--	--	--	--	--	--	--	13.08	13.84	14.61	13.98	15.49	15.18	16.25	16.15	17.20	Revenues per sh	20.00
--	--	--	--	--	--	--	--	--	.65	d.47	2.87	2.89	3.56	3.73	4.27	4.45	4.70	"Cash Flow" per sh	5.25
--	--	--	--	--	--	--	--	--	d.97	d2.14	1.10	1.25	1.53	1.72	2.11	2.20	2.40	Earnings per sh A	2.90
--	--	--	--	--	--	--	--	--	--	--	.40	.82	.86	.91	.96	1.06	1.20	Div'd Decl'd per sh B■	1.40
--	--	--	--	--	--	--	--	--	4.31	4.74	6.31	4.50	4.38	5.27	5.25	5.15	5.50	Cap'l Spending per sh	5.50
--	--	--	--	--	--	--	--	--	23.86	28.39	25.64	22.91	23.59	24.11	25.10	26.15	27.50	Book Value per sh D	31.85
--	--	--	--	--	--	--	--	--	160.00	160.00	160.00	174.63	175.00	175.66	176.99	178.50	180.00	Common Shs Outst'g C	185.00
--	--	--	--	--	--	--	--	--	--	--	18.9	15.6	14.6	16.8	16.7	18.6		Avg Ann'l P/E Ratio	18.5
--	--	--	--	--	--	--	--	--	--	--	1.14	1.04	.93	1.05	1.07	1.04		Relative P/E Ratio	1.25
--	--	--	--	--	--	--	--	--	--	--	1.9%	4.2%	3.8%	3.1%	2.7%	2.6%		Avg Ann'l Div'd Yield	2.7%
						--	--	--	2093.1	2214.2	2336.9	2440.7	2710.7	2666.2	2876.9	2885	3100	Revenues ($mill)	3700
						--	--	--	d155.8	d342.3	187.2	209.9	267.8	304.9	375.0	390	430	Net Profit ($mill)	535
						--	--	--	--	--	37.4%	37.9%	40.4%	39.5%	40.7%	38.5%	38.0%	Income Tax Rate	38.0%
						--	--	--	--	--	--	--	--	12.5%	6.2%	4.0%	8.0%	AFUDC % to Net Profit	8.0%
						--	--	--	56.1%	50.9%	53.1%	56.9%	56.8%	55.7%	53.8%	52.5%	52.0%	Long-Term Debt Ratio	51.5%
						--	--	--	43.9%	49.1%	46.9%	43.1%	43.2%	44.2%	46.0%	47.5%	48.0%	Common Equity Ratio	48.5%
						--	--	--	8692.8	9245.7	8750.2	9289.0	9561.3	9580.3	9652.7	9880	10400	Total Capital ($mill)	12200
						--	--	--	8720.6	9318.0	9991.8	10524	11059	11021	11739	12250	12750	Net Plant ($mill)	13550
						--	--	--	NMF	NMF	3.7%	3.8%	4.4%	4.8%	5.5%	5.5%	5.5%	Return on Total Cap'l	6.0%
						--	--	--	NMF	NMF	4.6%	5.2%	6.5%	7.2%	8.4%	8.5%	8.5%	Return on Shr. Equity	9.0%
						--	--	--	NMF	NMF	4.6%	5.2%	6.5%	7.2%	8.4%	8.3%	8.5%	Return on Com Equity	9.0%
						--	--	--	NMF	NMF	3.0%	1.8%	2.8%	3.5%	4.6%	4.5%	4.5%	Retained to Com Eq	4.5%
						--	--	--	--	--	34%	65%	56%	52%	45%	48%	50%	All Div'ds to Net Prof	48%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $5677.2 mil. **Due in 5 Yrs** $1034.0 mil.
LT Debt $5174.1 mil. **LT Interest** $301.0 mil.
(Total interest coverage: 4.4x) (53% of Cap'l)

Leases, Uncapitalized: Annual rentals $28.1 mill.
Pension Assets $1157.7 mill **Oblig.** $1621.2 mill.
Pfd Stock $17.6 mill. **Pfd Div'd** $.7 mill

Common Stock 178,274,197 shs.
as of 10/31/13

MARKET CAP: $7.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	14.2	24.4	32.4
Other	1383.5	475.0	580.8
Current Assets	1397.7	499.4	613.2
Accts Payable	243.7	279.6	209.8
Debt Due	543.9	385.9	503.1
Other	701.5	329.3	428.6
Current Liab.	1489.1	994.8	1141.5
Fix. Chg. Cov.	256%	292%	300%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	--	3.0%	4.0%
"Cash Flow"	--	NMF	5.5%
Earnings	--	--	8.5%
Dividends	--	--	7.5%
Book Value	--	-1.5%	4.5%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	588.1	671.2	786.9	664.5	2710.7
2011	596.7	668.8	760.9	639.8	2666.2
2012	618.7	745.6	831.8	680.8	2876.9
2013	636.1	724.3	829.2	695.4	2885
2014	675	775	900	750	3100

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.18	.42	.71	.23	1.53
2011	.23	.42	.73	.32	1.72
2012	.28	.66	.87	.30	2.11
2013	.32	.57	.84	.47	2.20
2014	.35	.65	1.00	.40	2.40

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.21	.21	.22	.22	.86
2011	.22	.23	.23	.23	.91
2012	.23	.23	.25	.25	.96
2013	.25	.25	.28	.28	1.06
2014					

BUSINESS: American Water Works Company, Inc. is the largest investor-owned water and wastewater utility in the U.S., providing services to over 14 million people in over 30 states and Canada. It's nonregulated business assists municipalities and military bases with the maintenance and upkeep as well. Regulated operations made up 89.1% of 2012 revenues. New Jersey is its biggest market accounting for 22.2% of revenues. Has roughly 7,000 employees. Depreciation rate, 2.6% in '12. BlackRock, Inc., owns 10.3% of the common stock outstanding. Off. & dir. own less than 1% (3/13 Proxy). President & CEO; Jeffry Sterba. Chairman; George Mackenzie. Address: 1025 Laurel Oak Road, Voorhees, NJ 08043. Telephone: 856-346-8200. Internet: www.amwater.com.

American Water Works dwarfs most of its peers. The company is larger by a wide margin than any of the other investor-owned utilities included in the industry group followed by *Value Line.* Indeed, the utility alone accounts for approximately 50% of the entire industry when measured by market capitalization.

Size matters in the water utility business. Currently, the market is made up of tens of thousands of small water utilities run by local municipalities. Due to financial pressures, most of these systems have not been properly maintained and are in dire need of modernization. Thus, it is more advantageous for these smaller entities to sell their operations to concerns that have both the financial wherewithal and managerial experience required to address the problems. American Water has added almost 20 new acquisitions over each of the past two years.

A decent amount of American Water's profit growth comes from the successful integration of acquisitions. With its large infrastructure, the company has consistently been able to reduce costs and squeeze efficiencies out of its purchases. For example, American Water has reduced its expense ratios from 42% in 2011 to close to 40% today. The company goal is to reduce this figure to 35% over the next five year period.

Excellent cost controls help American Water maintain good relationships with regulators. All utilities are exposed to the risk of harsh treatment by state authorities. By managing expenses so rigorously, the company has been able to considerably reduce the chance of this happening.

American Water offers good value vis-a-vis other water utilities. Historically, water stocks with above-average dividend growth prospects have much lower current yields than similar water stocks with subpar dividend potential. (This is the premium that investors must pay for greater future cash flows.) In the recent past, the yield spreads between the high-and low-quality stocks has narrowed considerably. Thus, this is a good time to take positions in industry leaders such as American Water because they are cheap on a relative value basis.

James A. Flood *January 17, 2014*

(A) Diluted earnings. Excludes nonrecurring losses: '08, $4.62; '09, $2.63; '11, $0.07. Discontinued operations: '06, (4¢); '11, 3¢; '12, (10¢). Next earnings report due early February. Quarterly earnings may not sum due to rounding. (B) Dividends paid in March, June, September, and December. ■ Div. reinvestment available. (C) In millions. (D) Includes intangibles. In 2012: $1.207 billion, $6.82/share. (E) Pro forma numbers for '06 & '07.

Company's Financial Strength	B+
Stock's Price Stability	95
Price Growth Persistence	75
Earnings Predictability	20

AQUA AMERICA NYSE-WTR

RECENT PRICE **23.09** | P/E RATIO **19.9** (Trailing: 20.6 Median: 24.0) | RELATIVE P/E RATIO **1.07** | DIV'D YLD **2.8%** | **VALUE LINE**

TIMELINESS	3	Lowered 5/24/13
SAFETY	2	Raised 4/20/12
TECHNICAL	3	Raised 12/27/13

BETA .60 (1.00 = Market)

2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	40	(+75%)	17%
Low	25	(+10%)	5%

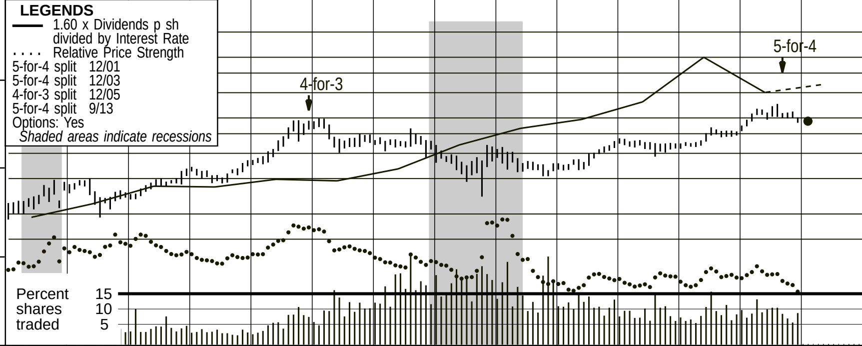
Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	0	0	0	0	0
Options	2	2	0	0	1	3	2	1	1
to Sell	0	0	0	0	2	0	0	1	1

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	136	141	153
to Sell	116	130	154
Hld's(000)	82403	82501	85173

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
High:	12.0	13.4	14.8	23.4	23.8	21.3	17.6	17.2	18.4	19.0	21.5	28.1
Low:	7.7	9.5	11.3	14.0	16.1	15.1	9.8	12.3	13.2	15.4	16.8	20.6



% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	18.8	38.4
3 yr.	42.1	52.8
5 yr.	65.2	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
1.61	1.67	1.93	1.97	2.16	2.28	2.38	2.78	3.08	3.23	3.61	3.71	3.93	4.21	4.10	4.32	4.55	4.60	Revenues per sh	4.95
.45	.49	.58	.61	.69	.76	.77	.87	.97	1.01	1.10	1.14	1.29	1.42	1.45	1.51	1.85	1.95	"Cash Flow" per sh	1.85
.27	.32	.33	.37	.41	.43	.46	.51	.57	.56	.57	.58	.62	.72	.83	.87	1.15	1.25	Earnings per sh A	1.45
.19	.20	.22	.23	.24	.26	.28	.29	.32	.35	.38	.41	.44	.47	.50	.54	.58	.64	Div'd Decl'd per sh B■	.86
.46	.65	.72	.93	.87	.96	1.06	1.23	1.47	1.64	1.43	1.58	1.66	1.89	1.90	1.98	1.90	1.90	Cap'l Spending per sh	2.15
2.27	2.57	2.74	3.08	3.32	3.49	4.27	4.71	5.04	5.57	5.85	6.26	6.50	6.81	7.21	7.90	8.60	9.45	Book Value per sh	11.50
84.33	90.25	133.50	139.78	142.47	141.49	154.31	158.97	161.21	165.41	166.75	169.21	170.61	172.46	173.60	175.43	177.00	179.50	Common Shs Outst'g C	184.00
17.8	22.5	21.2	18.2	23.6	23.6	24.5	25.1	31.8	34.7	32.0	24.9	23.1	21.1	21.3	21.9	21.4		Avg Ann'l P/E Ratio	22.5
1.03	1.17	1.21	1.18	1.21	1.29	1.40	1.33	1.69	1.87	1.70	1.50	1.54	1.34	1.34	1.40	1.20		Relative P/E Ratio	1.50
3.9%	2.9%	3.0%	3.3%	2.5%	2.5%	2.5%	2.3%	1.8%	1.8%	2.1%	2.8%	3.1%	3.1%	2.8%	2.8%	2.4%		Avg Ann'l Div'd Yield	2.6%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $1630.5 mill. **Due in 5 Yrs** $368.3 mill.
LT Debt $1439.3 mill. **LT Interest** $60.0 mill.
(LT interest earned: 5.0x; total interest coverage: 4.1x) (51% of Cap'l)
Pension Assets-12/12 $190.1 mill. **Oblig.** $303.1 mill.
Pfd Stock None
Common Stock 176,709,658 shares as of 10/24/13

MARKET CAP: $4.1 billion (Mid Cap)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
367.2	442.0	496.8	533.5	602.5	627.0	670.5	726.1	712.0	757.8	770	825	Revenues ($mill)	915
67.3	80.0	91.2	92.0	95.0	97.9	104.4	124.0	144.8	153.1	200	225	Net Profit ($mill)	265
39.3%	39.4%	38.4%	39.6%	38.9%	39.7%	39.4%	39.2%	32.9%	39.0%	22.0%	40.0%	Income Tax Rate	40.0%
--	--	--	--	--	--	--	--	2.9%	3.1%	1.5%	2.0%	AFUDC % to Net Profit	2.0%
51.4%	50.0%	52.0%	51.6%	55.4%	54.1%	55.6%	56.6%	52.7%	52.7%	51.0%	51.0%	Long-Term Debt Ratio	50.0%
48.6%	50.0%	48.0%	48.4%	44.6%	45.9%	44.4%	43.4%	47.3%	47.3%	49.0%	49.0%	Common Equity Ratio	50.0%
1355.7	1497.3	1690.4	1904.4	2191.4	2306.6	2495.5	2706.2	2646.8	2929.7	2975	3350	Total Capital ($mill)	4230
1824.3	2069.8	2280.0	2506.0	2792.8	2997.4	3227.3	3469.3	3612.9	3936.2	4150	4350	Net Plant ($mill)	4900
6.4%	6.7%	6.9%	6.4%	5.9%	5.7%	5.6%	5.9%	6.9%	6.6%	7.0%	6.0%	Return on Total Cap'l	6.5%
10.2%	10.7%	11.2%	10.0%	9.7%	9.3%	9.4%	10.6%	11.6%	11.0%	13.0%	13.0%	Return on Shr. Equity	12.5%
10.2%	10.7%	11.2%	10.0%	9.7%	9.3%	9.4%	10.6%	11.6%	11.0%	13.0%	13.0%	Return on Com Equity	12.5%
4.2%	4.6%	4.9%	3.7%	3.2%	2.8%	2.7%	3.7%	4.6%	4.3%	6.5%	6.0%	Retained to Com Eq	5.0%
59%	57%	56%	63%	67%	70%	72%	65%	60%	61%	50%	51%	All Div'ds to Net Prof	59%

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	8.2	5.5	6.4
Receivables	81.1	92.9	98.3
Inventory (AvgCst)	11.2	11.8	12.4
Other	220.0	150.7	94.5
Current Assets	320.5	260.9	211.6
Accts Payable	68.3	55.5	41.4
Debt Due	80.4	125.4	191.2
Other	277.0	93.3	85.7
Current Liab.	425.7	274.2	318.3
Fix. Chg. Cov.	367%	398%	398%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	8.0%	7.5%	2.5%
"Cash Flow"	8.5%	8.0%	4.0%
Earnings	6.5%	4.5%	10.0%
Dividends	7.5%	8.0%	9.5%
Book Value	9.0%	7.0%	8.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	160.5	178.5	207.8	179.3	726.1
2011	163.6	178.3	197.3	172.7	712.0
2012	164.0	191.7	214.6	187.5	757.8
2013	180.0	195.7	204.3	190	770
2014	190	215	225	200	830

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.13	.18	.26	.15	.72
2011	.18	.22	.24	.19	.83
2012	.15	.24	.29	.19	.87
2013	.26	.30	.36	.23	1.15
2014	.25	.32	.40	.28	1.25

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.116	.116	.116	.124	.47
2011	.124	.124	.124	.132	.50
2012	.132	.132	.132	.14	.54
2013	.14	.14	.152	.152	.58
2014					

BUSINESS: Aqua America, Inc. is the holding company for water and wastewater utilities that serve approximately three million residents in Pennsylvania, Ohio, North Carolina, Illinois, Texas, New Jersey, Florida, Indiana, and five other states. Acquired AquaSource, 7/03; Consumers Water, 4/99; and others. Water supply revenues '12: residential, 60.5%; commercial, 16.1%; industrial & other, 23.4%. Officers and directors own 1.4% of the common stock; Blackrock, Inc, 6.3%; State Street Capital Corp., 5.7%; Vanguard Group 5.6% (4/13 Proxy). Chairman & Chief Executive Officer: Nicholas DeBenedictis. Incorporated: Pennsylvania. Address: 762 West Lancaster Avenue, Bryn Mawr, Pennsylvania 19010. Telephone: 610-525-1400. Internet: www.aquaamerica.com.

Aqua America has exited the Florida market. In five separate transactions, the utility sold off all of its operations in the Sunshine State for a total of $90 million. This will allow the company to focus its attention in the states where most of its assets are concentrated.

Growth through acquisition will remain a keystone of the company's strategy. Aqua purchased 13 utilities last year and 18 in 2012. We think that this number will actually increase in the years ahead. That's because the U.S. is populated with thousands of small municipally-owned water utilities. Because cities across the country are struggling financially, they are having trouble financing the costs of repairing their aging water infrastructures. Many are finding it easier to sell their operations to larger investor-owned companies that have the financial wherewithal to fund the needed capital expenditures. Moreover, Aqua can run the operations at a much lower cost using its management expertise and economies of scale.

Aqua will follow up a strong 2013 with a solid 2014, in our opinion. Aided by the use of a "repair tax deduction", we think the company posted a gain in share net of over 30% last year. More impressive perhaps, would be the utility's ability to top last year's exceptional gain by 9% this year. Most of this will be due to a combination of cost reductions and the implementation of higher rates implemented by state regulators.

Hydraulic fracking provides opportunities for Aqua's nonregulated earnings. This drilling technique requires copious amounts of water. Aqua has entered into a joint venture on a pipeline that will bring water directly to the wells, eliminating the need for thousands of trucks laden with water choking the street traffic in Pennsylvania. When fully up and running, we think that this can add about $0.10 a share to the bottom line.

Aqua stock is attractive compared to other water utilities. While the yield is marginally lower than the group average, this is more than offset by the equity's strong dividend growth prospects. Therefore, conservative, income-seeking investors might find these shares of interest.

James A. Flood *January 17, 2014*

(A) Diluted egs. Excl. nonrec. gains (losses): '99, (9¢); '00, 2¢; '01, 2¢; '02, 4¢; '03, 3¢; '12, 18¢. Excl. gain from disc. operations: '12, 7¢; '13, 3¢. May not sum due to rounding. Next earnings report due early February.
(B) Dividends historically paid in early March, June, Sept. & Dec. ■ Div'd. reinvestment plan available (5% discount).
(C) In millions, adjusted for stock splits.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	70
Earnings Predictability	100

ARTESIAN RES. CORP. NDQ--ARTNA

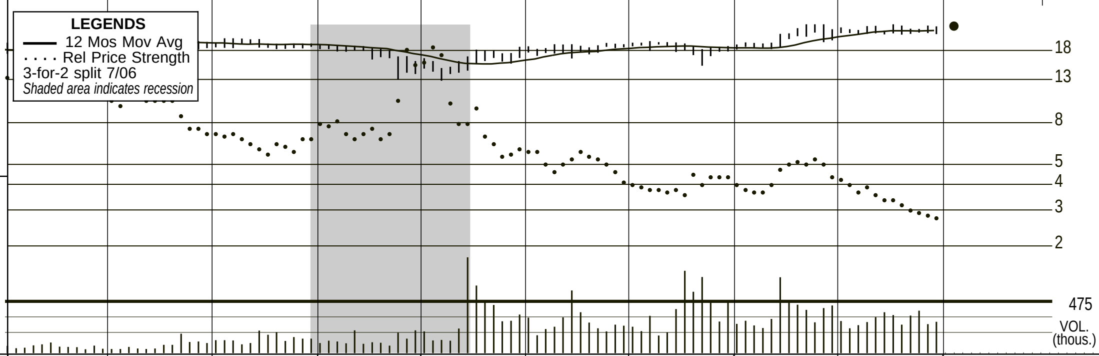
RECENT PRICE **23.70** | TRAILING P/E RATIO **24.7** | RELATIVE P/E RATIO **1.21** | DIV'D YLD **3.5%** | VALUE LINE

High	22.62	22.33	20.67	19.31	18.73	19.59	19.99	24.43	24.27	
Low	17.20	17.90	18.26	13.00	12.81	16.43	15.16	18.20	21.52	

RANKS

PERFORMANCE	**3**	*Average*
Technical	3	*Average*
SAFETY	**3**	*Average*
BETA .55		(1.00 = Market)

Financial Strength	B
Price Stability	95
Price Growth Persistence	50
Earnings Predictability	85



© VALUE LINE PUBLISHING LLC	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014/2015
SALES PER SH	7.52	7.77	7.20	7.59	8.11	8.48	7.56	8.10	--	
"CASH FLOW" PER SH	1.56	1.75	1.57	1.65	1.84	1.92	1.64	2.04	--	
EARNINGS PER SH	.81	.97	.90	.86	.97	1.00	.83	1.13	***1.02*** [A,B]	***1.23*** [C]***/NA***
DIV'DS DECL'D PER SH	.58	.61	.66	.71	.72	.75	.76	.79	--	
CAP'L SPENDING PER SH	3.35	5.08	3.66	6.09	2.32	2.57	1.83	2.36	--	
BOOK VALUE PER SH	9.60	10.15	11.66	11.86	12.15	12.44	13.12	13.57	--	
COMMON SHS OUTST'G (MILL)	6.02	6.09	7.30	7.40	7.51	7.65	8.61	8.71	--	
AVG ANN'L P/E RATIO	24.2	20.3	21.5	20.1	16.4	18.2	22.5	18.3	***23.2***	***19.3/NA***
RELATIVE P/E RATIO	1.28	1.10	1.14	1.21	1.09	1.16	1.41	1.17	--	
AVG ANN'L DIV'D YIELD	2.9%	3.1%	3.4%	4.1%	4.5%	4.1%	4.1%	3.8%	--	
SALES ($MILL)	45.3	47.3	52.5	56.2	60.9	64.9	65.1	70.6	--	***Bold figures***
OPERATING MARGIN	100.0%	45.6%	45.6%	45.1%	46.9%	46.5%	45.5%	48.7%	--	***are consensus***
DEPRECIATION ($MILL)	4.4	4.6	5.2	5.8	6.6	7.0	7.4	7.9	--	***earnings***
NET PROFIT ($MILL)	5.0	6.1	6.3	6.4	7.3	7.6	6.7	9.8	--	***estimates***
INCOME TAX RATE	39.9%	39.0%	39.8%	40.8%	40.1%	40.0%	40.8%	40.2%	--	***and, using the***
NET PROFIT MARGIN	11.1%	12.8%	11.9%	11.4%	11.9%	11.7%	10.4%	14.0%	--	***recent prices,***
WORKING CAP'L ($MILL)	d1.8	d8.8	2.5	d20.9	d23.3	d27.9	d11.4	d11.4	--	***P/E ratios.***
LONG-TERM DEBT ($MILL)	92.4	92.1	91.8	107.6	106.0	105.1	106.5	106.3	--	
SHR. EQUITY ($MILL)	57.8	61.8	85.1	87.8	91.2	95.1	113.0	118.2	--	
RETURN ON TOTAL CAP'L	5.3%	5.8%	5.3%	4.7%	5.2%	5.6%	4.6%	5.9%	--	
RETURN ON SHR. EQUITY	8.7%	9.8%	7.4%	7.3%	8.0%	8.0%	6.0%	8.3%	--	
RETAINED TO COM EQ	2.7%	3.8%	2.1%	1.4%	2.1%	2.0%	.5%	2.5%	--	
ALL DIV'DS TO NET PROF	69%	61%	71%	81%	74%	75%	92%	70%	--	

[A]No. of analysts changing earn. est. in last 3 days: 0 up, 0 down, consensus 5-year earnings growth not available. [B]Based upon 3 analysts' estimates. [C]Based upon 3 analysts' estimates.

ANNUAL RATES

of change (per share)	**5 Yrs.**	**1 Yr.**
Sales	1.5%	7.0%
"Cash Flow"	3.0%	24.0%
Earnings	2.0%	36.0%
Dividends	4.5%	4.0%
Book Value	4.5%	3.5%

Fiscal Year	QUARTERLY SALES ($mill.) 1Q	2Q	3Q	4Q	Full Year
12/31/11	14.8	16.5	17.7	16.1	65.1
12/31/12	16.7	17.9	19.0	17.0	70.6
12/31/13	16.3	17.8	18.1		
12/31/14					

Fiscal Year	EARNINGS PER SHARE 1Q	2Q	3Q	4Q	Full Year
12/31/10	.22	.24	.38	.16	1.00
12/31/11	.14	.23	.26	.20	.83
12/31/12	.28	.32	.33	.20	1.13
12/31/13	.19	.28	.29	***.24***	
12/31/14	***.20***	***.34***			

Cal-endar	QUARTERLY DIVIDENDS PAID 1Q	2Q	3Q	4Q	Full Year
2011	.19	.19	.19	.193	.76
2012	.193	.198	.198	.203	.79
2013	.203	.206	.206	.209	.82
2014					

INSTITUTIONAL DECISIONS

	1Q'13	2Q'13	3Q'13
to Buy	32	31	30
to Sell	26	30	27
Hld's(000)	3036	3029	3033

ASSETS ($mill.)	**2011**	**2012**	**9/30/13**
Cash Assets	.3	.6	.6
Receivables	8.6	8.7	8.8
Inventory	1.5	1.4	1.6
Other	2.9	2.8	3.7
Current Assets	13.3	13.5	14.7
Property, Plant & Equip, at cost	435.0	454.4	- -
Accum Depreciation	77.4	83.8	- -
Net Property	357.6	370.6	378.2
Other	7.8	7.6	7.5
Total Assets	378.7	391.7	400.4
LIABILITIES ($mill.)			
Accts Payable	2.8	3.5	3.7
Debt Due	13.8	12.6	10.9
Other	8.1	8.8	11.8
Current Liab	24.7	24.9	26.4

LONG-TERM DEBT AND EQUITY as of 9/30/13

Total Debt $116.6 mill. **Due in 5 Yrs.** NA
LT Debt $105.7 mill.
Including Cap. Leases NA
(47% of Cap'l)

Leases, Uncapitalized Annual rentals NA

Pension Liability $.4 mill. in '12 vs. $.5 mill. in '11

Pfd Stock None **Pfd Div'd Paid** None

Common Stock 8,793,216 shares
(53% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: Artesian Resources Corporation, through its subsidiaries, provides water, wastewater, and other services on the Delmarva Peninsula. It distributes and sells water to residential, commercial, industrial, municipal, and utility customers in Delaware, Maryland, and Pennsylvania. The company also offers water for public and private fire protection to customers in its service territories. In addition, it provides contract water and wastewater services, water and sewer service line protection plans, and wastewater management services, as well as design, construction, and engineering services. As of December 31, 2012, the company served approximately 79,000 metered water customers through 1,162 miles of transmission and distribution mains. Has 229 employees. Chairman, C.E.O. & President: Dian C. Taylor. Address: 664 Churchmans Rd., Newark, DE 19702. Tel.: (302) 453-6900. Internet: http://www.artesianwater.com.

J.V.

January 17, 2014

TOTAL SHAREHOLDER RETURN
Dividends plus appreciation as of 12/31/2013

3 Mos.	6 Mos.	1 Yr.	3 Yrs.	5 Yrs.
4.10%	4.92%	6.13%	35.96%	76.91%

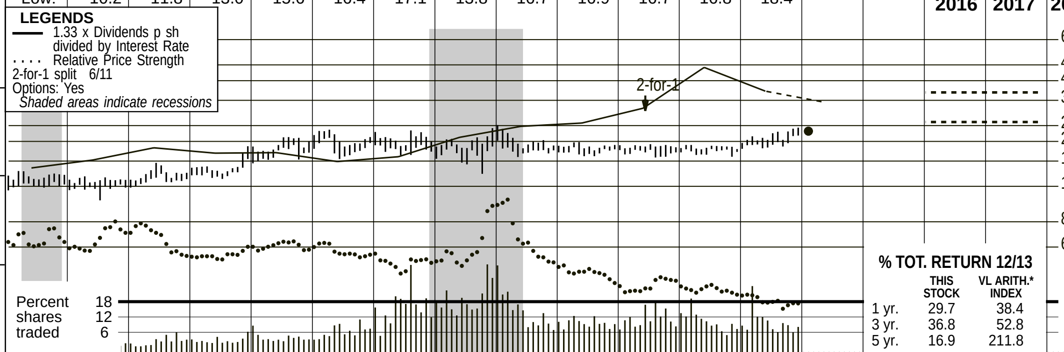
CALIFORNIA WATER NYSE-CWT

RECENT PRICE **22.47** | P/E RATIO **20.4** (Trailing: 22.9, Median: 21.0) | RELATIVE P/E RATIO **1.10** | DIV'D YLD **3.0%** | VALUE LINE

TIMELINESS 3 Raised 11/1/13
SAFETY 3 Lowered 7/27/07
TECHNICAL 2 Raised 1/17/14
BETA .60 (1.00 = Market)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
High:	13.4	15.7	19.0	21.1	22.9	22.7	23.3	24.1	19.8	19.4	19.3	23.4	
Low:	10.2	11.8	13.0	15.6	16.4	17.1	13.8	16.7	16.9	16.7	16.8	18.4	

Target Price Range 2016 | 2017 | 2018



% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	29.7	38.4
3 yr.	36.8	52.8
5 yr.	16.9	211.8

2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	35	(+55%)	15%
Low	25	(+10%)	7%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	20	0	0	0	0	0	1	0
Options	0	0	0	0	0	0	1	0	0
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	86	61	60
to Sell	39	57	51
Hld's(000)	26409	26677	27841

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
7.74	7.38	7.98	8.08	8.13	8.67	8.18	8.59	8.72	8.10	8.88	9.90	10.82	11.05	12.00	13.34	12.15	13.15	Revenues per sh	16.00
1.46	1.30	1.37	1.26	1.10	1.32	1.26	1.42	1.52	1.36	1.56	1.86	1.93	1.93	2.07	2.32	2.20	2.50	"Cash Flow" per sh	2.85
.92	.73	.77	.66	.47	.63	.61	.73	.74	.67	.75	.95	.98	.91	.86	1.02	.95	1.15	Earnings per sh A	1.40
.53	.54	.54	.55	.56	.56	.56	.57	.57	.58	.58	.59	.59	.60	.62	.63	.64	.68	Div'd Decl'd per sh B ■	.90
1.30	1.37	1.72	1.23	2.04	2.91	2.19	1.87	2.01	2.14	1.84	2.41	2.66	2.97	2.83	3.04	2.45	3.35	Cap'l Spending per sh	3.00
6.50	6.69	6.71	6.45	6.48	6.56	7.22	7.83	7.90	9.07	9.25	9.72	10.13	10.45	10.76	11.28	12.45	12.85	Book Value per sh C	14.75
25.24	25.24	25.87	30.29	30.36	30.36	33.86	36.73	36.78	41.31	41.33	41.45	41.53	41.67	41.82	41.98	47.75	48.00	Common Shs Outst'g D	50.0
12.6	17.8	17.8	19.6	27.1	19.8	22.1	20.1	24.9	29.2	26.1	19.8	19.7	20.3	21.3	17.9	21.6		Avg Ann'l P/E Ratio	22.0
.73	.93	1.01	1.27	1.39	1.08	1.26	1.06	1.33	1.58	1.39	1.19	1.31	1.29	1.34	1.14	1.44		Relative P/E Ratio	1.45
4.6%	4.2%	4.0%	4.3%	4.4%	4.5%	4.2%	3.9%	3.1%	2.9%	3.0%	3.1%	3.1%	3.2%	3.4%	3.5%	3.1%		Avg Ann'l Div'd Yield	3.0%

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
277.1	315.6	320.7	334.7	367.1	410.3	449.4	460.4	501.8	560.0	580	630	Revenues ($mill) E	800
19.4	26.0	27.2	25.6	31.2	39.8	40.6	37.7	36.1	42.6	45.0	55.0	Net Profit ($mill)	70.0
39.9%	39.6%	42.4%	37.4%	39.9%	37.7%	40.3%	39.5%	40.5%	37.5%	34.0%	39.0%	Income Tax Rate	39.0%
10.3%	3.2%	3.3%	10.6%	8.3%	8.6%	7.6%	4.2%	7.6%	8.0%	6.0%	8.5%	AFUDC % to Net Profit	10.0%
50.2%	48.6%	48.3%	43.5%	42.9%	41.6%	47.1%	52.4%	51.7%	47.8%	42.0%	44.0%	Long-Term Debt Ratio	47.5%
49.1%	50.8%	51.1%	55.9%	56.6%	58.4%	52.9%	47.6%	48.3%	52.2%	58.0%	56.0%	Common Equity Ratio	52.5%
498.4	565.9	568.1	670.1	674.9	690.4	794.9	914.7	931.5	908.2	1025	1100	Total Capital ($mill)	1400
759.5	800.3	862.7	941.5	1010.2	1112.4	1198.1	1294.3	1381.1	1457.1	1510	1565	Net Plant ($mill)	1725
5.6%	6.1%	6.3%	5.2%	5.9%	7.1%	6.5%	5.5%	5.5%	6.3%	6.0%	6.5%	Return on Total Cap'l	6.5%
7.8%	8.9%	9.3%	6.8%	8.1%	9.9%	9.6%	8.6%	8.0%	9.0%	7.5%	9.0%	Return on Shr. Equity	9.5%
7.9%	9.0%	9.3%	6.8%	8.1%	9.9%	9.6%	8.6%	8.0%	9.0%	7.5%	9.0%	Return on Com Equity	9.5%
.7%	2.1%	2.1%	1.0%	1.8%	3.8%	3.8%	3.0%	2.3%	3.4%	2.5%	3.5%	Retained to Com Eq	3.5%
91%	77%	78%	86%	77%	61%	60%	66%	71%	62%	67%	59%	All Div'ds to Net Prof	64%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $489.7 mill. **Due in 5 Yrs** $65.3 mill.

LT Debt $430.2 mill. **LT Interest** $29.5 mill.
(LT interest earned: 6.7x; total int. cov.: 6.0x)
(42% of Cap'l)
Pension Assets-12/12 $202.9 mill.
Oblig. $402.9 mill.
Pfd Stock None

Common Stock 47,739,024 shs.
as of 10/31/13

MARKET CAP: $1.1 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	27.2	38.8	48.8
Other	86.7	107.8	121.8
Current Assets	113.9	146.6	170.6
Accts Payable	48.9	46.8	60.4
Debt Due	53.7	136.3	59.5
Other	49.3	59.7	77.1
Current Liab.	151.9	242.8	197.0
Fix. Chg. Cov.	278%	297%	325%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	4.0%	7.0%	4.5%
"Cash Flow"	5.5%	7.5%	5.0%
Earnings	5.0%	5.5%	7.0%
Dividends	1.0%	1.5%	6.5%
Book Value	5.0%	4.5%	5.5%

Cal-endar	QUARTERLY REVENUES ($ mill.) E Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	90.3	118.3	146.3	105.5	460.4
2011	98.1	131.4	169.3	103.0	501.8
2012	116.8	143.6	178.1	121.5	560.0
2013	111.4	154.6	184.4	129.6	580
2014	130	160	200	140	630

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.05	.25	.49	.12	.91
2011	.03	.29	.50	.04	.86
2012	.03	.31	.56	.12	1.02
2013	d.03	.28	.61	.09	.95
2014	.05	.35	.60	.15	1.15

Cal-endar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.149	.149	.149	.149	.60
2011	.154	.154	.154	.154	.62
2012	.1575	.1575	.1575	.1575	.63
2013	.16	.16	.16	.16	.64
2014					

BUSINESS: California Water Service Group provides regulated and nonregulated water service to roughly 471,900 customers in 83 communities in California, Washington, New Mexico, and Hawaii. Main service areas: San Francisco Bay area, Sacramento Valley, Salinas Valley, San Joaquin Valley & parts of Los Angeles. Acquired Rio Grande Corp; West Hawaii Utilities (9/08). Revenue breakdown, '12: residential, 66%; business, 18%; public authorities, 4%; industrial, 4%; other 8%. '12 reported depreciation rate: 2.8%. Has 1,131 employees. President, Chairman, and Chief Executive Officer: Peter C. Nelson. Inc.: Delaware. Address: 1720 North First Street, San Jose, California 95112-4598. Telephone: 408-367-8200. Internet: www.calwatergroup.com.

A final agreement between California Water Service Group and state regulators is all but finalized. Last quarter, the California Public Utility Commission's (CPUC) Office of Ratepayers Advocates (ORA) announced that a settlement has been reached with the utility. Though the CPUC doesn't have to go along with the ORA's decision, the chances of that appear to be virtually nil.

The deal appears to be fair to both California Water and its customers. According to the terms of the arrangement, California Water will be allowed to increase its gross revenues by $45 million in 2014, $10 million in 2015, and $10 million in 2016. In return, the utility would be required to invest $321 million in water system infrastructure improvements from 2013-2015. Moreover, should the utility invest an additional $126 million, it would be granted another $19 million rate hike at a later date. The CPUC is expected to release its decision early this year.

We expect the company's bottom line to rebound nicely in 2014. Due to the implementation of higher rates, we think California's share net can rise 21% this year. Comparisons would be even more impressive if 2013's results were not bolstered by a $0.09-a-share tax break.

California Water's next dividend announcement could break a long-term trend. Over the past five and 10 years, the annual payout has grown by 1.0% and 1.5%, respectively, levels that were substantially below that of the average water utility. We estimate that when the new dividend is announced in the first quarter, the hike can be anywhere from 6% to 9%.

These shares have been strong performers of late. The broad market averages rose sharply in last year's fourth quarter. Not surprisingly, conservative, income-oriented water utility stocks lagged. That is, all but California Water and one of its peers.

Our view on California Water shares has changed for the better. Assuming state regulators remain fair when the utility seeks higher rates in three years, we think that the stock, which has been a major under performer over the past one-three- and five-year periods, could turn in solid total returns through 2016-2018.

James A. Flood *January 17, 2014*

(A) Basic EPS. Excl. nonrecurring gain (loss): '00, (4¢); '01, 2¢; '02, 4¢; '11, 4¢. Next earnings report due mid-February.
(B) Dividends historically paid in late Feb., May, Aug., and Nov. ■ Div'd reinvestment plan available.
(C) Incl. intangible assets. In '12: $18.8 mill., $0.44/sh.
(D) In millions, adjusted for splits.
(E) Excludes non-reg. rev.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	50
Earnings Predictability	90

CONNECTICUT WATER NDQ-CTWS

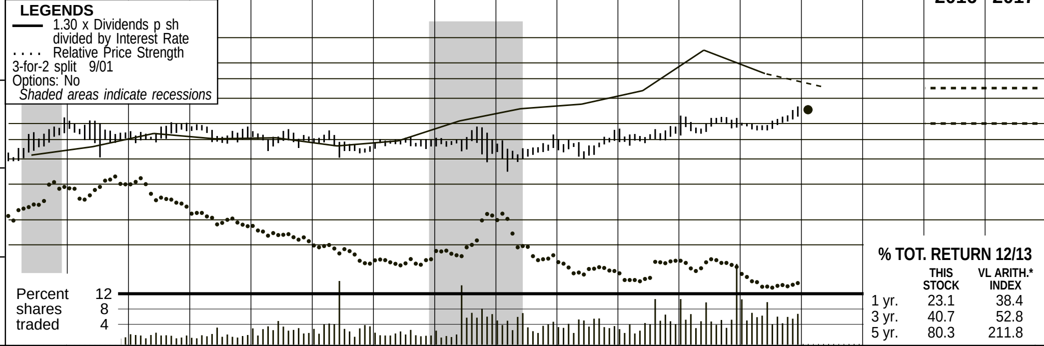
RECENT PRICE 35.09 | P/E RATIO 19.6 (Trailing: 21.3; Median: 23.0) | RELATIVE P/E RATIO 1.05 | DIV'D YLD 2.8% | VALUE LINE

TIMELINESS 2 Raised 12/13/13
SAFETY 3 New 1/18/13
TECHNICAL 3 Lowered 12/27/13
BETA .75 (1.00 = Market)

High:	31.1	30.4	29.8	28.2	27.7	25.6	29.0	26.4	27.9	29.1	32.8	36.4
Low:	20.3	24.0	23.8	21.9	20.3	22.4	19.3	17.3	20.0	23.3	26.2	27.8

Target Price Range 2016 | 2017 | 2018

LEGENDS
— 1.30 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-2 split 9/01
Options: No
Shaded areas indicate recessions



2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	45	(+30%)	9%
Low	30	(-15%)	Nil

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	52	39	42
to Sell	21	39	31
Hld's(000)	4336	4492	4509

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	23.1	38.4
3 yr.	40.7	52.8
5 yr.	80.3	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
5.67	5.58	5.87	5.70	5.93	5.77	5.91	6.04	5.81	5.68	7.05	7.24	6.93	7.65	7.93	7.63	8.65	8.90	Revenues per sh	11.25
1.51	1.59	1.65	1.73	1.78	1.78	1.89	1.91	1.62	1.52	1.90	1.95	1.93	2.04	2.11	2.10	2.55	2.65	"Cash Flow" per sh	2.75
1.00	1.02	1.03	1.09	1.13	1.12	1.15	1.16	.88	.81	1.05	1.11	1.19	1.13	1.13	1.53	1.65	1.75	Earnings per sh A	1.85
.77	.78	.79	.79	.80	.81	.83	.84	.85	.86	.87	.88	.90	.92	.94	.96	.98	1.01	Div'd Decl'd per sh B■	1.12
1.99	1.12	1.42	1.43	1.86	1.98	1.49	1.58	1.96	1.96	2.24	2.44	3.28	3.06	2.61	2.34	2.75	2.85	Cap'l Spending per sh	2.90
8.26	8.52	8.61	8.92	9.25	10.06	10.46	10.94	11.52	11.60	11.95	12.23	12.67	13.05	13.50	16.89	17.55	17.80	Book Value per sh D	20.40
6.79	6.80	7.26	7.28	7.65	7.94	7.97	8.04	8.17	8.27	8.38	8.46	8.57	8.68	8.76	10.97	11.10	11.25	Common Shs Outst'g C	12.00
12.9	15.5	18.2	18.2	21.5	24.3	23.5	22.9	28.6	29.0	23.0	22.2	18.4	20.7	23.0	19.4	18.5		Avg Ann'l P/E Ratio	20.0
.74	.81	1.04	1.18	1.10	1.33	1.34	1.21	1.52	1.57	1.22	1.34	1.23	1.32	1.44	1.24	1.03		Relative P/E Ratio	1.35
6.0%	4.9%	4.2%	4.0%	3.3%	3.0%	3.0%	3.1%	3.4%	3.6%	3.6%	3.6%	4.1%	3.9%	3.6%	3.2%	3.2%		Avg Ann'l Div'd Yield	3.4%

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
47.1	48.5	47.5	46.9	59.0	61.3	59.4	66.4	69.4	83.8	95.0	100	Revenues ($mill)	135
9.2	9.4	7.2	6.7	8.8	9.4	10.2	9.8	9.9	13.6	18.0	19.5	Net Profit ($mill)	22.0
17.9%	22.9%	- -	23.5%	32.4%	27.2%	19.5%	35.2%	41.3%	32.0%	32.0%	33.0%	Income Tax Rate	35.0%
- -	- -	- -	- -	- -	1.7%	- -	- -	1.8%	1.7%	2.0%	2.0%	AFUDC % to Net Profit	3.0%
43.5%	42.8%	44.9%	44.4%	47.8%	46.9%	50.6%	49.5%	53.2%	49.0%	49.5%	49.5%	Long-Term Debt Ratio	48.5%
55.9%	56.7%	54.6%	55.1%	51.8%	52.7%	49.1%	50.2%	46.5%	50.8%	50.5%	50.5%	Common Equity Ratio	51.5%
148.9	155.1	172.3	174.1	193.2	196.5	221.3	225.6	254.2	364.6	370	395	Total Capital ($mill)	475
238.9	246.1	247.7	268.1	284.3	302.3	325.2	344.2	362.4	447.9	465	490	Net Plant ($mill)	550
7.5%	7.0%	5.0%	4.9%	5.5%	5.9%	5.5%	5.4%	4.9%	4.8%	6.0%	6.0%	Return on Total Cap'l	5.5%
10.9%	10.6%	7.5%	6.9%	8.7%	9.0%	9.3%	8.6%	8.3%	7.3%	9.5%	9.5%	Return on Shr. Equity	9.0%
11.0%	10.6%	7.6%	7.0%	8.7%	9.1%	9.4%	8.7%	8.3%	7.3%	9.5%	9.5%	Return on Com Equity	9.0%
3.2%	3.1%	.3%	NMF	1.6%	1.9%	2.3%	1.6%	1.4%	2.7%	4.0%	3.5%	Retained to Com Eq	3.0%
71%	71%	95%	105%	82%	79%	76%	81%	83%	62%	59%	58%	All Div'ds to Net Prof	61%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $180.9 mill. **Due in 5 Yrs** $14.8 mill.
LT Debt $175.5 mill. **LT Interest** $7.6 mill.
(Total interest coverage: 8.8x)
(49% of Cap'l)
Leases, Uncapitalized: Annual rentals $.2 mill.
Pension Assets $45.4 mill.
Oblig. $66.5 mill.

Pfd Stock $0.8 mill. **Pfd Divd** NMF

Common Stock 11,018,161 shs.
as of 10/31/13
MARKET CAP: $375 million (Small Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	1.0	13.2	1.6
Accounts Receivable	14.9	11.5	14.3
Other	3.0	11.7	31.3
Current Assets	18.9	36.4	47.2
Accts Payable	7.2	10.0	7.4
Debt Due	- -	3.0	5.4
Other	23.2	2.9	6.5
Current Liab.	30.4	15.9	19.3
Fix. Chg. Cov.	419%	455%	460%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	3.5%	6.0%	6.5%
"Cash Flow"	2.5%	6.0%	4.5%
Earnings	1.5%	6.5%	6.5%
Dividends	1.5%	2.0%	3.0%
Book Value	5.5%	6.5%	6.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	13.8	15.9	21.0	15.7	66.4
2011	16.0	17.4	20.6	15.4	69.4
2012	18.5	21.3	24.5	19.5	83.8
2013	21.5	22.5	29.6	21.4	95.0
2014	22.0	24.0	30.0	24.0	100

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.12	.27	.54	.20	1.13
2011	.26	.37	.39	.11	1.13
2012	.22	.47	.67	.16	1.53
2013	.24	.39	.86	.16	1.65
2014	.30	.47	.73	.25	1.75

Cal-endar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.228	.228	.233	.233	.922
2011	.233	.233	.238	.238	.942
2012	.238	.238	.2425	.2425	.962
2013	.2425	.2425	.2475	.2475	.98
2014					

BUSINESS: Connecticut Water Service, Inc. is a non-operating holding company, whose income is derived from earnings of its wholly-owned subsidiary companies (regulated water utilities). Its largest subsidiary, Connecticut Water, accounted for about 85% of the holding company's net income in 2012, and provides water services to 400,000 people in 55 towns throughout Connecticut and Maine. Acquired The Maine Water Co., 1/12; Biddeford and Saco Water, 12/12. Inc.: CT. Has about 260 employees. Chairman/President/CEO: Eric W. Thornburg. Officers and directors own 2.2% of the common stock; BlackRock, Inc. 6.7%; The Vanguard Group, 5.3% (4/13 proxy). Address: 93 West Main Street, Clinton, CT 06413. Telephone: (860) 669-8636. Internet: www.ctwater.com.

Connecticut Water Service is consolidating its operations in Maine. In 2012, the company acquired The Maine Water Co. and Biddeford and Saco Water. Merging the two entities will reduce overhead, specifically resources spent on regulatory matters. Moreover, now that it has established a presence in the state, future tuck in acquisitions there seem likely.

The utility is also expanding on its home turf. Agreements have been reached to expand pipelines to supply water to the town of Mansfield as well as the main campus of the University of Connecticut, which is the equivalent of a small city. Additional mergers are probable here too.

Less onerous regulation augurs well for Connecticut Water. One of the key factors in analyzing a utility is how fair is the regulatory climate where it operates. Historically, Connecticut's Public Regulatory Authority (PURA) hasn't had a good reputation. Indeed, *Value Line* ranks the conditions in the state as Below Average. In the recent past, however, PURA appears to be striking a better balance between the interests of the public and the utilities it oversees. For example, last year the company was permitted to keep the benefits from an IRS refund in exchange for lowering rates and agreeing not to seek rate relief before 2015.

We are raising our earnings estimates for the utility. Despite fourth quarter's results probably being flat, we think that Connecticut Water's share net rose 8% to $1.65 in 2013, versus 2012's strong showing. For 2014, combining the utility's growing rate base with the advantages allowed by PURA, earnings per share could rise 6% to $1.75.

Dividend growth is still below average for a water utility. Over the past decade, the company has not had a good dividend-paying record compared to its peers. This is a trend that should continue for the foreseeable future due to the projected sharp rise in Connecticut Water's capital spending program.

These share are ranked to outperform the market in the year ahead. But due to the stock's recent strength, much of its appeal over the next three-to five-year period has been diminished.

James A. Flood *January 17, 2014*

(A) Diluted earnings. Next earnings report due mid-February. Quarterly earnings do no add in '12 due to rounding.
(B) Dividends historically paid in mid-March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for split.
(D) Includes intangibles. In '12: $31.7 million/$2.89 a share.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	45
Earnings Predictability	85

MIDDLESEX WATER NDQ-MSEX

RECENT PRICE 20.80 | P/E RATIO 21.4 (Trailing: 20.6 Median: 22.0) | RELATIVE P/E RATIO 1.15 | DIV'D YLD 3.7% | VALUE LINE

TIMELINESS 3 Lowered 11/15/13
SAFETY 2 New 10/21/11
TECHNICAL 3 Lowered 1/17/14
BETA .75 (1.00 = Market)

2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	25	(+20%)	8%
Low	20	(-5%)	3%

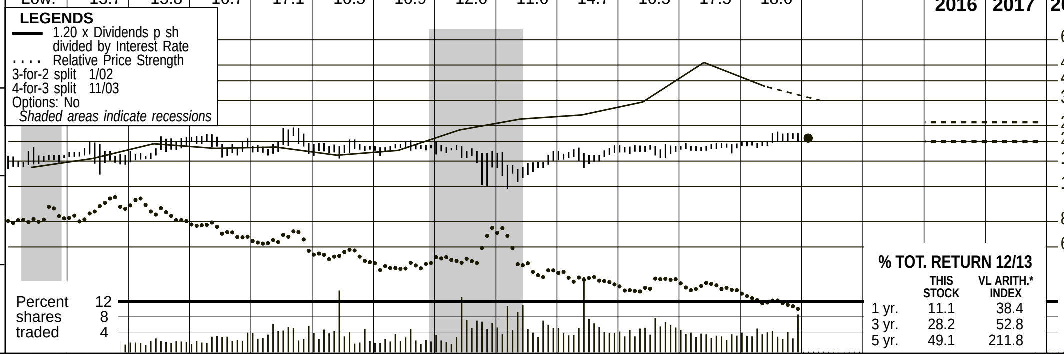
Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	1	0	1	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	1	2	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	38	37	42
to Sell	30	35	29
Hld's(000)	6579	6489	6608

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
High:	20.0	21.2	21.8	23.5	20.5	20.2	19.8	17.9	19.3	19.4	19.6	22.5	
Low:	13.7	15.8	16.7	17.1	16.5	16.9	12.0	11.6	14.7	16.5	17.5	18.6	



Target Price Range
2016 | 2017 | 2018

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	11.1	38.4
3 yr.	28.2	52.8
5 yr.	49.1	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
4.72	4.39	5.35	5.39	5.87	5.98	6.12	6.25	6.44	6.16	6.50	6.79	6.75	6.60	6.50	6.98	*7.20*	*7.70*	Revenues per sh	*9.10*
1.02	1.02	1.19	.99	1.18	1.20	1.15	1.28	1.33	1.33	1.49	1.53	1.40	1.55	1.46	1.56	*1.75*	*1.85*	"Cash Flow" per sh	*2.30*
.67	.71	.76	.51	.66	.73	.61	.73	.71	.82	.87	.89	.72	.96	.84	.90	*1.00*	*1.05*	Earnings per sh A	*1.15*
.57	.58	.60	.61	.62	.63	.65	.66	.67	.68	.69	.70	.71	.72	.73	.74	.75	*.76*	Div'd Decl'd per sh B■	*.80*
1.20	2.68	2.33	1.32	1.25	1.59	1.87	2.54	2.18	2.31	1.66	2.12	1.49	1.90	1.50	1.36	*1.50*	*1.65*	Cap'l Spending per sh	*2.00*
6.00	6.80	6.95	6.98	7.11	7.39	7.60	8.02	8.26	9.52	10.05	10.03	10.33	11.13	11.27	11.48	*11.70*	*12.10*	Book Value per sh D	*12.90*
8.54	9.82	10.00	10.11	10.17	10.36	10.48	11.36	11.58	13.17	13.25	13.40	13.52	15.57	15.70	15.82	*16.00*	*16.25*	Common Shs Outst'g C	*17.00*
13.4	15.2	17.6	28.7	24.6	23.5	30.0	26.4	27.4	22.7	21.6	19.8	21.0	17.8	21.7	20.8	*20.3*		Avg Ann'l P/E Ratio	*20.0*
.77	.79	1.00	1.87	1.26	1.28	1.71	1.39	1.46	1.23	1.15	1.19	1.40	1.13	1.36	1.33	*1.13*		Relative P/E Ratio	*1.35*
6.3%	5.4%	4.4%	4.2%	3.8%	3.7%	3.5%	3.4%	3.5%	3.7%	3.7%	4.0%	4.7%	4.2%	4.0%	4.0%	3.7%		Avg Ann'l Div'd Yield	*3.6%*

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
64.1	71.0	74.6	81.1	86.1	91.0	91.2	102.7	102.1	110.4	*115*	*125*	Revenues ($mill)	*155*
6.6	8.4	8.5	10.0	11.8	12.2	10.0	14.3	13.4	14.4	*16.0*	*17.0*	Net Profit ($mill)	*20.0*
32.8%	31.1%	27.6%	33.4%	32.6%	33.2%	34.1%	32.1%	32.7%	33.9%	*34.0%*	*34.0%*	Income Tax Rate	*34.0%*
--	--	--	--	--	--	--	6.8%	6.1%	3.4%	*4.5%*	*4.5%*	AFUDC % to Net Profit	*5.0%*
53.8%	53.8%	55.3%	49.5%	49.0%	45.6%	46.6%	43.1%	42.3%	41.5%	*41.5%*	*42.0%*	Long-Term Debt Ratio	*43.0%*
44.0%	42.5%	41.3%	47.5%	49.6%	51.8%	52.1%	55.8%	56.6%	57.4%	*57.5%*	*57.0%*	Common Equity Ratio	*57.0%*
181.1	214.5	231.7	264.0	268.8	259.4	267.9	310.5	312.5	316.5	*325*	*345*	Total Capital ($mill)	*400*
230.9	262.9	288.0	317.1	333.9	366.3	376.5	405.9	422.2	435.2	*445*	*450*	Net Plant ($mill)	*510*
5.0%	5.1%	5.0%	5.1%	5.6%	5.8%	5.0%	5.7%	5.2%	5.4%	*6.0%*	*7.0%*	Return on Total Cap'l	*5.5%*
7.9%	8.5%	8.2%	7.5%	8.6%	8.6%	7.0%	8.1%	7.5%	7.8%	*8.5%*	*8.5%*	Return on Shr. Equity	*9.0%*
8.0%	9.0%	8.6%	7.8%	8.7%	8.9%	7.0%	8.2%	7.5%	7.8%	*8.5%*	*8.5%*	Return on Com Equity	*9.0%*
NMF	.9%	.6%	1.3%	1.8%	2.0%	.1%	2.1%	1.0%	1.4%	*2.0%*	*2.5%*	Retained to Com Eq	*3.0%*
106%	90%	94%	84%	79%	78%	98%	75%	87%	83%	*76%*	*73%*	All Div'ds to Net Prof	*70%*

CAPITAL STRUCTURE as of 9/30/13
Total Debt $166.4 mill. **Due in 5 Yrs** $60.0 mill.
LT Debt $130.6 mill. **LT Interest** $7.0 mill.
(LT interest coverage: 4.1x)
(41% of Cap'l)

Pension Assets-12/12 $37.9 mill.
Oblig. $62.8 mill.
Pfd Stock $2.9 mill. **Pfd Div'd:** $.1 mill.

Common Stock 15,919,974 shs.
as of 10/31/13

MARKET CAP: $325 million (Small Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	3.1	3.0	3.0
Other	19.8	21.6	24.3
Current Assets	22.9	24.6	27.3
Accts Payable	5.7	3.8	4.4
Debt Due	4.6	11.1	35.8
Other	36.4	41.1	12.1
Current Liab.	46.7	56.0	52.3
Fix. Chg. Cov.	380%	410%	415%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	1.5%	1.0%	5.5%
"Cash Flow"	3.0%	2.0%	7.0%
Earnings	3.5%	2.5%	4.0%
Dividends	1.5%	1.5%	1.5%
Book Value	4.5%	4.0%	2.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	21.6	26.5	29.6	25.0	102.7
2011	24.0	26.1	28.7	23.3	102.1
2012	23.5	27.4	32.3	27.1	110.4
2013	27.0	29.1	31.3	*27.6*	*115*
2014	*30.0*	*30.0*	*35.0*	*30.0*	*125*

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.11	.31	.37	.17	.96
2011	.17	.23	.32	.12	.84
2012	.11	.23	.38	.17	.90
2013	.20	.28	.36	*.16*	*1.00*
2014	*.17*	*.28*	*.40*	*.20*	*1.05*

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.180	.180	.180	.183	.72
2011	.183	.183	.183	.185	.73
2012	.185	.185	.185	.1875	.74
2013	.1875	.1875	.1875	.19	.753
2014					

BUSINESS: Middlesex Water Company engages in the ownership and operation of regulated water utility systems in New Jersey, Delaware, and Pennsylvania. It also operates water and wastewater systems under contract on behalf of municipal and private clients in NJ and DE. Its Middlesex System provides water services to 60,000 retail customers, primarily in Middlesex County, New Jersey. in 2012, the Middlesex System accounted for 65% of total revenues. At 12/31/12, the company had 279 employees. Incorporated: NJ. President, CEO, and Chairman: Dennis W. Doll. Officers/directors own 3.1% of the common stock; BlackRock, 6.3%; The Vanguard Group, 5.7% (4/13 proxy). Address: 1500 Ronson Road, Iselin, NJ 08830. Tel.: 732-634-1500. Internet: www.middlesexwater.com.

Middlesex Water's recent dividend hike was subpar for a water utility. The company increased its payout by only 1.3%, versus the industry average of over 5%. Moreover, this represents the lowest growth rate of the nine water utilities that *Value Line* covers. It was also the 11th straight year in which the annual increase was only $0.01 a share.

Long-term dividend growth prospects are also below average. Over the next three- to five-year period, we expect the yearly raises to remain in the 1%-2% range. Much of this is a result of the company's high dividend payout ratio, which provides little room for future increases. This is also the reason why Middlesex sports a current dividend yield that is a full percentage point higher than the typical water utility. (Investors are willing to pay a premium and accept a lower yield in return for the potential of larger dividends in the future.)

Middlesex has been hit with some bad luck in the commercial and industrial markets. Last year, a large Hess refinery was shuttered. In addition, a major contract to supply water to a large borough in New Jersey lapsed. Together both accounted for almost $5 million in revenues.

Meanwhile, requests for higher rates have recently been filed. Two of Middlesex's subsidiaries petitioned regulators in Delaware and New Jersey seeking to recover costs used to repair and upgrade its water systems. If approved, rates would increase 14.4% and 15.9%, respectively. Very favorable rulings would probably make our earnings estimates conservative through 2016-2018.

The capital spending program has been increased. The company plans on spending $75 million over the next three years to upgrade and expand its infrastructure. Most of the funds will be invested in the residential sector, which is more predictable and carries higher margins than the commercial and industrial segments of the business.

We would advise investors to steer clear of this stock for the time being. Until the company's earnings can somehow gain sufficient traction to support a loftier dividend, there are more worthwhile selections in the water utility group.

James A. Flood *January 17, 2014*

(A) Diluted earnings. May not sum due to rounding. Next earnings report due mid-Feb.
(B) Dividends historically paid in mid-Feb., May, Aug., and November. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for splits.
(D) Intangible assets in 2012: $9.2 million, $0.58 a share.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	40
Earnings Predictability	80

SJW CORP. NYSE-SJW

RECENT PRICE 29.15 | P/E RATIO 23.1 (Trailing: 24.5 Median: 23.0) | RELATIVE P/E RATIO 1.24 | DIV'D YLD 2.6% | VALUE LINE

TIMELINESS	3	Lowered 11/8/13
SAFETY	3	New 4/22/11
TECHNICAL	2	Raised 1/3/14

BETA .85 (1.00 = Market)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
High:	15.1	15.0	19.6	27.8	45.3	43.0	35.1	30.4	28.2	26.8	26.9	30.1
Low:	12.7	12.6	14.6	16.1	21.2	27.7	20.0	18.2	21.6	20.9	22.6	24.5

2016-18 PROJECTIONS

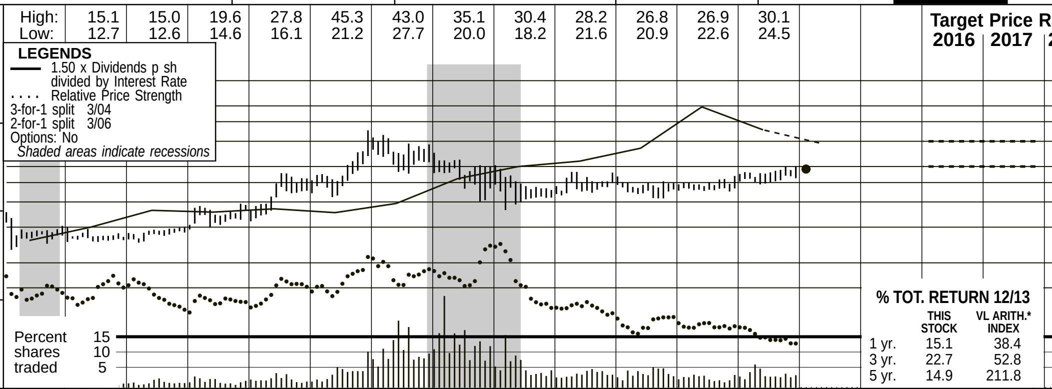
	Price	Gain	Ann'l Total Return
High	40	(+35%)	11%
Low	30	(+5%)	4%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	1	0	0
to Sell	0	0	0	0	0	0	1	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	46	47	43
to Sell	20	28	29
Hld's(000)	10000	10629	10697



% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	15.1	38.4
3 yr.	22.7	52.8
5 yr.	14.9	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
5.79	5.58	6.40	6.74	7.45	7.97	8.20	9.14	9.86	10.35	11.25	12.12	11.68	11.62	12.85	14.01	14.05	14.75	Revenues per sh	16.30
1.27	1.26	1.43	1.23	1.49	1.55	1.75	1.89	2.21	2.38	2.30	2.44	2.21	2.38	2.80	2.97	3.25	3.50	"Cash Flow" per sh	3.65
.80	.76	.87	.58	.77	.78	.91	.87	1.12	1.19	1.04	1.08	.81	.84	1.11	1.18	1.20	1.40	Earnings per sh A	1.60
.38	.39	.40	.41	.43	.46	.49	.51	.53	.57	.61	.65	.66	.68	.69	.71	.73	.75	Div'd Decl'd per sh B■	.90
1.27	1.81	1.77	1.89	2.63	2.06	3.41	2.31	2.83	3.87	6.62	3.79	3.17	5.65	3.75	5.67	5.25	5.20	Cap'l Spending per sh	4.85
7.02	7.53	7.88	7.90	8.17	8.40	9.11	10.11	10.72	12.48	12.90	13.99	13.66	13.75	14.20	14.71	15.40	16.40	Book Value per sh	19.15
19.02	19.01	18.27	18.27	18.27	18.27	18.27	18.27	18.27	18.28	18.36	18.18	18.50	18.55	18.59	18.67	20.25	21.00	Common Shs Outst'g C	23.00
11.2	13.1	15.5	33.1	18.5	17.3	15.4	19.6	19.7	23.5	33.4	26.2	28.7	29.1	21.2	20.4	22.7		Avg Ann'l P/E Ratio	22.0
.65	.68	.88	2.15	.95	.94	.88	1.04	1.05	1.27	1.77	1.58	1.91	1.85	1.33	1.30	1.27		Relative P/E Ratio	1.45
4.3%	3.9%	3.0%	2.1%	3.0%	3.4%	3.5%	3.0%	2.4%	2.0%	1.7%	2.3%	2.8%	2.8%	2.9%	3.0%	2.7%		Avg Ann'l Div'd Yield	2.6%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $335.1 mill. **Due in 5 Yrs** $21.2 mill.
LT Debt $335.1 mill. **LT Interest** $18.6 mill.
(Total interest coverage: 4.6x) (51% of Cap'l)

Leases, Uncapitalized: Annual rentals $4.7 mill.

Pension Assets $75.5 mill. **Oblig.** $141.0 mill.

Pfd Stock None.

Common Stock 20,162,133 shs. as of 10/25/13
MARKET CAP: $600 million (Small Cap)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
149.7	166.9	180.1	189.2	206.6	220.3	216.1	215.6	239.0	261.5	275	310	Revenues ($mill)	375
16.7	16.0	20.7	22.2	19.3	20.2	15.2	15.8	20.9	22.3	26.0	29.0	Net Profit ($mill)	37.0
36.2%	42.1%	41.6%	40.8%	39.4%	39.5%	40.4%	38.8%	41.1%	41.1%	41.0%	40.0%	Income Tax Rate	40.0%
1.6%	2.1%	1.6%	2.1%	2.7%	2.3%	2.0%	--	2.0%	2.0%	3.0%	4.0%	AFUDC % to Net Profit	5.0%
45.6%	43.7%	42.6%	41.8%	47.7%	46.0%	49.4%	53.7%	56.6%	55.0%	54.5%	54.0%	Long-Term Debt Ratio	51.0%
54.4%	56.3%	57.4%	58.2%	52.3%	54.0%	50.6%	46.3%	43.4%	45.0%	45.5%	46.0%	Common Equity Ratio	49.0%
306.0	328.3	341.2	391.8	453.2	470.9	499.6	550.7	607.9	610.2	685	745	Total Capital ($mill)	900
428.5	456.8	484.8	541.7	645.5	684.2	718.5	785.5	756.2	831.6	890	950	Net Plant ($mill)	1150
6.9%	6.5%	7.6%	7.0%	5.7%	5.8%	4.4%	4.3%	4.9%	5.0%	5.0%	5.0%	Return on Total Cap'l	6.0%
10.0%	8.7%	10.6%	9.7%	8.2%	8.0%	6.0%	6.2%	7.9%	8.1%	8.5%	8.5%	Return on Shr. Equity	8.5%
10.0%	8.7%	10.6%	9.7%	8.2%	8.0%	6.0%	6.2%	7.9%	8.1%	8.5%	8.5%	Return on Com Equity	8.5%
4.7%	3.6%	5.6%	5.2%	3.5%	3.3%	1.2%	1.2%	3.1%	3.3%	3.5%	4.0%	Retained to Com Eq	3.5%
53%	58%	47%	46%	57%	59%	80%	80%	61%	59%	56%	54%	All Div'ds to Net Prof	56%

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	26.7	2.5	3.2
Other	42.2	40.4	46.1
Current Assets	68.9	42.9	49.3
Accts Payable	7.4	8.5	11.8
Debt Due	.8	20.7	7.6
Other	20.1	19.9	30.3
Current Liab.	28.3	49.1	49.7
Fix. Chg. Cov.	276%	247%	231%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	5.5%	4.0%	4.0%
"Cash Flow"	6.5%	3.5%	5.0%
Earnings	4.0%	-1.5%	7.5%
Dividends	5.0%	4.0%	4.5%
Book Value	5.5%	3.5%	5.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	40.4	54.1	70.3	50.8	215.6
2011	43.7	59.0	73.9	62.4	239.0
2012	51.1	65.6	82.4	62.4	261.5
2013	50.1	74.2	85.2	65.5	275
2014	60.0	75.0	100	75.0	310

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.055	.24	.44	.11	.84
2011	.03	.29	.44	.35	1.11
2012	.06	.28	.53	.31	1.18
2013	.07	.37	.44	.32	1.20
2014	.10	.40	.55	.35	1.40

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.17	.17	.17	.17	.68
2011	.173	.173	.173	.173	.69
2012	.1775	.1775	.1775	.1775	.71
2013	.1825	.1825	.1825	.1825	.73
2014					

BUSINESS: SJW Corporation engages in the production, purchase, storage, purification, distribution, and retail sale of water. It provides water service to approximately 227,000 connections that serve a population of approximately one million people in the San Jose area and 8,700 connections that serve approximately 36,000 residents in a service area in the region between San Antonio and Austin, Texas. The company offers nonregulated water-related services, including water system operations, cash remittances, and maintenance contract services. SJW also owns and operates commercial real estate investments. Has about 375 employees. Chrm.: Charles J. Toeniskoetter. Inc.: CA. Address: 110 W. Taylor Street, San Jose, CA 95110. Tel.: (408) 279-7800. Int: www.sjwater.com.

We have lowered our 2013 earnings estimate for SJW. Higher costs for both extracting ground water and for purchasing water on the open market resulted in an unexpected 17% decline in last year's third-quarter earnings per share. As a result, we think the company's annual share net only reached $1.20, $0.10 less than our previous estimate.

Earnings for the next several years will depend upon state regulators. In 2012, SJW filed a rate case with the California Public Utility Commission (CPUC) seeking to have rates increased 21.5% in 2013, 4.9% in 2014, and 12.6% in 2016, respectively. Raising customers' bills by such significant amounts is not easy for any public body. However, SJW's pipelines are antiquated and badly in need of modernization.

We are guardedly optimistic regarding SJW's chances of receiving a favorable ruling. With the exception of the allowed return on equity, the CPUC's recent decisions have been reasonable. Utilities that have made sound arguments for the need for higher tariffs have been treated fairly. Still, predicting regulators' actions is not an exact science.

SJW's short-term dividend growth prospects are unexciting. The company is expected to raise its dividend later this month or in early February. We are anticipating only a quarterly increase of $0.005 a share (or $0.02 a share on an annual basis). This increase is only 2.7%, versus the industry average of over 5%. As future rate relief is implemented, there is the possibility that our projections could prove conservative.

SJW's operates in healthy service areas. The company's main utility operations are in San Jose, the home of Silicon Valley. While other parts of California may suffer, due to the high cost of doing business, this is a geographic location that should continue to experience solid growth. Moreover, the company's Texas subsidiary is located in the thriving Austin-to-San Antonio corridor.

We think that there are other stocks in the water utility group that hold greater appeal than SJW. On a risk adjusted basis, the equity's prospects are in line with the industry averages.

James A. Flood *January 17, 2014*

(A) Diluted earnings. Excludes nonrecurring losses : '03, $1.97; '04, $3.78; '05, $1.09; '06, $16.36; '08, $1.22; '10, 46¢. Next earnings report due early February. Quarterly egs. may not add due to rounding.
(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for stock splits.

Company's Financial Strength	B+
Stock's Price Stability	80
Price Growth Persistence	45
Earnings Predictability	80

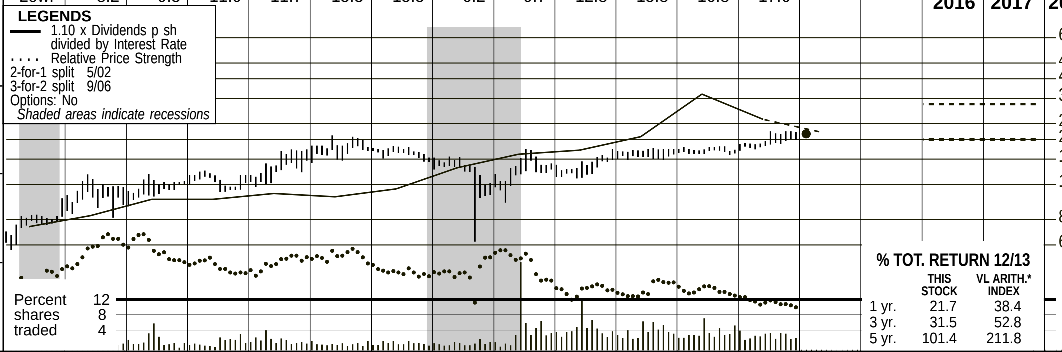
YORK WATER NDQ-YORW

RECENT PRICE 21.37 | P/E RATIO 26.7 (Trailing: 29.7 Median: 25.0) | RELATIVE P/E RATIO 1.44 | DIV'D YLD 2.7% | VALUE LINE

TIMELINESS 5 Lowered 11/22/13
SAFETY 2 New 7/19/13
TECHNICAL 2 Raised 1/3/14
BETA .70 (1.00 = Market)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
High:	13.4	13.5	14.0	17.9	21.0	18.5	16.5	18.0	18.0	18.1	18.5	22.0	
Low:	8.2	9.3	11.0	11.7	15.3	15.5	6.2	9.7	12.8	15.8	16.8	17.6	

Target Price Range 2016 | 2017 | 2018



2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	30	(+40%)	12%
Low	20	(-5%)	2%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	4	0	1	5	0	2	5
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	1	0	0	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	33	32	30
to Sell	21	26	23
Hld's(000)	3375	3346	3451

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	21.7	38.4
3 yr.	31.5	52.8
5 yr.	101.4	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
- -	- -	- -	- -	2.05	2.05	2.17	2.18	2.58	2.56	2.79	2.89	2.95	3.07	3.18	3.21	3.40	3.65	Revenues per sh	4.15
- -	- -	- -	- -	.59	.57	.65	.65	.79	.77	.86	.88	.95	1.07	1.09	1.12	1.25	1.35	"Cash Flow" per sh	1.65
- -	- -	- -	- -	.43	.40	.47	.49	.56	.58	.57	.57	.64	.71	.71	.72	.75	.90	Earnings per sh A	1.05
- -	- -	- -	- -	.34	.35	.37	.39	.42	.45	.48	.49	.51	.52	.53	.54	.55	.57	Div'd Decl'd per sh B	.70
- -	- -	- -	- -	.75	.66	1.07	2.50	1.69	1.85	1.69	2.17	1.18	.83	.74	.94	.90	.85	Cap'l Spending per sh	1.05
- -	- -	- -	- -	3.79	3.90	4.06	4.65	4.85	5.84	5.97	6.14	6.92	7.19	7.45	7.73	7.85	8.70	Book Value per sh	9.60
- -	- -	- -	- -	9.46	9.55	9.63	10.33	10.40	11.20	11.27	11.37	12.56	12.69	12.79	12.92	13.00	12.60	Common Shs Outst'g C	12.00
- -	- -	- -	- -	17.8	26.9	24.5	25.7	26.3	31.2	30.3	24.6	21.9	20.7	23.9	24.4	26.3		Avg Ann'l P/E Ratio	23.0
- -	- -	- -	- -	.91	1.47	1.40	1.36	1.40	1.68	1.61	1.48	1.46	1.32	1.50	1.55	1.47		Relative P/E Ratio	1.55
- -	- -	- -	- -	4.4%	3.3%	3.2%	3.1%	2.9%	2.5%	2.8%	3.5%	3.6%	3.5%	3.1%	3.1%	2.8%		Avg Ann'l Div'd Yield	2.8%

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
20.9	22.5	26.8	28.7	31.4	32.8	37.0	39.0	40.6	41.4	43.0	46.0	Revenues ($mill)	50.0
4.4	4.8	5.8	6.1	6.4	6.4	7.5	8.9	9.1	9.3	10.0	11.5	Net Profit ($mill)	12.5
34.8%	36.7%	36.7%	34.4%	36.5%	36.1%	37.9%	38.5%	35.3%	37.6%	36.0%	36.0%	Income Tax Rate	36.0%
- -	- -	- -	7.2%	3.6%	10.1%	- -	1.2%	1.1%	1.1%	1.0%	1.0%	AFUDC % to Net Profit	1.0%
43.4%	42.5%	44.1%	48.3%	46.5%	54.5%	45.7%	48.3%	47.1%	46.0%	45.0%	44.5%	Long-Term Debt Ratio	42.5%
56.6%	57.5%	55.9%	51.7%	53.5%	45.5%	54.3%	51.7%	52.9%	54.0%	55.0%	54.5%	Common Equity Ratio	57.5%
69.0	83.6	90.3	126.5	125.7	153.4	160.1	176.4	180.2	184.8	190	185	Total Capital ($mill)	200
116.5	140.0	155.3	174.4	191.6	211.4	222.0	228.4	233.0	240.3	245	250	Net Plant ($mill)	260
8.5%	7.6%	8.4%	6.2%	6.7%	5.7%	6.2%	6.5%	6.4%	6.4%	6.5%	7.5%	Return on Total Cap'l	7.5%
11.4%	10.0%	11.6%	9.3%	9.5%	9.2%	8.6%	9.8%	9.5%	9.3%	9.5%	11.5%	Return on Shr. Equity	11.0%
11.4%	10.0%	11.6%	9.3%	9.5%	9.2%	8.6%	9.8%	9.5%	9.3%	9.5%	11.5%	Return on Com Equity	11.0%
2.6%	2.1%	3.0%	2.2%	1.7%	1.4%	1.9%	2.7%	2.5%	2.4%	3.0%	3.0%	Retained to Com Eq	3.5%
77%	79%	74%	77%	82%	85%	78%	72%	73%	74%	71%	63%	All Div'ds to Net Prof	67%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $84.9 mill. **Due in 5 Yrs** $19.5 mill.
LT Debt $84.9 mill. **LT Interest** $5.2 mill.
(Total interest coverage: 2.9x)
(45% of Cap'l)

Pension Assets 12/12 $22.7 mill.
Oblig. $34.7 mill.

Pfd Stock None

Common Stock 12,942,843 shs.
as of 11/6/13

MARKET CAP: $275 million (Small Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	4.0	4.0	6.8
Accounts Receivable	6.0	6.4	3.9
Other	1.4	1.2	3.6
Current Assets	11.4	11.6	14.3
Accts Payable	1.1	1.1	1.9
Debt Due	.1	.1	- -
Other	4.1	4.3	5.0
Current Liab.	5.3	5.5	6.9
Fix. Chg. Cov.	160%	156%	154%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	4.5%	3.5%	4.5%
"Cash Flow"	6.5%	6.5%	7.0%
Earnings	5.5%	4.5%	6.5%
Dividends	1.5%	3.0%	5.0%
Book Value	7.0%	6.0%	4.5%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	9.0	9.7	10.5	9.8	39.0
2011	9.6	10.5	10.5	10.0	40.6
2012	9.6	10.4	11.0	10.4	41.4
2013	10.1	10.7	10.9	11.3	43.0
2014	10.5	11.5	12.2	11.8	46.0

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.15	.18	.21	.17	.71
2011	.17	.19	.19	.16	.71
2012	.15	.17	.22	.18	.72
2013	.17	.18	.19	.21	.75
2014	.19	.22	.22	.22	.85

Cal-endar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.128	.128	.128	.128	.512
2011	.131	.131	.131	.131	.524
2012	.134	.134	.134	.134	.535
2013	.138	.138	.138	.138	.552
2014	.1431				

BUSINESS: The York Water Company is the oldest investor-owned regulated water utility in the United States. It has operated continuously since 1816. As of December 31, 2012, the company's average daily availability was 35.0 million gallons and its service territory had an estimated population of 189,000. Has more than 63,000 customers. Residential customers accounted for 63% of 2012 revenues; commercial and industrial (29%); other (8%). It also provides sewer billing services. Incorporated: PA. York had 103 full-time employees at 12/31/12. President/CEO: Jeffrey R. Hines. Officers/directors own 1.2% of the common stock (3/13 proxy). Address: 130 East Market Street York, Pennsylvania 17401. Telephone: (717) 845-3601. Internet: www.yorkwater.com.

The York Water Company probably experienced little growth in the year just ended. We think that the company's share net barely moved higher in 2013, reaching $0.75, at best. This represents the fourth-consecutive year in which the bottom line has showed little improvement. Moreover, the dividend only increased slightly over the same time period.

Higher rates could possibly provide a nice lift to profits in 2014, however. York is still awaiting the ruling on a rate case filed last year in Pennsylvania. The petition was for a 17% hike in tariffs to enable it to recover the nearly $50 million that it spent over the past several years upgrading the system's deteriorating infrastructure.

A share-repurchase program would also help. The company hasn't really bought back any of the 1.2 million shares authorized by its board more than a year ago. While this might not sound like much, the amount represents more than 9% of the company's outstanding shares.

The balance sheet should remain in good shape. York's finances have strengthened over the last several years. And, even assuming a reduction in the equity base resulting from the share repurchases, we think that the equity-to-total capital ratio will remain at a healthy 55% next year, and gradually rise to 57% by 2016-2018. Having solid finances will also provide York with greater flexibility. As the industry continues to consolidate, perhaps a small acquisition or two could be made to help foster earnings growth.

We have raised the company's long-term dividend growth prospects. York raised its dividend by 3.5% last quarter, nearly double the average of the past several years. Though this rate is still below the industry average, it might signal a more positive long-term trend.

York shares are now ranked 5 (Lowest) for year-ahead relative performance. While our outlook for the company has improved since our October report, it now appears that all of the company's positive metrics are fully reflected in the recent stock price. Indeed, the current price earnings ratio of nearly 27 is high, both for a water utility and the general market.

James A. Flood *January 17, 2014*

(A) Diluted earnings. Next earnings report due early February.
(B) Dividends historically paid in mid-January, April, July, and October.
(C) In millions, adjusted for splits.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	70
Earnings Predictability	100

United Water Rhode Island, Inc.
Summary of Risk Premium Models for the
Proxy Group of Nine Water Companies

	Proxy Group of Nine Water Companies
Predictive Risk Premium Model ™ (PRPM™) (1)	11.89 %
Risk Premium Using an Adjusted Market Approach (2)	9.67 %
Average	11.33 %

Notes:
(1) From page 13 of this Schedule.
(2) From page 14 of this Schedule.

United Water Rhode Island, Inc.
Derivation of Common Equity Cost Rate
Using the Predictive Risk Premium Model ™ (PRPM ™)
Proxy Group of Nine Water Companies

	American States Water Co.	American Water Works Co., Inc.	Aqua America, Inc.	Artesian Resources Corp.	California Water Service Group	Connecticut Water Service, Inc.	Middlesex Water Company	SJW Corporation	York Water Company
GARCH Coefficient (1)	1.541826259	4.572332998	2.198333083	2.159831171	1.83967266	1.808647271	1.950055786	1.364467426	1.995065254
Average Variance (1)	0.39%	0.25%	0.48%	0.30%	0.31%	0.28%	0.27%	0.42%	0.46%
PRPM™ Derived Risk Premium (1)	7.45%	14.41%	13.30%	8.11%	7.12%	6.35%	6.49%	7.09%	11.57%
Risk-Free Rate (2)	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%
Indicated Cost of Common Equity	11.89%	18.85%	17.74%	12.55%	11.56%	10.79%	10.93%	11.53%	16.01%
								Average	13.54%
								Median	11.89%

Notes:
(1) Based upon data from CRSP(R) Data © 2012, Center For Research in Security Prices (CRSP(R)), The University of Chicago Booth School of Business.
(2) From note 3 on page 23 of this Schedule.

United Water Rhode Island, Inc.
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

Line No.		Proxy Group of Nine Water Companies
1.	Prospective Yield on Aaa Rated Corporate Bonds (1)	5.19 %
2.	Adjustment to Reflect Yield Spread Between Aaa Rated Corporate Bonds and A Rated Public Utility Bonds	0.16 (2)
3.	Adjusted Prospective Yield on A Rated Public Utility Bonds	5.35 %
4.	Adjustment to Reflect Bond Rating Difference of Proxy Group	-0.04 (3)
5.	Adjusted Prospective Bond Yield	5.32 %
6.	Equity Risk Premium (5)	4.35
7.	Risk Premium Derived Common Equity Cost Rate	9.67 %

Notes:

(1) Six quarter average consensus forecast ending with Q1 of 2015 averaged with the 2015-2019 and 2020-2024 consensus forecast of Moody's Aaa Rated Corporate bonds from Blue Chip Financial

(2) The average yield spread of A rated public utility bonds over Aaa rated corporate bonds of 0.16% from page 16 of this Schedule.

(3) Adjustment to reflect the A1/A2 Moody's bond rating of the proxy group of nine water companies as shown on page 16 of this Schedule. The 4 basis point adjustment is derived by taking 1/6 of the spread between Aa2 and A2 Public Utility Bonds (1/6 * 0.21% = 0.04%).

(4) From page 17 of this Schedule.

United Water Rhode Island, Inc.
Comparison of Bond Ratings, Business Risk and Financial Risk Profiles for the
Proxy Group of Nine Water Companies

	Moody's Bond Rating February 2014		Standard & Poor's Bond Rating February 2014	
Proxy Group of Nine Water Companies	Bond Rating	Numerical Weighting (1)	Bond Rating	Numerical Weighting (1)
American States Water Co. (2)	A2	6.0	A+	5.0
American Water Works Co., Inc. (3)	A1	5.0	A	6.0
Aqua America, Inc. (4)	NR	- -	AA-	4.0
Artesian Resources Corp.	NR	- -	NR	- -
California Water Service Group (5)	NR	- -	AA-	4.0
Connecticut Water Service, Inc. (6)	NR	- -	A/A-	6.5
Middlesex Water Company	NR	- -	A	6.0
SJW Corporation (7)	NR	- -	A	6.0
York Water Company	NR	- -	A-	7.0
Average	A1/A2	5.5	A+/A	5.5

Notes:
(1) From Schedule PMA-7, page 5 of Ms. Ahern's Direct Exhibit.
(2) Ratings are those of Golden State Water Company.
(3) Ratings are those of Pennsylvania American Water.
(4) Ratings are those of Aqua Pennsylvania, Inc.
(5) Ratings are those of California Water Service Co.
(6) Ratings are those of Connecticut Water Company.
(7) Ratings are those of San Jose Water Co.

Source Information:
Moody's Investors Service
Standard & Poor's Global Utilities Rating Service

Moody's
Comparison of Interest Rate Trends
for the Three Months Ending January 2014 (1)

Months	Corporate Bonds	Public Utility Bonds			Spread - Corporate v. Public Utility Bonds			Spread - Public Utility Bonds	
	Aaa Rated	Aa Rated	A Rated	Baa Rated	Aa (Pub. Util.) over Aaa (Corp.)	A (Pub. Util.) over Aaa (Corp.)	Baa (Pub. Util.) over Aaa (Corp.)	A over Aa	Baa over A
January-14	4.49 %	4.44 %	4.63 %	5.09 %					
December-13	4.62	4.59	4.81	5.25					
November-13	4.63	4.56	4.77	5.24					
Average of Last 3 Months	4.58 %	4.53 %	4.74 %	5.19 %	(0.05) %	0.16 %	0.61 %	0.21 %	0.45 %

Notes: (1) All yields are distributed yields.

Source of Information: Mergent Bond Record, February 2014, Vol. 81, No. 2.

United Water Rhode Island, Inc.
Judgment of Equity Risk Premium for
the Proxy Group of Nine Water Companies

Line No.		Proxy Group of Nine Water Companies
1.	Calculated equity risk premium based on the total market using the beta approach (1)	4.00 %
2.	Mean equity risk premium based on a study using the holding period returns of public utilities with A rated bonds (2)	4.70
3.	Average equity risk premium	4.35 %

Notes: (1) From page 18 of this Schedule.
(2) From page 21 of this Schedule.

United Water Rhode Island, Inc.
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for
the Proxy Group of Nine Water Companies

Line No.		Proxy Group of Nine Water Companies
	Based on SBBI Valuation Yearbook Data:	
1.	Ibbotson Equity Risk Premium (1)	5.60 %
2.	Ibbotson Equity Risk Premium based on PRPM™ (2)	9.33
	Based on Value Line Summary and Index:	
3.	Equity Risk Premium Based on Value Line Summary and Index (3)	3.55
4.	Conclusion of Equity Risk Premium (4)	6.16 %
5.	Adjusted Value Line Beta (5)	0.65
6	Beta Adjusted Equity Risk Premium	4.00 %

Notes:
(1) Based on the arithmetic mean historical monthly returns on large company common stocks from Ibbotson® SBBI® 2012 Valuation Yearbook - Market Results for Stocks, Bonds, Bills, and Inflation minus the arithmetic mean monthly yield of Moody's Aaa and Aa corporate bonds from 1926 - 2012. (11.83% - 6.23% = 5.60%).

(2) The Predictive Risk Premium Model (PRPM™) is discussed in Ms. Ahern's accompanying direct testimony. The Ibbotson equity risk premium based on the PRPM™ is derived by applying the PRPM™ to the monthly risk premiums between Ibbotson large company common stock monthly returns minus the average Aaa and Aa corporate monthly bond yields, from January 1928 through December 2013.

(3) The equity risk premium based on the Value Line Summary and Index is derived from taking the projected 3-5 year total annual market return of 8.74% (described fully in note 1 of page 23 of this Schedule) and subtracting the average consensus forecast of Aaa corporate bonds of 5.19% (Shown on page 14 of this Schedule). (8.74% - 5.19% = 3.55%).

(4) Average of Lines 1, 2, & 3.

(5) Median beta derived from page 22 of this Schedule.

Sources of Information:
Ibbotson® SBBI® 2013 Valuation Yearbook - Market Results for Stocks, Bonds, Bills, and Inflation, Morningstar, Inc., 2013 Chicago, IL.
Industrial Manual and Mergent Bond Record Monthly Update.
Value Line Summary and Index
Blue Chip Financial Forecasts, February 1, 2014

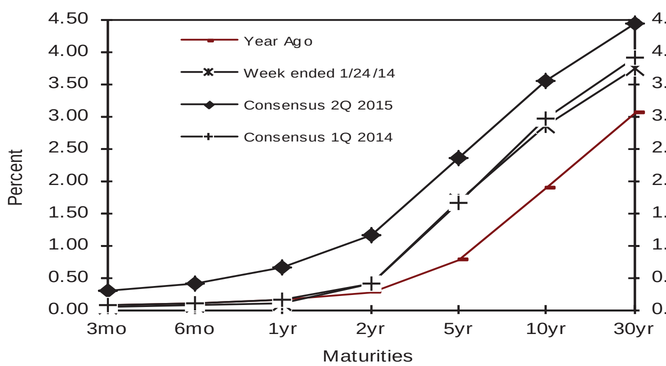
Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Jan. 24	Jan. 17	Jan. 10	Jan. 3	Dec.	Nov.	Oct.	4Q 2013	2014	2014	2014	2014	2015	2015
Federal Funds Rate	0.07	0.07	0.08	0.08	0.09	0.08	0.09	0.09	**0.1**	**0.1**	**0.2**	**0.2**	**0.2**	**0.3**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.4**
LIBOR, 3-mo.	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	**0.3**	**0.3**	**0.3**	**0.4**	**0.4**	**0.5**
Commercial Paper, 1-mo.	0.05	0.05	0.05	0.05	0.06	0.05	0.07	0.06	**0.1**	**0.1**	**0.1**	**0.2**	**0.2**	**0.4**
Treasury bill, 3-mo.	0.04	0.04	0.05	0.07	0.07	0.07	0.05	0.06	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.3**
Treasury bill, 6-mo.	0.07	0.06	0.07	0.10	0.10	0.10	0.08	0.09	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**	**0.4**
Treasury bill, 1 yr.	0.11	0.11	0.13	0.13	0.13	0.12	0.12	0.12	**0.2**	**0.2**	**0.3**	**0.4**	**0.5**	**0.7**
Treasury note, 2 yr.	0.41	040	0.41	0.39	0.34	0.30	0.34	0.33	**0.4**	**0.5**	**0.6**	**0.8**	**1.0**	**1.2**
Treasury note, 5 yr.	1.67	1.65	1.71	1.73	1.58	1.37	1.37	1.44	**1.7**	**1.8**	**1.9**	**2.1**	**2.2**	**2.4**
Treasury note, 10 yr.	2.86	2.86	2.96	3.01	2.90	2.72	2.62	2.75	**3.0**	**3.1**	**3.2**	**3.3**	**3.4**	**3.5**
Treasury note, 30 yr.	3.75	3.78	3.87	3.93	3.89	3.80	3.68	3.79	**3.9**	**4.0**	**4.1**	**4.3**	**4.3**	**4.4**
Corporate Aaa bond	4.47	4.48	4.53	4.55	4.62	4.63	4.53	4.59	**4.6**	**4.8**	**4.9**	**5.0**	**5.1**	**5.2**
Corporate Baa bond	5.17	5.19	5.28	5.35	5.38	5.38	5.31	5.36	**5.4**	**5.6**	**5.7**	**5.8**	**5.9**	**6.0**
State & Local bonds	4.50	4.55	4.68	4.75	4.73	4.60	4.56	4.63	**4.6**	**4.7**	**4.8**	**4.8**	**4.9**	**5.0**
Home mortgage rate	4.39	4.41	4.51	4.53	4.46	4.26	4.19	4.30	**4.6**	**4.7**	**4.8**	**5.0**	**5.1**	**5.2**

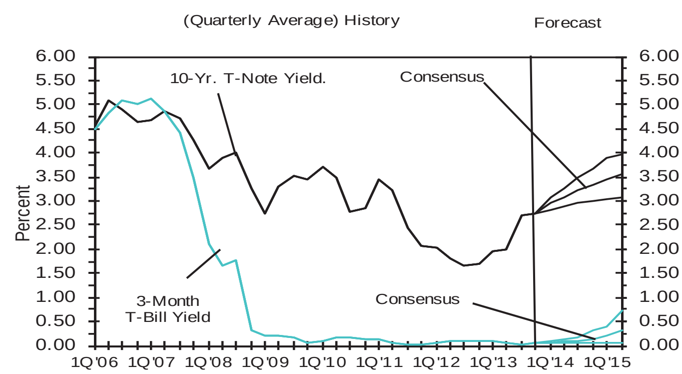
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	*4Q**	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2012	2012	2012	2012	2013	2013	2013	*2013*	2014	2014	2014	2014	2015	2015
Major Currency Index	72.9	73.9	74.0	73.2	74.7	76.4	76.7	76.0	**76.8**	**77.2**	**77.6**	**77.6**	**77.7**	**77.7**
Real GDP	3.7	1.2	2.8	0.1	1.1	2.5	4.1	*3.1*	**2.5**	**2.8**	**2.9**	**3.0**	**3.0**	**3.0**
GDP Price Index	2.0	1.8	2.3	1.1	1.3	0.6	2.0	*1.4*	**1.7**	**1.7**	**1.9**	**1.9**	**2.0**	**2.0**
Consumer Price Index	2.3	1.0	2.1	2.2	1.4	0.0	2.6	0.9	**1.8**	**1.8**	**2.1**	**2.0**	**2.1**	**2.0**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Figures for 4Q 2013 Real GDP and GDP Chained Price Index are consensus forecasts based on a special question asked of the panelists' this month.*

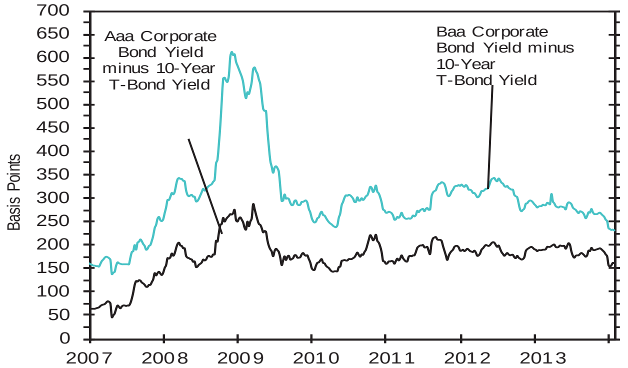
U.S. Treasury Yield Curve
Week ended January 24, 2014 and Year Ago vs.
1Q 2014 and 2Q 2015 Consensus Forecasts



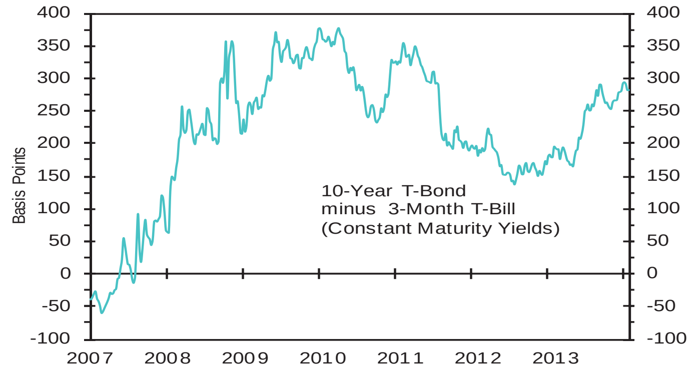
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield



Corporate Bond Spreads
As of week ended January 24, 2014



U.S. Treasury Yield Curve
As of week ended January 24, 2014



Long-Range Estimates:

The table below contains results of our semi-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are estimates for the years 2015 through 2019 and averages for the five-year periods 2015-2019 and 2020-2024. Apply these projections cautiously. Few economic, demographic and political forces can be evaluated accurately over such long time spans.

		-----------Average For The Year------------					Five-Year Averages	
Interest Rates		**2015**	**2016**	**2017**	**2018**	**2019**	**2015-2019**	**2020-2024**
1. Federal Funds Rate	**CONSENSUS**	**0.4**	**1.7**	**2.9**	**3.6**	**3.9**	**2.5**	**3.7**
	Top 10 Average	0.8	2.6	3.9	4.2	4.5	3.2	4.4
	Bottom 10 Average	0.2	0.8	1.6	2.6	3.1	1.6	2.9
2. Prime Rate	**CONSENSUS**	**3.5**	**4.8**	**6.0**	**6.6**	**6.9**	**5.6**	**6.7**
	Top 10 Average	3.9	5.6	6.9	7.2	7.6	6.2	7.4
	Bottom 10 Average	3.3	4.1	5.0	5.7	6.1	4.8	5.8
3. LIBOR, 3-Mo.	**CONSENSUS**	**0.9**	**2.2**	**3.3**	**4.0**	**4.2**	**2.9**	**4.0**
	Top 10 Average	1.6	3.3	4.6	5.0	5.2	3.9	5.0
	Bottom 10 Average	0.4	1.1	2.0	2.8	3.3	1.9	3.0
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**0.6**	**2.0**	**3.1**	**3.7**	**3.9**	**2.6**	**3.7**
	Top 10 Average	1.0	2.7	3.9	4.3	4.5	3.3	4.3
	Bottom 10 Average	0.3	1.3	2.3	2.9	3.1	2.0	3.0
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**0.5**	**1.7**	**2.9**	**3.5**	**3.7**	**2.5**	**3.6**
	Top 10 Average	1.0	2.7	3.9	4.3	4.5	3.3	4.3
	Bottom 10 Average	0.2	0.8	1.7	2.4	3.0	1.6	2.7
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**0.7**	**2.0**	**3.1**	**3.7**	**3.9**	**2.7**	**3.8**
	Top 10 Average	1.2	2.9	4.1	4.5	4.6	3.5	4.5
	Bottom 10 Average	0.3	1.1	1.9	2.7	3.1	1.8	2.8
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**0.9**	**2.2**	**3.2**	**3.8**	**4.0**	**2.8**	**3.9**
	Top 10 Average	1.5	3.2	4.3	4.7	4.8	3.7	4.6
	Bottom 10 Average	0.4	1.2	2.0	2.8	3.1	1.9	2.9
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**1.4**	**2.6**	**3.6**	**4.0**	**4.3**	**3.2**	**4.2**
	Top 10 Average	2.0	3.5	4.5	4.9	5.0	4.0	4.9
	Bottom 10 Average	0.8	1.7	2.4	3.1	3.5	2.3	3.3
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**2.3**	**3.3**	**4.1**	**4.4**	**4.6**	**3.7**	**4.4**
	Top 10 Average	2.9	4.0	4.8	5.1	5.3	4.4	5.1
	Bottom 10 Average	1.7	2.6	3.2	3.5	3.7	2.9	3.6
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.4**	**4.1**	**4.6**	**4.8**	**5.0**	**4.4**	**4.9**
	Top 10 Average	3.9	4.8	5.3	5.6	5.8	5.1	5.6
	Bottom 10 Average	2.8	3.5	3.8	4.0	4.1	3.7	4.0
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.3**	**4.7**	**5.2**	**5.5**	**5.6**	**5.0**	**5.5**
	Top 10 Average	4.8	5.5	6.0	6.3	6.5	5.8	6.2
	Bottom 10 Average	3.7	4.0	4.4	4.6	4.7	4.3	4.6
13. Corporate Aaa Bond Yield	**CONSENSUS**	**4.9**	**5.4**	**5.9**	**6.2**	**6.3**	**5.7**	**6.2**
	Top 10 Average	5.6	6.2	6.7	7.0	7.2	6.5	7.0
	Bottom 10 Average	4.2	4.5	4.9	5.2	5.3	4.8	5.3
13. Corporate Baa Bond Yield	**CONSENSUS**	**5.9**	**6.3**	**6.8**	**7.1**	**7.2**	**6.7**	**7.0**
	Top 10 Average	6.5	7.1	7.5	7.9	8.1	7.4	7.9
	Bottom 10 Average	5.1	5.4	5.7	6.1	6.1	5.7	6.0
14. State & Local Bonds Yield	**CONSENSUS**	**4.8**	**5.2**	**5.6**	**5.7**	**5.7**	**5.4**	**5.5**
	Top 10 Average	5.2	5.9	6.3	6.5	6.6	6.1	6.3
	Bottom 10 Average	4.3	4.5	4.8	4.9	4.9	4.7	4.7
15. Home Mortgage Rate	**CONSENSUS**	**5.1**	**5.6**	**6.1**	**6.4**	**6.5**	**5.9**	**6.4**
	Top 10 Average	5.6	6.3	6.9	7.1	7.3	6.6	7.1
	Bottom 10 Average	4.4	5.0	5.3	5.5	5.6	5.2	5.6
A. FRB - Major Currency Index	**CONSENSUS**	**77.8**	**78.4**	**78.8**	**79.1**	**79.2**	**78.7**	**79.7**
	Top 10 Average	81.0	82.3	83.4	84.2	84.4	83.1	84.8
	Bottom 10 Average	74.6	74.3	74.0	73.7	74.0	74.1	74.7

		----------Year-Over-Year, % Change----------					Five-Year Averages	
		2015	**2016**	**2017**	**2018**	**2019**	**2015-2019**	**2020-2024**
B. Real GDP	**CONSENSUS**	**3.0**	**2.9**	**2.7**	**2.6**	**2.5**	**2.7**	**2.4**
	Top 10 Average	3.5	3.3	3.1	2.9	2.9	3.1	2.7
	Bottom 10 Average	2.5	2.5	2.3	2.1	2.2	2.3	2.1
C. GDP Chained Price Index	**CONSENSUS**	**2.0**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.5	2.5	2.6	2.5	2.5	2.5	2.5
	Bottom 10 Average	1.5	1.7	1.7	1.7	1.7	1.7	1.7
D. Consumer Price Index	**CONSENSUS**	**2.2**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**
	Top 10 Average	2.6	2.8	2.8	2.8	2.8	2.8	2.8
	Bottom 10 Average	1.7	1.9	1.9	1.9	2.0	1.9	1.9

United Water Rhode Island, Inc.
Derivation of Mean Equity Risk Premium Based on a Study
Using Holding Period Returns of Public Utilities

		Over A Rated Moody's Public Utility Bonds - AUS Consultants Study (1)
1.	Arithmetic Mean Holding Period Returns on the Standard & Poor's Utility Index 1926-2012 (2):	10.69 %
2.	Arithmetic Mean Yield on Moody's A Rated Public Utility Yields 1926-2012	(6.53)
3.	Historical Equity Risk Premium	4.16 %
4.	Forecasted Equity Risk Premium Based on PRPM™ (3)	5.24
5.	Average of Historical and PRPM™ Equity Risk Premium	4.70 %

Notes: (1) Based on S&P Public Utility Index monthly total returns and Moody's Public Utility Bond average monthly yields from 1926-2012, (AUS Consultants, 2013).

(2) Holding period returns are calculated based upon income received (dividends and interest) plus the relative change in the market value of a security over a one-year holding period.

(3) The Predictive Risk Premium Model (PRPM™) is applied to the risk premium of the monthly total returns of the S&P Utility Index and the monthly yields on Moody's A rated public utility bonds from 1928 - 2012.

United Water Rhode Island, Inc.
Indicated Common Equity Cost Rate Through Use
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)

	1	2	3	4	5	6
Proxy Group of Nine Water Companies	Value Line Adjusted Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate (3)	ECAPM Cost Rate (4)	Indicated Common Equity Cost Rate (5)
American States Water Co.	0.65	7.09 %	4.44 %	9.05 %	9.67 %	
American Water Works Co., Inc.	0.65	7.09	4.44	9.05	9.67	
Aqua America, Inc.	0.60	7.09	4.44	8.69	9.40	
Artesian Resources Corp.	0.55	7.09	4.44	8.34	9.14	
California Water Service Group	0.60	7.09	4.44	8.69	9.40	
Connecticut Water Service, Inc.	0.75	7.09	4.44	9.76	10.20	
Middlesex Water Company	0.75	7.09	4.44	9.76	10.20	
SJW Corporation	0.85	7.09	4.44	10.47	10.73	
York Water Company	0.70	7.09	4.44	9.40	9.93	
Average	0.68			9.25 %	9.82 %	9.54 %
Median	0.65			9.05 %	9.67 %	9.36 %

See page 23 for notes.

United Water Rhode Island, Inc.
Development of the Market-Required Rate of Return on Common Equity Using
the Capital Asset Pricing Model for
the Proxy Group of Nine Water Companies
Adjusted to Reflect a Forecasted Risk-Free Rate and Market Return

Notes:

(1) For reasons explained in Ms. Ahern's accompanying direct testimony, from the 13 weeks ending February 7, 2014, Value Line Summary & Index, a forecasted 3-5 year total annual market return of 8.74% can be derived by averaging the 13 weeks ending February 7, 2014 forecasted total 3-5 year total appreciation, converting it into an annual market appreciation and adding the Value Line average forecasted annual dividend yield.

The 3-5 year average total market appreciation of 30% produces a four-year average annual return of 6.78% (($1.30^{0.25}$) - 1). When the average annual forecasted dividend yield of 1.96% is added, a total average market return of 8.74% (1.96% + 6.78%) is derived.

The 13 weeks ending February 7, 2014 forecasted total market return of 8.74% minus the risk-free rate of 4.44% (developed in Note 2) is 4.30% (8.74% - 4.44%).

The Predictive Risk Premium Model (PRPM™) market equity risk premium of 10.43% is derived by applying the PRPM™ to the monthly equity risk premium of large company common stocks over the income return on long-term U.S. Government Securities from January 1926 through December 2013.

The Morningstar, Inc. (Ibbotson Associates) calculated arithmetic mean monthly market equity risk premium of 6.55% for the period 1926-2012 results from a total market return of 11.83%% less the arithmetic mean income return on long-term U.S. Government Securities of 5.28% (11.83% - 5.28% = 6.55%).

These three expectational risk premiums are then averaged, resulting in a 7.09% market equity risk premium, which is then multiplied by the beta in column 1 of page 1 of this Schedule. ((4.30% + 10.43% + 6.55%)/3).

(2) For reasons explained in Ms. Ahern's direct testimony, the risk-free rate that Ms. Ahern relies upon for her CAPM analysis is the average forecast of 30-year Treasury Note yields per the consensus of nearly 50 economists reported in the Blue Chip Financial Forecasts dated December 1, 2013 and February 1, 2014 (see pages 19 & 20 of this Schedule).The estimates are detailed below:

	30-Year Treasury Note Yield
First Quarter 2014	3.90%
Second Quarter 2014	4.00%
Third Quarter 2014	4.10%
Fourth Quarter 2014	4.30%
First Quarter 2015	4.30%
Second Quarter 2015	4.40%
2015 – 2019	5.00%
2020 – 2024	5.50%
Average	4.44%

(3) The traditional Capital Asset Pricing Model (CAPM) is applied using the following formula:

$R_S = R_F + \beta (R_M - R_F)$

Where R_S = Return rate of common stock
R_F = Risk Free Rate
β = Value Line Adjusted Beta
R_M = Return on the market as a whole

(4) The empirical CAPM is applied using the following formula:

$R_S = R_F + .25 (R_M - R_F) + .75 \beta (R_M - R_F)$

Where R_S = Return rate of common stock
R_F = Risk-Free Rate
β = Value Line Adjusted Beta
R_M = Return on the market as a whole

Source of Information: Value Line Summary & Index
Blue Chip Financial Forecasts, December 1, 2013 & February 1, 2014
Value Line Investment Survey, (Standard Edition)
2013 Ibbotson® SBBI® Valuation Yearbook, Morningstar, Inc., 2013, Chicago, IL

United Water Rhode Island, Inc.
Summary of Cost of Equity Models Applied to the
Proxy Group of Non-Price-Regulated Companies
Comparable in Total Risk to the
Proxy Group of Nine Water Companies

Principal Methods		Proxy Group of Twenty-Seven Non-Price-Regulated
Discounted Cash Flow Model (DCF) (1)		12.02 %
Risk Premium Model (RPM) (2)		10.32 %
Capital Asset Pricing Model (CAPM) (3)		9.67 %
	Average	10.67 %

Notes:
(1) From page 28 of this Schedule.
(2) From page 29 of this Schedule.
(3) From Page 32 of this Schedule.

United Water Rhode Island, Inc.
Basis of Selection of Comparable Risk
Domestic Non-Price Regulated Companies

Proxy Group of Nine Water Companies	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
American States Water Co.	0.70	0.48	3.3620	0.0650
American Water Works Co., Inc.	0.65	0.44	3.0655	0.0610
Aqua America, Inc.	0.60	0.36	2.5902	0.0501
Artesian Resources Corp.	0.55	0.30	2.6477	0.0512
California Water Service Group	0.65	0.40	2.7115	0.0524
Connecticut Water Service, Inc.	0.75	0.58	3.1061	0.0601
Middlesex Water Company	0.70	0.54	2.6637	0.0515
SJW Corporation	0.85	0.70	3.6057	0.0697
York Water Company	0.70	0.48	3.1325	0.0606
Average	0.68	0.48	2.9872	0.0580

Beta Range (+/- 2 std. Devs. of Beta)	0.36	0.60
2 std. Devs. of Beta	0.12	
Residual Std. Err. Range (+/- 2 std. Devs. of the Residual Std. Err.)	2.7246	3.2498
Std. dev. of the Res. Std. Err.	0.1313	
2 std. devs. of the Res. Std. Err.	0.2626	

United Water Rhode Island, Inc.
Proxy Group of Non-Price Regulated Companies
Comparable in Total Risk to the
Proxy Group of Nine Water Companies

Proxy Group of Twenty-Seven Non-Price-Regulated Companies	VL Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
Gallagher (Arthur J.)	0.75	0.57	2.9742	0.0575
Baxter Intl Inc.	0.70	0.49	2.9372	0.0568
Bristol-Myers Squibb	0.70	0.50	2.8839	0.0558
Brown & Brown	0.75	0.55	3.1464	0.0608
ConAgra Foods	0.65	0.42	2.7898	0.0540
Capitol Fed. Finl	0.60	0.39	3.0449	0.0589
Quest Diagnostics	0.75	0.59	2.7655	0.0535
Dun & Bradstreet	0.75	0.60	2.9024	0.0561
DaVita HealthCare	0.65	0.46	2.8841	0.0558
Haemonetics Corp.	0.65	0.41	2.7538	0.0533
Kroger Co.	0.60	0.36	2.8843	0.0558
Lancaster Colony	0.70	0.53	3.1660	0.0612
McKesson Corp.	0.75	0.58	3.2240	0.0623
Mercury General	0.70	0.48	3.0066	0.0581
Mead Johnson Nutrition	0.65	0.43	3.1630	0.0824
Annaly Capital Mgmt.	0.65	0.39	3.2022	0.0619
Northwest Bancshares	0.75	0.59	3.0864	0.0597
Owens & Minor	0.70	0.53	3.2368	0.0626
Peoples United Finl	0.65	0.46	2.8665	0.0554
Sherwin-Williams	0.70	0.48	2.9688	0.0574
Smucker (J.M.)	0.70	0.49	2.9429	0.0569
Silgan Holdings	0.75	0.56	2.8926	0.0559
Suburban Propane	0.70	0.54	3.0689	0.0593
Stericycle Inc.	0.70	0.49	2.9267	0.0566
Waste Connections	0.70	0.53	2.7663	0.0535
Weis Markets	0.65	0.42	2.9050	0.0562
Berkley (W.R.)	0.70	0.47	2.9475	0.0570
Average	0.69	0.49	2.9754	0.0583
Proxy Group of Nine Water Companies	0.68	0.48	2.9872	0.0580

Basis of Selection of the Group of Non-Price Regulated Companies
Comparable in Total Risk to the Proxy Group of Nine Water Companies

The criteria for selection of the proxy group of twenty-seven non-price regulated companies was that the non-price regulated companies be domestic and reported in Value Line Investment Survey (Standard Edition).

The proxy group of twenty-seven non-price regulated companies were then selected based upon the unadjusted beta range of 0.36 – 0.60 and standard error of the regression range of 2.7246 – 3.2498 of the water proxy group.

These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression. Plus or minus two standard deviations captures 95.50% of the distribution of unadjusted betas and standard errors of the regression.

The standard deviation of the water industry's standard error of the regression is 0.1313. The standard deviation of the standard error of the regression is calculated as follows:

$$\text{Standard Deviation of the Std. Err. of the Regr.} = \frac{\text{Standard Error of the Regression}}{\sqrt{2N}}$$

where: N = number of observations. Since Value Line betas are derived from weekly price change observations over a period of five years, N = 259

$$\text{Thus, } 0.1313 = \frac{2.9872}{\sqrt{518}} = \frac{2.9872}{22.7596}$$

Source of Information: Value Line, Inc., June 15, 2013
Value Line Investment Survey (Standard Edition)

United Water Rhode Island, Inc.
DCF Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to
the Proxy Group of Nine Water Companies

Proxy Group of Twenty-Seven Non-Price-Regulated Companies	Average Dividend Yield	Value Line Projected Five Year Growth in EPS	Reuters Mean Consensus Projected Five Year Growth Rate in EPS	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth Rate in EPS	Adjusted Dividend Yield	Indicated Common Equity Cost Rate
Gallagher (Arthur J.	2.99 %	12.50 %	12.00 %	10.70 %	12.36 %	11.89 %	3.17 %	15.06 %
Baxter Intl Inc.	2.88	8.50	7.40	8.50	7.44	7.96	3.00	10.96
Bristol-Myers Squibb	2.69	10.00	13.00	9.10	13.67	11.44	2.84	14.28
Brown & Brown	1.28	14.00	14.00	13.10	15.53	14.16	1.38	15.54
ConAgra Foods	3.06	11.00	8.80	8.70	8.70	9.30	3.21	12.51
Capitol Fed. Finl	2.51	6.00	5.00	3.50	5.00	4.88	2.57	7.45
Quest Diagnostics	2.12	7.00	9.80	10.60	9.84	9.31	2.22	11.53
Dun & Bradstreet	1.37	9.00	9.90	9.90	9.05	9.46	1.44	10.90
DaVita Inc.	-	14.00	12.00	12.30	12.22	12.63	-	NA
Haemonetics Corp.	-	11.00	13.00	12.30	13.00	12.33	-	NA
Kroger Co.	1.51	10.50	7.90	7.20	7.90	8.38	1.58	9.96
Lancaster Colony	1.87	6.00	7.00	NA	7.00	6.67	1.93	8.60
McKesson Corp.	0.59	10.50	19.00	14.00	19.93	15.86	0.63	16.49
Mercury General	5.15	8.00	2.10	2.10	2.10	3.58	5.24	8.82
Mead Johnson Nutrition	1.65	12.00	10.00	11.80	10.75	11.14	1.74	12.88
Annaly Capital Mgmt.	13.89	(2.50)	NA	3.50	(4.70)	3.50	14.13	17.63
Northwest Bancshares, Inc.	3.63	8.50	5.00	5.00	5.00	5.88	3.74	9.62
Owens & Minor	2.63	10.50	13.00	9.00	13.00	11.38	2.78	14.16
Peoples United Fin	4.44	19.00	12.00	6.50	12.07	12.39	4.71	17.10
Sherwin-Williams	1.08	16.50	14.00	14.60	14.10	14.80	1.16	15.96
Smucker (J.M.)	2.27	8.50	8.40	7.70	8.43	8.26	2.37	10.63
Silgan Holdings	1.20	10.50	9.70	10.30	9.73	10.06	1.26	11.32
Suburban Propane	7.81	6.00	23.00	3.00	23.00	13.75	8.35	22.10
Stericycle Inc.	-	12.00	15.00	16.00	15.67	14.67	-	NA
Waste Connections	0.94	12.00	13.00	19.50	13.85	14.59	1.01	15.60
Weis Markets	2.37	3.50	NA	NA	NA	3.50	2.41	5.91
Berkley (W.R.)	0.94	12.50	7.90	9.50	6.91	9.20	0.99	10.19
Average								12.72 %
Median								12.02 %

NA= Not Available
NMF= Not Meaningful Figure

(1) Ms. Ahern's application of the DCF model to the domestic, non-price regluated comparable risk companies is identical to the application of the DCF to her proxy group of water companies. She uses the 60 day average price and the spot indicated dividend as of February 4, 2014 for her dividend yield and then adjusts that yield for 1/2 the average projected growth rate in EPS, which is calculated by averaging the 5 year projected growth in EPS provided by Value Line, www.reuters.com, www.zacks.com, and www.yahoo.com (excluding any negative growth rates) and then adding that growth rate to the adjusted dividend yield.

Source of Information: Value Line Investment Survey:
www.reuters.com Downloaded on 02/05/2014
www.zacks.com Downloaded on 02/05/2014
www.yahoo.com Downloaded on 02/05/2014

United Water Rhode Island, Inc.
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

Line No.		Proxy Group of Twenty-Seven Non-Price-Regulated Companies
1.	Prospective Yield on Baa Rated Corporate Bonds (1)	6.01 %
2.	Equity Risk Premium (2)	4.31
3.	Risk Premium Derived Common Equity Cost Rate	10.32 %

Notes: (1) Average forecast based upon estimates of Baa rated corporate bonds per the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts dated December 1, 2013 and February 1, 2014 (see pages 19 and 20 of this Schedule). The estimates are detailed below.

First Quarter 2014	5.40 %
Second Quarter 2014	5.60
Third Quarter 2014	5.70
Fourth Quarter 2014	5.80
First Quarter 2015	5.90
Second Quarter 2015	6.00
2015-2019	6.70
2020-2024	7.00
Average	6.01 %

(2) From page 31 of this Schedule.

United Water Rhode Island, Inc.
Comparison of Bond Ratings for the
Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Nine Water Companies

Proxy Group of Twenty-Seven Non-Price-Regulated Companies	Moody's Bond Rating February 2014: Bond Rating	Moody's Bond Rating February 2014: Numerical Weighting (1)	Standard & Poor's Bond Rating February 2014: Bond Rating	Standard & Poor's Bond Rating February 2014: Numerical Weighting (1)
Gallagher (Arthur J.)	NA	--	NA	--
Baxter Intl Inc.	A3	10.0	A	6.0
Bristol-Myers Squibb	A2	6.0	A+	5.0
Brown & Brown	NA	--	NA	--
ConAgra Foods	Baa2	9.0	BB+	11.0
Capitol Fed. Finl	NA	16.0	NA	--
Quest Diagnostics	Baa2	9.0	BBB+	8.0
Dun & Bradstreet	NA	--	NA	--
DaVita HealthCare	Ba3	13.0	B	15.0
Haemonetics Corp.	NA	--	NA	--
Kroger Co.	Baa2	9.0	BBB	9.0
Lancaster Colony	NA	--	NA	--
McKesson Corp.	Baa2	9.0	A-	7.0
Mercury General	NA	--	NA	--
Mead Johnson Nutrition	NA	--	BBB-	10.0
Annaly Capital Mgmt.	NA	--	NA	--
Northwest Bancshares	NA	--	NA	--
Owens & Minor	Ba1	11.0	BBB	9.0
Peoples United Finl	A3	7.0	BBB+	8.0
Sherwin-Williams	A3	7.0	A	6.0
Smucker (J.M.)	A3	7.0	NA	--
Silgan Holdings	Ba1	11.0	BB-	13.0
Suburban Propane	Ba2	12.0	BB-	13.0
Stericycle Inc.	NA	--	NA	--
Waste Connections	NA	--	NA	--
Weis Markets	NA	--	NA	--
Berkley (W.R.)	Baa2	9.0	BBB+	8.0
Average	Baa2	9.7	BBB	9.1

Notes:
(1) From Schedule PMA-7, page 5 of Ms. Ahern's Direct Testimony.

Source of Information:
Standard & Poor's Bond Guide January 2014
www.moodys.com; downloaded 2/5/2014

United Water Rhode Island, Inc.
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for
the Proxy Group of Non-Price-Regulated Companies
Proxy Group of Nine Water Companies

Line No.		Proxy Group of Twenty-Seven Non-Price-Regulated Companies
	Based on SBBI Valuation Yearbook Data:	
1.	Ibbotson Equity Risk Premium (1)	5.60 %
2.	Ibbotson Equity Risk Premium based on PRPM™ (2)	9.33
	Based on Value Line Summary and Index:	
3.	Equity Risk Premium Based on Value Line Summary and Index (3)	3.55
4.	Conclusion of Equity Risk Premium (4)	6.16 %
5.	Adjusted Value Line Beta (5)	0.70
6.	Forecasted Equity Risk Premium	4.31 %

Notes: (1) Based on the arithmetic mean historical monthly returns on large company common stocks from Ibbotson® SBBI® 2013 Valuation Yearbook - Market Results for Stocks, Bonds, Bills, and Inflation minus the arithmetic mean monthly yield of Moody's Aaa and Aa corporate bonds from 1926 - 2012. (11.83% - 6.23% = 5.60%).

(2) The Predictive Risk Premium Model (PRPM™) is discussed in Ms. Ahern's accompanying direct testimony. The Ibbotson equity risk premium based on the PRPM™ is derived by applying the PRPM™ to the monthly risk premiums between Ibbotson large company common stock monthly returns minus the average Aaa and Aa corporate monthly bond yields, from January 1928 through December 2013.

(3) From page 18 of this schedule.
(4) Average of Lines 1, 2, & 3.Average of Lines 1, 2, & 3.
(5) Median beta derived from page 32 of this Schedule.

Sources of Information:

Ibbotson® SBBI® 2013 Valuation Yearbook - Market Results for Stocks, Bonds, Bills, and Inflation, Morningstar, Inc., 2013 Chicago, IL.

Value Line Summary and Index
Blue Chip Financial Forecasts, December 1,2013 and February 1, 2014

United Water Rhode Island, Inc.
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Nine Water Companies

Proxy Group of Twenty-Seven Non-Price-Regulated Companies	Value Line Adjusted Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate (3)	ECAPM Cost Rate (4)	Indicated Common Equity Cost Rate (5)
Gallagher (Arthur J.)	0.75	7.09 %	4.44 %	9.76 %	10.20 %	
Baxter Intl Inc.	0.70	7.09	4.44	9.40	9.93	
Bristol-Myers Squibb	0.70	7.09	4.44	9.40	9.93	
Brown & Brown	0.75	7.09	4.44	9.76	10.20	
ConAgra Foods	0.65	7.09	4.44	9.05	9.67	
Capitol Fed. Finl	0.60	7.09	4.44	8.69	9.40	
Quest Diagnostics	0.75	7.09	4.44	9.76	10.20	
Dun & Bradstreet	0.75	7.09	4.44	9.76	10.20	
DaVita HealthCare	0.65	0.00	4.44	4.44	4.44	
Haemonetics Corp.	0.65	0.00	4.44	4.44	4.44	
Kroger Co.	0.60	0.00	4.44	4.44	4.44	
Lancaster Colony	0.70	0.00	4.44	4.44	4.44	
McKesson Corp.	0.75	0.00	4.44	4.44	4.44	
Mercury General	0.70	7.09	4.44	9.40	9.93	
Mead Johnson Nutrition	0.65	7.09	4.44	9.05	9.67	
Annaly Capital Mgmt.	0.65	7.09	4.44	9.05	9.67	
Northwest Bancshares	0.75	7.09	4.44	9.76	10.20	
Owens & Minor	0.70	7.09	4.44	9.40	9.93	
Peoples United Finl	0.65	7.09	4.44	9.05	9.67	
Sherwin-Williams	0.70	7.09	4.44	9.40	9.93	
Smucker (J.M.)	0.70	7.09	4.44	9.40	9.93	
Silgan Holdings	0.75	7.09	4.44	9.76	10.20	
Suburban Propane	0.70	7.09	4.44	9.40	9.93	
Stericycle Inc.	0.70	7.09	4.44	9.40	9.93	
Waste Connections	0.70	7.09	4.44	9.40	9.93	
Weis Markets	0.65	7.09	4.44	9.05	9.67	
Berkley (W.R.)	0.70	7.09	4.44	9.40	9.93	
Average	0.69			8.47 %	8.91 %	8.69 %
Median	0.70			9.40 %	9.93 %	9.67 %

Notes:
(1) From page 23, note 1 of this Schedule.
(2) From page 23, note 2 of this Schedule.
(3) Derived from the model shown on page 23, note 3 of this Schedule.
(4) Derived from the model shown on page 23, note 4 of this Schedule.
(5) Average of CAPM and ECAPM cost rates.

United Water Rhode Island, Inc.
Derivation of Investment Risk Adjustment Based upon
Ibbotson Associates' Size Premia for the Decile Portfolios of the NYSE/AMEX/NASDAQ

Line No.		1 Market Capitalization on February 4, 2014 (1) (millions)	(times larger)	2 Applicable Decile of the NYSE/AMEX/ NASDAQ (2)	3 Applicable Size Premium (3)	4 Spread from Applicable Size Premium for (4)
1.	United Water Rhode Island, Inc.					
a.	Based Upon the Proxy Group of Nine Water Companies	$ 12.184		10	6.03%	
b.	Based Upon Mr. Kahal's Water Proxy Group	$ 12.627		10	6.03%	
2.	Proxy Group of Nine Water Companies	$ 1,680.289	137.9 x	6	1.72%	4.31%
3.	Mr. Kahal's Proxy Group	$ 1,868.672	148.0 x	5 - 6	1.70%	4.33%

	(A) Decile	(B) Number of Companies (millions)	(C) Recent Total Market Capitalization (millions)	(D) Recent Average Market Capitalization (millions)	(E) Size Premium (Return in Excess of CAPM) (2)
Largest	1	173	$ 10,255,341.469	$ 59,279.430	-0.37%
	2	193	2,219,118.548	$ 11,498.024	0.76%
	3	187	1,072,861.025	$ 5,737.225	0.92%
	4	202	695,897.336	$ 3,445.036	1.14%
	5	205	473,139.390	$ 2,307.997	1.70%
	6	234	377,485.205	$ 1,613.185	1.72%
	7	317	329,504.738	$ 1,039.447	1.73%
	8	329	214,084.258	$ 650.712	2.46%
	9	466	166,708.095	$ 357.743	2.70%
Smallest	10	1068	107,517.520	$ 100.672	6.03%

*From Ibbotson 2013 Yearbook

Notes:
(1) From Page 34 of this Schedule.
(2) Gleaned from Column (D) on the bottom of this page. The appropriate decile (Column (A)) corresponds to the market capitalization of the proxy group, which is found in Column 1.
(3) Corresponding risk premium to the decile is provided on Column (E) on the bottom of this page.
(4) Line No. 1a Column 3 – Line No. 2 Column 3 and Line No. 1b, Column 3 – Line No. 3 of Column 3 etc.. For example, the 4.31% in Column 4, Line No. 2 is derived as follows 4.31% = 6.03% - 1.72%.

United Water Rhode Island, Inc.
Market Capitalization of United Water Rhode Island, Inc. and
the Proxy Group of Nine Water Companies

		1	2	3	4	5	6
Company	Exchange	Common Stock Shares Outstanding at Fiscal Year End 2012 (millions)	Book Value per Share at Fiscal Year End 2012 (1)	Total Common Equity at Fiscal Year End 2012 (millions)	Closing Stock Market Price on February 04, 2014	Market-to-Book Ratio on February 04, 2014 (2)	Market Capitalization on February 04, 2014 (3) (millions)
United Water Rhode Island, Inc.		NA	NA	$ 5.915 (4)	NA		
Based Upon the Proxy Group of Nine Water Companies						206.0 % (5)	$ 12.184 (6)
Based Upon Mr. Kahal's Water Proxy Group						213.5 % (7)	$ 12.627 (8)
Proxy Group of Nine Water Companies							
American States Water Co.		38.474	$ 11.815	$ 454.579	$ 27.740	234.8 %	$ 1,067.281
American Water Works Co., Inc.		176.988	$ 25.115	$ 4,444.988	$ 41.760	166.3	$ 7,391.019
Aqua America, Inc.		175.209	$ 7.909	$ 1,385.704	$ 23.370	295.5	$ 4,094.636
Artesian Resources Corp.		7.838	$ 15.078	$ 118.180	$ 22.100	146.6	$ 173.222
California Water Service Group		41.908	$ 11.304	$ 473.712	$ 22.590	199.8	$ 946.707
Connecticut Water Service, Inc.		10.939	$ 17.014	$ 186.121	$ 32.620	191.7	$ 356.846
Middlesex Water Company		15.795	$ 11.499	$ 181.632	$ 19.670	171.1	$ 310.688
SJW Corporation		18.671	$ 14.708	$ 274.604	$ 28.160	191.5	$ 525.763
York Water Company		12.919	$ 7.727	$ 99.825	$ 19.850	256.9	$ 256.435
Average		55.416	$ 13.574	$ 846.594	$ 26.429	206.0 %	$ 1,680.289
Average of Mr. Kahal's Water Proxy Group		61.363	$ 13.386	$ 937.646	$ 26.970	213.450 %	$ 1,868.672

NA= Not Available

Notes:
(1) Column 3 / Column 1.
(2) Column 4 / Column 2.
(3) Column 5 * Column 3.
(4) Total capitalization of United Water Rhode Island multiplied by the recommended common equity ratio (11.065M x 53.45% = 5.915M).
(5) The market-to-book ratio of United Water Rhode Island, Inc. on February 04, 2014 is assumed to be equal to the market-to-book ratio of the Proxy Group of Nine Water Companies at February 04, 2014.
(6) United Water Rhode Island, Inc.'s common stock, if traded, would trade at a market-to-book ratio equal to the average market-to-book ratio at February 04, 2014 of the Proxy Group of Nine Water Companies, 206%, and United Water Rhode Island, Inc.'s market capitalization on February 04, 2014 would therefore have been $12.184 million.
(7) The market-to-book ratio of United Water Rhode Island, Inc. on February 04, 2014 is assumed to be equal to the market-to-book ratio of the Mr. Kahal's Water Proxy Group at February 04, 2014.
(8) United Water Rhode Island, Inc.'s common stock, if traded, would trade at a market-to-book ratio equal to the average market-to-book ratio at February 04, 2014 of the Mr. Kahal's Water Proxy Group, 213.5%, and United Water Rhode Island, Inc.'s market capitalization on February 04, 2014 would therefore have been $12.627 million.

Source of Information: 2012 Annual Forms 10K
yahoo.finance.com

BEFORE THE

RHODE ISLAND PUBLIC UTILITY COMMISSION

EXHIBIT
TO ACCOMPANY THE

PREPARED REBUTTAL TESTIMONY

OF

PAULINE M. AHERN, CRRA
PRINCIPAL
AUS CONSULTANTS

CONCERNING

FAIR RATE OF RETURN

RE: UNITED WATER RHODE ISLAND, INC.

March 2014

United Water Rhode Island, Inc.
Example of the Inadequacy of DCF Return Rate Related to Book Value When Market Value Exceeds Book Value

		Based on Mr. Kahal's Water Proxy Group	
		(a)	(b)
Line No.		Market Value	Book Value
1.	Per Share	$ 28.900 (1)	$ 15.110 (2)
2.	DCF Cost Rate	9.25% (3)	9.25% (3)
3.	Return in Dollars	$ 2.673	$ 1.398
4.	Dividends	$ 0.867 (4)	$ 0.867 (4)
5.	Growth in Dollars	$ 1.806	$ 0.531
6.	Return on Market Value (5)	9.25%	4.84%
7.	Rate of Growth on Market Value (6)	6.25%	1.84%

Notes:
(1) Month-end prices from Standard & Poor's Stock Guide, July-December 2013.
(2) Derived from page 34 of Schedule PMA-8 Rebuttal.
(3) From Schedule MIK-4, page 1 of 5.
(4) Dividends per share based upon a 3.00% adjusted dividend yield. $0.867 = $28.900 * 3.00%.
(5) Line 3 / market value per share (line 1 column (a)).
(6) Line 6 - dividend yield (9.25% - 3.00% = 6.25%).

United Water Rhode Island, Inc.
Corrected Common Equity Cost Rate Through Use
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)

	1	2	3	4	5	6
Mr. Kahal's Water Utility Group	Value Line Adjusted Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate (3)	ECAPM Cost Rate (4)	Indicated Common Equity Cost Rate (5)
American States Water Co.	0.65	7.09 %	4.44 %	9.05 %	9.67 %	
American Water Works Co., Inc.	0.65	7.09	4.44	9.05	9.67	
Aqua America, Inc.	0.60	7.09	4.44	8.69	9.40	
California Water Service Group	0.60	7.09	4.44	8.69	9.40	
Connecticut Water Service, Inc.	0.75	7.09	4.44	9.76	10.20	
Middlesex Water Company	0.75	7.09	4.44	9.76	10.20	
SJW Corporation	0.85	7.09	4.44	10.47	10.73	
York Water Company	0.70	7.09	4.44	9.40	9.93	
Average	0.69			9.36 %	9.90 %	9.63 %

See page 23 of Exhibit PMA-8 for notes.

NEW

REGULATORY

FINANCE

Roger A. Morin, PhD

2006
PUBLIC UTILITIES REPORTS, INC.
Vienna, Virginia

First Printing, June 2006

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The model is analogous to the standard CAPM, but with the return on a minimum risk portfolio that is unrelated to market returns, R_Z, replacing the risk-free rate, R_F. The model has been empirically tested by Black, Jensen, and Scholes (1972), who find a flatter than predicted SML, consistent with the model and other researchers' findings. An updated version of the Black-Jensen-Scholes study is available in Brealey, Myers, and Allen (2006) and reaches similar conclusions.

The zero-beta CAPM cannot be literally employed to estimate the cost of capital, since the zero-beta portfolio is a statistical construct difficult to replicate. Attempts to estimate the model are formally equivalent to estimating the constants, a and b, in Equation 6-2. A practical alternative is to employ the Empirical CAPM, to which we now turn.

6.3 Empirical CAPM

As discussed in the previous section, several finance scholars have developed refined and expanded versions of the standard CAPM by relaxing the constraints imposed on the CAPM, such as dividend yield, size, and skewness effects. These enhanced CAPMs typically produce a risk-return relationship that is flatter than the CAPM prediction in keeping with the actual observed risk-return relationship. The ECAPM makes use of these empirical findings. The ECAPM estimates the cost of capital with the equation:

$$K = R_F + \acute{\alpha} + \beta \times (MRP - \acute{\alpha}) \qquad (6\text{-}5)$$

where $\acute{\alpha}$ is the "alpha" of the risk-return line, a constant, and the other symbols are defined as before. All the potential vagaries of the CAPM are telescoped into the constant $\acute{\alpha}$, which must be estimated econometrically from market data. Table 6-2 summarizes[10] the empirical evidence on the magnitude of alpha.[11]

[10] The technique is formally applied by Litzenberger, Ramaswamy, and Sosin (1980) to public utilities in order to rectify the CAPM's basic shortcomings. Not only do they summarize the criticisms of the CAPM insofar as they affect public utilities, but they also describe the econometric intricacies involved and the methods of circumventing the statistical problems. Essentially, the average monthly returns over a lengthy time period on a large cross-section of securities grouped into portfolios are related to their corresponding betas by statistical regression techniques; that is, Equation 6-5 is estimated from market data. The utility's beta value is substituted into the equation to produce the cost of equity figure. Their own results demonstrate how the standard CAPM underestimates the cost of equity capital of public utilities because of utilities' high dividend yield and return skewness.

[11] Adapted from Vilbert (2004).

TABLE 6-2
EMPIRICAL EVIDENCE ON THE ALPHA FACTOR

Author	Range of alpha
Fischer (1993)	−3.6% to 3.6%
Fischer, Jensen and Scholes (1972)	−9.61% to 12.24%
Fama and McBeth (1972)	4.08% to 9.36%
Fama and French (1992)	10.08% to 13.56%
Litzenberger and Ramaswamy (1979)	5.32% to 8.17%
Litzenberger, Ramaswamy and Sosin (1980)	1.63% to 5.04%
Pettengill, Sundaram and Mathur (1995)	4.6%
Morin (1989)	2.0%

For an alpha in the range of 1%–2% and for reasonable values of the market risk premium and the risk-free rate, Equation 6-5 reduces to the following more pragmatic form:

$$K = R_F + 0.25\ (R_M - R_F) + 0.75\ \beta(R_M - R_F) \qquad (6\text{-}6)$$

Over reasonable values of the risk-free rate and the market risk premium, Equation 6-6 produces results that are indistinguishable from the ECAPM of Equation 6-5.[12]

An alpha range of 1%–2% is somewhat lower than that estimated empirically. The use of a lower value for alpha leads to a lower estimate of the cost of capital for low-beta stocks such as regulated utilities. This is because the use of a long-term risk-free rate rather than a short-term risk-free rate already incorporates some of the desired effect of using the ECAPM. That is, the

[12] Typical of the empirical evidence on the validity of the CAPM is a study by Morin (1989) who found that the relationship between the expected return on a security and beta over the period 1926–1984 was given by:

$$\text{Return} = 0.0829 + 0.0520\ \beta$$

Given that the risk-free rate over the estimation period was approximately 6% and that the market risk premium was 8% during the period of study, the intercept of the observed relationship between return and beta exceeds the risk-free rate by about 2%, or 1/4 of 8%, and that the slope of the relationship is close to 3/4 of 8%. Therefore, the empirical evidence suggests that the expected return on a security is related to its risk by the following approximation:

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

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

$$K = R_F + 0.25(R_M - R_F) + 0.75\beta(R_M - R_F)$$

long-term risk-free rate version of the CAPM has a higher intercept and a flatter slope than the short-term risk-free version which has been tested. Thus, it is reasonable to apply a conservative alpha adjustment. Moreover, the lowering of the tax burden on capital gains and dividend income enacted in 2002 may have decreased the required return for taxable investors, steepening the slope of the ECAPM risk-return trade-off and bring it closer to the CAPM predicted returns.[13]

To illustrate the application of the ECAPM, assume a risk-free rate of 5%, a market risk premium of 7%, and a beta of 0.80. The Empirical CAPM equation (6-6) above yields a cost of equity estimate of 11.0% as follows:

$$K = 5\% + 0.25\ (12\% - 5\%) + 0.75 \times 0.80\ (12\% - 5\%)$$
$$= 5.0\% + 1.8\% + 4.2\%$$
$$= 11.0\%$$

As an alternative to specifying alpha, see Example 6-1.

Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend, an ECAPM analysis results in double-counting. This argument is erroneous. Fundamentally, the ECAPM is not an adjustment, increase or decrease, in beta. This is obvious from the fact that the expected return on high beta securities is actually lower than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks. Even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to Figure 6-1, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary. Moreover, recall from Chapter 3 that the use of adjusted betas compensates for interest rate sensitivity of utility stocks not captured by unadjusted betas.

[13] The lowering of the tax burden on capital gains and dividend income has no impact as far as non-taxable institutional investors (pension funds, 401K, and mutual funds) are concerned, and such investors engage in very large amounts of trading on security markets. It is quite plausible that taxable retail investors are relatively inactive traders and that large non-taxable investors have a substantial influence on capital markets.

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The Capital Asset Pricing Model: Theory and Evidence

Eugene F. Fama and Kenneth R. French

The capital asset pricing model (CAPM) of William Sharpe (1964) and John Lintner (1965) marks the birth of asset pricing theory (resulting in a Nobel Prize for Sharpe in 1990). Four decades later, the CAPM is still widely used in applications, such as estimating the cost of capital for firms and evaluating the performance of managed portfolios. It is the centerpiece of MBA investment courses. Indeed, it is often the only asset pricing model taught in these courses.[1]

The attraction of the CAPM is that it offers powerful and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk. Unfortunately, the empirical record of the model is poor—poor enough to invalidate the way it is used in applications. The CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions. But they may also be caused by difficulties in implementing valid tests of the model. For example, the CAPM says that the risk of a stock should be measured relative to a comprehensive "market portfolio" that in principle can include not just traded financial assets, but also consumer durables, real estate and human capital. Even if we take a narrow view of the model and limit its purview to traded financial assets, is it

[1] Although every asset pricing model is a capital asset pricing model, the finance profession reserves the acronym CAPM for the specific model of Sharpe (1964), Lintner (1965) and Black (1972) discussed here. Thus, throughout the paper we refer to the Sharpe-Lintner-Black model as the CAPM.

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legitimate to limit further the market portfolio to U.S. common stocks (a typical choice), or should the market be expanded to include bonds, and other financial assets, perhaps around the world? In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid.

We begin by outlining the logic of the CAPM, focusing on its predictions about risk and expected return. We then review the history of empirical work and what it says about shortcomings of the CAPM that pose challenges to be explained by alternative models.

The Logic of the CAPM

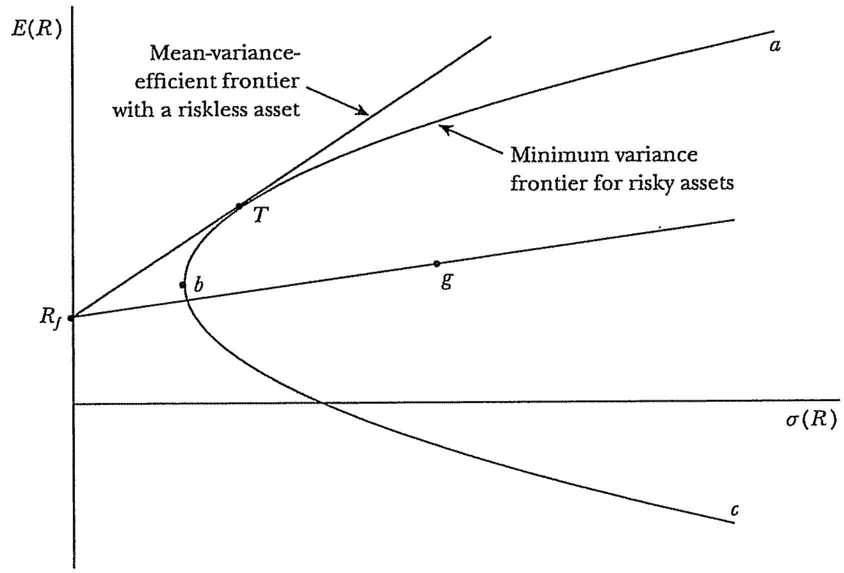
The CAPM builds on the model of portfolio choice developed by Harry Markowitz (1959). In Markowitz's model, an investor selects a portfolio at time $t - 1$ that produces a stochastic return at t. The model assumes investors are risk averse and, when choosing among portfolios, they care only about the mean and variance of their one-period investment return. As a result, investors choose "mean-variance-efficient" portfolios, in the sense that the portfolios 1) minimize the variance of portfolio return, given expected return, and 2) maximize expected return, given variance. Thus, the Markowitz approach is often called a "mean-variance model."

The portfolio model provides an algebraic condition on asset weights in mean-variance-efficient portfolios. The CAPM turns this algebraic statement into a testable prediction about the relation between risk and expected return by identifying a portfolio that must be efficient if asset prices are to clear the market of all assets.

Sharpe (1964) and Lintner (1965) add two key assumptions to the Markowitz model to identify a portfolio that must be mean-variance-efficient. The first assumption is *complete agreement*: given market clearing asset prices at $t - 1$, investors agree on the joint distribution of asset returns from $t - 1$ to t. And this distribution is the true one—that is, it is the distribution from which the returns we use to test the model are drawn. The second assumption is that there is *borrowing and lending at a risk-free rate*, which is the same for all investors and does not depend on the amount borrowed or lent.

Figure 1 describes portfolio opportunities and tells the CAPM story. The horizontal axis shows portfolio risk, measured by the standard deviation of portfolio return; the vertical axis shows expected return. The curve *abc*, which is called the minimum variance frontier, traces combinations of expected return and risk for portfolios of risky assets that minimize return variance at different levels of expected return. (These portfolios do not include risk-free borrowing and lending.) The tradeoff between risk and expected return for minimum variance portfolios is apparent. For example, an investor who wants a high expected return, perhaps at point *a*, must accept high volatility. At point *T*, the investor can have an interme-

Figure 1
Investment Opportunities



diate expected return with lower volatility. If there is no risk-free borrowing or lending, only portfolios above *b* along *abc* are mean-variance-efficient, since these portfolios also maximize expected return, given their return variances.

Adding risk-free borrowing and lending turns the efficient set into a straight line. Consider a portfolio that invests the proportion x of portfolio funds in a risk-free security and $1 - x$ in some portfolio *g*. If all funds are invested in the risk-free security—that is, they are loaned at the risk-free rate of interest—the result is the point R_f in Figure 1, a portfolio with zero variance and a risk-free rate of return. Combinations of risk-free lending and positive investment in *g* plot on the straight line between R_f and *g*. Points to the right of *g* on the line represent borrowing at the risk-free rate, with the proceeds from the borrowing used to increase investment in portfolio *g*. In short, portfolios that combine risk-free lending or borrowing with some risky portfolio *g* plot along a straight line from R_f through *g* in Figure 1.[2]

[2] Formally, the return, expected return and standard deviation of return on portfolios of the risk-free asset *f* and a risky portfolio *g* vary with x, the proportion of portfolio funds invested in *f*, as

$$R_p = xR_f + (1 - x)R_g,$$

$$E(R_p) = xR_f + (1 - x)E(R_g),$$

$$\sigma(R_p) = (1 - x)\sigma(R_g),\ x \leq 1.0,$$

which together imply that the portfolios plot along the line from R_f through *g* in Figure 1.

To obtain the mean-variance-efficient portfolios available with risk-free borrowing and lending, one swings a line from R_f in Figure 1 up and to the left as far as possible, to the tangency portfolio T. We can then see that all efficient portfolios are combinations of the risk-free asset (either risk-free borrowing or lending) and a single risky tangency portfolio, T. This key result is Tobin's (1958) "separation theorem."

The punch line of the CAPM is now straightforward. With complete agreement about distributions of returns, all investors see the same opportunity set (Figure 1), and they combine the same risky tangency portfolio T with risk-free lending or borrowing. Since all investors hold the same portfolio T of risky assets, it must be the value-weight market portfolio of risky assets. Specifically, each risky asset's weight in the tangency portfolio, which we now call M (for the "market"), must be the total market value of all outstanding units of the asset divided by the total market value of all risky assets. In addition, the risk-free rate must be set (along with the prices of risky assets) to clear the market for risk-free borrowing and lending.

In short, the CAPM assumptions imply that the market portfolio M must be on the minimum variance frontier if the asset market is to clear. This means that the algebraic relation that holds for any minimum variance portfolio must hold for the market portfolio. Specifically, if there are N risky assets,

$$\text{(Minimum Variance Condition for } M) \quad E(R_i) = E(R_{ZM}) + [E(R_M) - E(R_{ZM})]\beta_{iM}, \; i = 1, \ldots, N.$$

In this equation, $E(R_i)$ is the expected return on asset i, and β_{iM}, the market beta of asset i, is the covariance of its return with the market return divided by the variance of the market return,

$$\text{(Market Beta)} \quad \beta_{iM} = \frac{\text{cov}(R_i, R_M)}{\sigma^2(R_M)}.$$

The first term on the right-hand side of the minimum variance condition, $E(R_{ZM})$, is the expected return on assets that have market betas equal to zero, which means their returns are uncorrelated with the market return. The second term is a risk premium—the market beta of asset i, β_{iM}, times the premium per unit of beta, which is the expected market return, $E(R_M)$, minus $E(R_{ZM})$.

Since the market beta of asset i is also the slope in the regression of its return on the market return, a common (and correct) interpretation of beta is that it measures the sensitivity of the asset's return to variation in the market return. But there is another interpretation of beta more in line with the spirit of the portfolio model that underlies the CAPM. The risk of the market portfolio, as measured by the variance of its return (the denominator of β_{iM}), is a weighted average of the covariance risks of the assets in M (the numerators of β_{iM} for different assets).

Thus, β_{iM} is the covariance risk of asset i in M measured relative to the average covariance risk of assets, which is just the variance of the market return.[3] In economic terms, β_{iM} is proportional to the risk each dollar invested in asset i contributes to the market portfolio.

The last step in the development of the Sharpe-Lintner model is to use the assumption of risk-free borrowing and lending to nail down $E(R_{ZM})$, the expected return on zero-beta assets. A risky asset's return is uncorrelated with the market return—its beta is zero—when the average of the asset's covariances with the returns on other assets just offsets the variance of the asset's return. Such a risky asset is riskless in the market portfolio in the sense that it contributes nothing to the variance of the market return.

When there is risk-free borrowing and lending, the expected return on assets that are uncorrelated with the market return, $E(R_{ZM})$, must equal the risk-free rate, R_f. The relation between expected return and beta then becomes the familiar Sharpe-Lintner CAPM equation,

$$\text{(Sharpe-Lintner CAPM)} \quad E(R_i) = R_f + [E(R_M) - R_f)]\beta_{iM},\ i = 1, \ldots, N.$$

In words, the expected return on any asset i is the risk-free interest rate, R_f, plus a risk premium, which is the asset's market beta, β_{iM}, times the premium per unit of beta risk, $E(R_M) - R_f$.

Unrestricted risk-free borrowing and lending is an unrealistic assumption. Fischer Black (1972) develops a version of the CAPM without risk-free borrowing or lending. He shows that the CAPM's key result—that the market portfolio is mean-variance-efficient—can be obtained by instead allowing unrestricted short sales of risky assets. In brief, back in Figure 1, if there is no risk-free asset, investors select portfolios from along the mean-variance-efficient frontier from a to b. Market clearing prices imply that when one weights the efficient portfolios chosen by investors by their (positive) shares of aggregate invested wealth, the resulting portfolio is the market portfolio. The market portfolio is thus a portfolio of the efficient portfolios chosen by investors. With unrestricted short selling of risky assets, portfolios made up of efficient portfolios are themselves efficient. Thus, the market portfolio is efficient, which means that the minimum variance condition for M given above holds, and it is the expected return-risk relation of the Black CAPM.

The relations between expected return and market beta of the Black and Sharpe-Lintner versions of the CAPM differ only in terms of what each says about $E(R_{ZM})$, the expected return on assets uncorrelated with the market. The Black version says only that $E(R_{ZM})$ must be less than the expected market return, so the

[3] Formally, if x_{iM} is the weight of asset i in the market portfolio, then the variance of the portfolio's return is

$$\sigma^2(R_M) = Cov(R_M, R_M) = Cov\left(\sum_{i=1}^{N} x_{iM}R_i,\ R_M\right) = \sum_{i=1}^{N} x_{iM}Cov(R_i,\ R_M).$$

premium for beta is positive. In contrast, in the Sharpe-Lintner version of the model, $E(R_{ZM})$ must be the risk-free interest rate, R_f, and the premium per unit of beta risk is $E(R_M) - R_f$.

The assumption that short selling is unrestricted is as unrealistic as unrestricted risk-free borrowing and lending. If there is no risk-free asset and short sales of risky assets are not allowed, mean-variance investors still choose efficient portfolios—points above *b* on the *abc* curve in Figure 1. But when there is no short selling of risky assets and no risk-free asset, the algebra of portfolio efficiency says that portfolios made up of efficient portfolios are not typically efficient. This means that the market portfolio, which is a portfolio of the efficient portfolios chosen by investors, is not typically efficient. And the CAPM relation between expected return and market beta is lost. This does not rule out predictions about expected return and betas with respect to other efficient portfolios—if theory can specify portfolios that must be efficient if the market is to clear. But so far this has proven impossible.

In short, the familiar CAPM equation relating expected asset returns to their market betas is just an application to the market portfolio of the relation between expected return and portfolio beta that holds in any mean-variance-efficient portfolio. The efficiency of the market portfolio is based on many unrealistic assumptions, including complete agreement and either unrestricted risk-free borrowing and lending or unrestricted short selling of risky assets. But all interesting models involve unrealistic simplifications, which is why they must be tested against data.

Early Empirical Tests

Tests of the CAPM are based on three implications of the relation between expected return and market beta implied by the model. First, expected returns on all assets are linearly related to their betas, and no other variable has marginal explanatory power. Second, the beta premium is positive, meaning that the expected return on the market portfolio exceeds the expected return on assets whose returns are uncorrelated with the market return. Third, in the Sharpe-Lintner version of the model, assets uncorrelated with the market have expected returns equal to the risk-free interest rate, and the beta premium is the expected market return minus the risk-free rate. Most tests of these predictions use either cross-section or time-series regressions. Both approaches date to early tests of the model.

Tests on Risk Premiums

The early cross-section regression tests focus on the Sharpe-Lintner model's predictions about the intercept and slope in the relation between expected return and market beta. The approach is to regress a cross-section of average asset returns on estimates of asset betas. The model predicts that the intercept in these regressions is the risk-free interest rate, R_f, and the coefficient on beta is the expected return on the market in excess of the risk-free rate, $E(R_M) - R_f$.

Two problems in these tests quickly became apparent. First, estimates of beta

for individual assets are imprecise, creating a measurement error problem when they are used to explain average returns. Second, the regression residuals have common sources of variation, such as industry effects in average returns. Positive correlation in the residuals produces downward bias in the usual ordinary least squares estimates of the standard errors of the cross-section regression slopes.

To improve the precision of estimated betas, researchers such as Blume (1970), Friend and Blume (1970) and Black, Jensen and Scholes (1972) work with portfolios, rather than individual securities. Since expected returns and market betas combine in the same way in portfolios, if the CAPM explains security returns it also explains portfolio returns.[4] Estimates of beta for diversified portfolios are more precise than estimates for individual securities. Thus, using portfolios in cross-section regressions of average returns on betas reduces the critical errors in variables problem. Grouping, however, shrinks the range of betas and reduces statistical power. To mitigate this problem, researchers sort securities on beta when forming portfolios; the first portfolio contains securities with the lowest betas, and so on, up to the last portfolio with the highest beta assets. This sorting procedure is now standard in empirical tests.

Fama and MacBeth (1973) propose a method for addressing the inference problem caused by correlation of the residuals in cross-section regressions. Instead of estimating a single cross-section regression of average monthly returns on betas, they estimate month-by-month cross-section regressions of monthly returns on betas. The times-series means of the monthly slopes and intercepts, along with the standard errors of the means, are then used to test whether the average premium for beta is positive and whether the average return on assets uncorrelated with the market is equal to the average risk-free interest rate. In this approach, the standard errors of the average intercept and slope are determined by the month-to-month variation in the regression coefficients, which fully captures the effects of residual correlation on variation in the regression coefficients, but sidesteps the problem of actually estimating the correlations. The residual correlations are, in effect, captured via repeated sampling of the regression coefficients. This approach also becomes standard in the literature.

Jensen (1968) was the first to note that the Sharpe-Lintner version of the

[4] Formally, if x_{ip}, $i = 1, \ldots, N$, are the weights for assets in some portfolio p, the expected return and market beta for the portfolio are related to the expected returns and betas of assets as

$$E(R_p) = \sum_{i=1}^{N} x_{ip}E(R_i), \text{ and } \beta_{pM} = \sum_{i=1}^{N} x_{ip}\beta_{pM}.$$

Thus, the CAPM relation between expected return and beta,

$$E(R_i) = E(R_f) + [E(R_M) - E(R_f)]\beta_{iM},$$

holds when asset i is a portfolio, as well as when i is an individual security.

relation between expected return and market beta also implies a time-series regression test. The Sharpe-Lintner CAPM says that the expected value of an asset's excess return (the asset's return minus the risk-free interest rate, $R_{it} - R_{ft}$) is completely explained by its expected CAPM risk premium (its beta times the expected value of $R_{Mt} - R_{ft}$). This implies that "Jensen's alpha," the intercept term in the time-series regression,

$$\text{(Time-Series Regression)} \quad R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \varepsilon_{it},$$

is zero for each asset.

The early tests firmly reject the Sharpe-Lintner version of the CAPM. There is a positive relation between beta and average return, but it is too "flat." Recall that, in cross-section regressions, the Sharpe-Lintner model predicts that the intercept is the risk-free rate and the coefficient on beta is the expected market return in excess of the risk-free rate, $E(R_M) - R_f$. The regressions consistently find that the intercept is greater than the average risk-free rate (typically proxied as the return on a one-month Treasury bill), and the coefficient on beta is less than the average excess market return (proxied as the average return on a portfolio of U.S. common stocks minus the Treasury bill rate). This is true in the early tests, such as Douglas (1968), Black, Jensen and Scholes (1972), Miller and Scholes (1972), Blume and Friend (1973) and Fama and MacBeth (1973), as well as in more recent cross-section regression tests, like Fama and French (1992).

The evidence that the relation between beta and average return is too flat is confirmed in time-series tests, such as Friend and Blume (1970), Black, Jensen and Scholes (1972) and Stambaugh (1982). The intercepts in time-series regressions of excess asset returns on the excess market return are positive for assets with low betas and negative for assets with high betas.

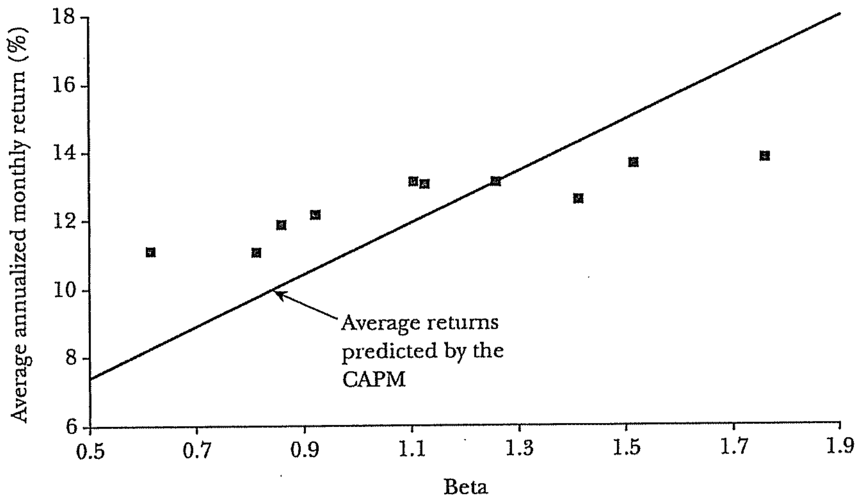
Figure 2 provides an updated example of the evidence. In December of each year, we estimate a preranking beta for every NYSE (1928–2003), AMEX (1963–2003) and NASDAQ (1972–2003) stock in the CRSP (Center for Research in Security Prices of the University of Chicago) database, using two to five years (as available) of prior monthly returns.[5] We then form ten value-weight portfolios based on these preranking betas and compute their returns for the next twelve months. We repeat this process for each year from 1928 to 2003. The result is 912 monthly returns on ten beta-sorted portfolios. Figure 2 plots each portfolio's average return against its postranking beta, estimated by regressing its monthly returns for 1928–2003 on the return on the CRSP value-weight portfolio of U.S. common stocks.

The Sharpe-Lintner CAPM predicts that the portfolios plot along a straight

[5] To be included in the sample for year t, a security must have market equity data (price times shares outstanding) for December of $t - 1$, and CRSP must classify it as ordinary common equity. Thus, we exclude securities such as American Depository Receipts (ADRs) and Real Estate Investment Trusts (REITs).

Figure 2

Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on Prior Beta, 1928–2003



line, with an intercept equal to the risk-free rate, R_f, and a slope equal to the expected excess return on the market, $E(R_M) - R_f$. We use the average one-month Treasury bill rate and the average excess CRSP market return for 1928–2003 to estimate the predicted line in Figure 2. Confirming earlier evidence, the relation between beta and average return for the ten portfolios is much flatter than the Sharpe-Lintner CAPM predicts. The returns on the low beta portfolios are too high, and the returns on the high beta portfolios are too low. For example, the predicted return on the portfolio with the lowest beta is 8.3 percent per year; the actual return is 11.1 percent. The predicted return on the portfolio with the highest beta is 16.8 percent per year; the actual is 13.7 percent.

Although the observed premium per unit of beta is lower than the Sharpe-Lintner model predicts, the relation between average return and beta in Figure 2 is roughly linear. This is consistent with the Black version of the CAPM, which predicts only that the beta premium is positive. Even this less restrictive model, however, eventually succumbs to the data.

Testing Whether Market Betas Explain Expected Returns

The Sharpe-Lintner and Black versions of the CAPM share the prediction that the market portfolio is mean-variance-efficient. This implies that differences in expected return across securities and portfolios are entirely explained by differences in market beta; other variables should add nothing to the explanation of expected return. This prediction plays a prominent role in tests of the CAPM. In the early work, the weapon of choice is cross-section regressions.

In the framework of Fama and MacBeth (1973), one simply adds predetermined explanatory variables to the month-by-month cross-section regressions of

returns on beta. If all differences in expected return are explained by beta, the average slopes on the additional variables should not be reliably different from zero. Clearly, the trick in the cross-section regression approach is to choose specific additional variables likely to expose any problems of the CAPM prediction that, because the market portfolio is efficient, market betas suffice to explain expected asset returns.

For example, in Fama and MacBeth (1973) the additional variables are squared market betas (to test the prediction that the relation between expected return and beta is linear) and residual variances from regressions of returns on the market return (to test the prediction that market beta is the only measure of risk needed to explain expected returns). These variables do not add to the explanation of average returns provided by beta. Thus, the results of Fama and MacBeth (1973) are consistent with the hypothesis that their market proxy—an equal-weight portfolio of NYSE stocks—is on the minimum variance frontier.

The hypothesis that market betas completely explain expected returns can also be tested using time-series regressions. In the time-series regression described above (the excess return on asset i regressed on the excess market return), the intercept is the difference between the asset's average excess return and the excess return predicted by the Sharpe-Lintner model, that is, beta times the average excess market return. If the model holds, there is no way to group assets into portfolios whose intercepts are reliably different from zero. For example, the intercepts for a portfolio of stocks with high ratios of earnings to price and a portfolio of stocks with low earning-price ratios should both be zero. Thus, to test the hypothesis that market betas suffice to explain expected returns, one estimates the time-series regression for a set of assets (or portfolios) and then jointly tests the vector of regression intercepts against zero. The trick in this approach is to choose the left-hand-side assets (or portfolios) in a way likely to expose any shortcoming of the CAPM prediction that market betas suffice to explain expected asset returns.

In early applications, researchers use a variety of tests to determine whether the intercepts in a set of time-series regressions are all zero. The tests have the same asymptotic properties, but there is controversy about which has the best small sample properties. Gibbons, Ross and Shanken (1989) settle the debate by providing an F-test on the intercepts that has exact small-sample properties. They also show that the test has a simple economic interpretation. In effect, the test constructs a candidate for the tangency portfolio T in Figure 1 by optimally combining the market proxy and the left-hand-side assets of the time-series regressions. The estimator then tests whether the efficient set provided by the combination of this tangency portfolio and the risk-free asset is reliably superior to the one obtained by combining the risk-free asset with the market proxy alone. In other words, the Gibbons, Ross and Shanken statistic tests whether the market proxy is the tangency portfolio in the set of portfolios that can be constructed by combining the market portfolio with the specific assets used as dependent variables in the time-series regressions.

Enlightened by this insight of Gibbons, Ross and Shanken (1989), one can see

a similar interpretation of the cross-section regression test of whether market betas suffice to explain expected returns. In this case, the test is whether the additional explanatory variables in a cross-section regression identify patterns in the returns on the left-hand-side assets that are not explained by the assets' market betas. This amounts to testing whether the market proxy is on the minimum variance frontier that can be constructed using the market proxy and the left-hand-side assets included in the tests.

An important lesson from this discussion is that time-series and cross-section regressions do not, strictly speaking, test the CAPM. What is literally tested is whether a specific proxy for the market portfolio (typically a portfolio of U.S. common stocks) is efficient in the set of portfolios that can be constructed from it and the left-hand-side assets used in the test. One might conclude from this that the CAPM has never been tested, and prospects for testing it are not good because 1) the set of left-hand-side assets does not include all marketable assets, and 2) data for the true market portfolio of all assets are likely beyond reach (Roll, 1977; more on this later). But this criticism can be leveled at tests of any economic model when the tests are less than exhaustive or when they use proxies for the variables called for by the model.

The bottom line from the early cross-section regression tests of the CAPM, such as Fama and MacBeth (1973), and the early time-series regression tests, like Gibbons (1982) and Stambaugh (1982), is that standard market proxies seem to be on the minimum variance frontier. That is, the central predictions of the Black version of the CAPM, that market betas suffice to explain expected returns and that the risk premium for beta is positive, seem to hold. But the more specific prediction of the Sharpe-Lintner CAPM that the premium per unit of beta is the expected market return minus the risk-free interest rate is consistently rejected.

The success of the Black version of the CAPM in early tests produced a consensus that the model is a good description of expected returns. These early results, coupled with the model's simplicity and intuitive appeal, pushed the CAPM to the forefront of finance.

Recent Tests

Starting in the late 1970s, empirical work appears that challenges even the Black version of the CAPM. Specifically, evidence mounts that much of the variation in expected return is unrelated to market beta.

The first blow is Basu's (1977) evidence that when common stocks are sorted on earnings-price ratios, future returns on high E/P stocks are higher than predicted by the CAPM. Banz (1981) documents a size effect: when stocks are sorted on market capitalization (price times shares outstanding), average returns on small stocks are higher than predicted by the CAPM. Bhandari (1988) finds that high debt-equity ratios (book value of debt over the market value of equity, a measure of leverage) are associated with returns that are too high relative to their market betas.

Finally, Statman (1980) and Rosenberg, Reid and Lanstein (1985) document that stocks with high book-to-market equity ratios (B/M, the ratio of the book value of a common stock to its market value) have high average returns that are not captured by their betas.

There is a theme in the contradictions of the CAPM summarized above. Ratios involving stock prices have information about expected returns missed by market betas. On reflection, this is not surprising. A stock's price depends not only on the expected cash flows it will provide, but also on the expected returns that discount expected cash flows back to the present. Thus, in principle, the cross-section of prices has information about the cross-section of expected returns. (A high expected return implies a high discount rate and a low price.) The cross-section of stock prices is, however, arbitrarily affected by differences in scale (or units). But with a judicious choice of scaling variable X, the ratio X/P can reveal differences in the cross-section of expected stock returns. Such ratios are thus prime candidates to expose shortcomings of asset pricing models—in the case of the CAPM, shortcomings of the prediction that market betas suffice to explain expected returns (Ball, 1978). The contradictions of the CAPM summarized above suggest that earnings-price, debt-equity and book-to-market ratios indeed play this role.

Fama and French (1992) update and synthesize the evidence on the empirical failures of the CAPM. Using the cross-section regression approach, they confirm that size, earnings-price, debt-equity and book-to-market ratios add to the explanation of expected stock returns provided by market beta. Fama and French (1996) reach the same conclusion using the time-series regression approach applied to portfolios of stocks sorted on price ratios. They also find that different price ratios have much the same information about expected returns. This is not surprising given that price is the common driving force in the price ratios, and the numerators are just scaling variables used to extract the information in price about expected returns.

Fama and French (1992) also confirm the evidence (Reinganum, 1981; Stambaugh, 1982; Lakonishok and Shapiro, 1986) that the relation between average return and beta for common stocks is even flatter after the sample periods used in the early empirical work on the CAPM. The estimate of the beta premium is, however, clouded by statistical uncertainty (a large standard error). Kothari, Shanken and Sloan (1995) try to resuscitate the Sharpe-Lintner CAPM by arguing that the weak relation between average return and beta is just a chance result. But the strong evidence that other variables capture variation in expected return missed by beta makes this argument irrelevant. If betas do not suffice to explain expected returns, the market portfolio is not efficient, and the CAPM is dead in its tracks. Evidence on the size of the market premium can neither save the model nor further doom it.

The synthesis of the evidence on the empirical problems of the CAPM provided by Fama and French (1992) serves as a catalyst, marking the point when it is generally acknowledged that the CAPM has potentially fatal problems. Research then turns to explanations.

One possibility is that the CAPM's problems are spurious, the result of data dredging—publication-hungry researchers scouring the data and unearthing contradictions that occur in specific samples as a result of chance. A standard response to this concern is to test for similar findings in other samples. Chan, Hamao and Lakonishok (1991) find a strong relation between book-to-market equity (B/M) and average return for Japanese stocks. Capaul, Rowley and Sharpe (1993) observe a similar B/M effect in four European stock markets and in Japan. Fama and French (1998) find that the price ratios that produce problems for the CAPM in U.S. data show up in the same way in the stock returns of twelve non-U.S. major markets, and they are present in emerging market returns. This evidence suggests that the contradictions of the CAPM associated with price ratios are not sample specific.

Explanations: Irrational Pricing or Risk

Among those who conclude that the empirical failures of the CAPM are fatal, two stories emerge. On one side are the behavioralists. Their view is based on evidence that stocks with high ratios of book value to market price are typically firms that have fallen on bad times, while low B/M is associated with growth firms (Lakonishok, Shleifer and Vishny, 1994; Fama and French, 1995). The behavioralists argue that sorting firms on book-to-market ratios exposes investor overreaction to good and bad times. Investors overextrapolate past performance, resulting in stock prices that are too high for growth (low B/M) firms and too low for distressed (high B/M, so-called value) firms. When the overreaction is eventually corrected, the result is high returns for value stocks and low returns for growth stocks. Proponents of this view include DeBondt and Thaler (1987), Lakonishok, Shleifer and Vishny (1994) and Haugen (1995).

The second story for explaining the empirical contradictions of the CAPM is that they point to the need for a more complicated asset pricing model. The CAPM is based on many unrealistic assumptions. For example, the assumption that investors care only about the mean and variance of one-period portfolio returns is extreme. It is reasonable that investors also care about how their portfolio return covaries with labor income and future investment opportunities, so a portfolio's return variance misses important dimensions of risk. If so, market beta is not a complete description of an asset's risk, and we should not be surprised to find that differences in expected return are not completely explained by differences in beta. In this view, the search should turn to asset pricing models that do a better job explaining average returns.

Merton's (1973) intertemporal capital asset pricing model (ICAPM) is a natural extension of the CAPM. The ICAPM begins with a different assumption about investor objectives. In the CAPM, investors care only about the wealth their portfolio produces at the end of the current period. In the ICAPM, investors are concerned not only with their end-of-period payoff, but also with the opportunities

they will have to consume or invest the payoff. Thus, when choosing a portfolio at time $t - 1$, ICAPM investors consider how their wealth at t might vary with future *state variables,* including labor income, the prices of consumption goods and the nature of portfolio opportunities at t, and expectations about the labor income, consumption and investment opportunities to be available after t.

Like CAPM investors, ICAPM investors prefer high expected return and low return variance. But ICAPM investors are also concerned with the covariances of portfolio returns with state variables. As a result, optimal portfolios are "multifactor efficient," which means they have the largest possible expected returns, given their return variances and the covariances of their returns with the relevant state variables.

Fama (1996) shows that the ICAPM generalizes the logic of the CAPM. That is, if there is risk-free borrowing and lending or if short sales of risky assets are allowed, market clearing prices imply that the market portfolio is multifactor efficient. Moreover, multifactor efficiency implies a relation between expected return and beta risks, but it requires additional betas, along with a market beta, to explain expected returns.

An ideal implementation of the ICAPM would specify the state variables that affect expected returns. Fama and French (1993) take a more indirect approach, perhaps more in the spirit of Ross's (1976) arbitrage pricing theory. They argue that though size and book-to-market equity are not themselves state variables, the higher average returns on small stocks and high book-to-market stocks reflect unidentified state variables that produce undiversifiable risks (covariances) in returns that are not captured by the market return and are priced separately from market betas. In support of this claim, they show that the returns on the stocks of small firms covary more with one another than with returns on the stocks of large firms, and returns on high book-to-market (value) stocks covary more with one another than with returns on low book-to-market (growth) stocks. Fama and French (1995) show that there are similar size and book-to-market patterns in the covariation of fundamentals like earnings and sales.

Based on this evidence, Fama and French (1993, 1996) propose a three-factor model for expected returns,

$$\text{(Three-Factor Model)} \quad E(R_{it}) - R_{ft} = \beta_{iM}[E(R_{Mt}) - R_{ft}] + \beta_{is}E(SMB_t) + \beta_{ih}E(HML_t).$$

In this equation, SMB_t (small minus big) is the difference between the returns on diversified portfolios of small and big stocks, HML_t (high minus low) is the difference between the returns on diversified portfolios of high and low B/M stocks, and the betas are slopes in the multiple regression of $R_{it} - R_{ft}$ on $R_{Mt} - R_{ft}$, SMB_t and HML_t.

For perspective, the average value of the market premium $R_{Mt} - R_{ft}$ for 1927–2003 is 8.3 percent per year, which is 3.5 standard errors from zero. The

average values of SMB_t, and HML_t are 3.6 percent and 5.0 percent per year, and they are 2.1 and 3.1 standard errors from zero. All three premiums are volatile, with annual standard deviations of 21.0 percent $(R_{Mt} - R_{ft})$, 14.6 percent (SMB_t) and 14.2 percent (HML_t) per year. Although the average values of the premiums are large, high volatility implies substantial uncertainty about the true expected premiums.

One implication of the expected return equation of the three-factor model is that the intercept α_i in the time-series regression,

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{is}SMB_t + \beta_{ih}HML_t + \varepsilon_{it},$$

is zero for all assets i. Using this criterion, Fama and French (1993, 1996) find that the model captures much of the variation in average return for portfolios formed on size, book-to-market equity and other price ratios that cause problems for the CAPM. Fama and French (1998) show that an international version of the model performs better than an international CAPM in describing average returns on portfolios formed on scaled price variables for stocks in 13 major markets.

The three-factor model is now widely used in empirical research that requires a model of expected returns. Estimates of α_i from the time-series regression above are used to calibrate how rapidly stock prices respond to new information (for example, Loughran and Ritter, 1995; Mitchell and Stafford, 2000). They are also used to measure the special information of portfolio managers, for example, in Carhart's (1997) study of mutual fund performance. Among practitioners like Ibbotson Associates, the model is offered as an alternative to the CAPM for estimating the cost of equity capital.

From a theoretical perspective, the main shortcoming of the three-factor model is its empirical motivation. The small-minus-big (SMB) and high-minus-low (HML) explanatory returns are not motivated by predictions about state variables of concern to investors. Instead they are brute force constructs meant to capture the patterns uncovered by previous work on how average stock returns vary with size and the book-to-market equity ratio.

But this concern is not fatal. The ICAPM does not require that the additional portfolios used along with the market portfolio to explain expected returns "mimic" the relevant state variables. In both the ICAPM and the arbitrage pricing theory, it suffices that the additional portfolios are well diversified (in the terminology of Fama, 1996, they are multifactor minimum variance) and that they are sufficiently different from the market portfolio to capture covariation in returns and variation in expected returns missed by the market portfolio. Thus, adding diversified portfolios that capture covariation in returns and variation in average returns left unexplained by the market is in the spirit of both the ICAPM and the Ross's arbitrage pricing theory.

The behavioralists are not impressed by the evidence for a risk-based explanation of the failures of the CAPM. They typically concede that the three-factor model captures covariation in returns missed by the market return and that it picks

up much of the size and value effects in average returns left unexplained by the CAPM. But their view is that the average return premium associated with the model's book-to-market factor—which does the heavy lifting in the improvements to the CAPM—is itself the result of investor overreaction that happens to be correlated across firms in a way that just looks like a risk story. In short, in the behavioral view, the market tries to set CAPM prices, and violations of the CAPM are due to mispricing.

The conflict between the behavioral irrational pricing story and the rational risk story for the empirical failures of the CAPM leaves us at a timeworn impasse. Fama (1970) emphasizes that the hypothesis that prices properly reflect available information must be tested in the context of a model of expected returns, like the CAPM. Intuitively, to test whether prices are rational, one must take a stand on what the market is trying to do in setting prices—that is, what is risk and what is the relation between expected return and risk? When tests reject the CAPM, one cannot say whether the problem is its assumption that prices are rational (the behavioral view) or violations of other assumptions that are also necessary to produce the CAPM (our position).

Fortunately, for some applications, the way one uses the three-factor model does not depend on one's view about whether its average return premiums are the rational result of underlying state variable risks, the result of irrational investor behavior or sample specific results of chance. For example, when measuring the response of stock prices to new information or when evaluating the performance of managed portfolios, one wants to account for known patterns in returns and average returns for the period examined, whatever their source. Similarly, when estimating the cost of equity capital, one might be unconcerned with whether expected return premiums are rational or irrational since they are in either case part of the opportunity cost of equity capital (Stein, 1996). But the cost of capital is forward looking, so if the premiums are sample specific they are irrelevant.

The three-factor model is hardly a panacea. Its most serious problem is the momentum effect of Jegadeesh and Titman (1993). Stocks that do well relative to the market over the last three to twelve months tend to continue to do well for the next few months, and stocks that do poorly continue to do poorly. This momentum effect is distinct from the value effect captured by book-to-market equity and other price ratios. Moreover, the momentum effect is left unexplained by the three-factor model, as well as by the CAPM. Following Carhart (1997), one response is to add a momentum factor (the difference between the returns on diversified portfolios of short-term winners and losers) to the three-factor model. This step is again legitimate in applications where the goal is to abstract from known patterns in average returns to uncover information-specific or manager-specific effects. But since the momentum effect is short-lived, it is largely irrelevant for estimates of the cost of equity capital.

Another strand of research points to problems in both the three-factor model and the CAPM. Frankel and Lee (1998), Dechow, Hutton and Sloan (1999), Piotroski (2000) and others show that in portfolios formed on price ratios like

book-to-market equity, stocks with higher expected cash flows have higher average returns that are not captured by the three-factor model or the CAPM. The authors interpret their results as evidence that stock prices are irrational, in the sense that they do not reflect available information about expected profitability.

In truth, however, one can't tell whether the problem is bad pricing or a bad asset pricing model. A stock's price can always be expressed as the present value of expected future cash flows discounted at the expected return on the stock (Campbell and Shiller, 1989; Vuolteenaho, 2002). It follows that if two stocks have the same price, the one with higher expected cash flows must have a higher expected return. This holds true whether pricing is rational or irrational. Thus, when one observes a positive relation between expected cash flows and expected returns that is left unexplained by the CAPM or the three-factor model, one can't tell whether it is the result of irrational pricing or a misspecified asset pricing model.

The Market Proxy Problem

Roll (1977) argues that the CAPM has never been tested and probably never will be. The problem is that the market portfolio at the heart of the model is theoretically and empirically elusive. It is not theoretically clear which assets (for example, human capital) can legitimately be excluded from the market portfolio, and data availability substantially limits the assets that are included. As a result, tests of the CAPM are forced to use proxies for the market portfolio, in effect testing whether the proxies are on the minimum variance frontier. Roll argues that because the tests use proxies, not the true market portfolio, we learn nothing about the CAPM.

We are more pragmatic. The relation between expected return and market beta of the CAPM is just the minimum variance condition that holds in any efficient portfolio, applied to the market portfolio. Thus, if we can find a market proxy that is on the minimum variance frontier, it can be used to describe differences in expected returns, and we would be happy to use it for this purpose. The strong rejections of the CAPM described above, however, say that researchers have not uncovered a reasonable market proxy that is close to the minimum variance frontier. If researchers are constrained to reasonable proxies, we doubt they ever will.

Our pessimism is fueled by several empirical results. Stambaugh (1982) tests the CAPM using a range of market portfolios that include, in addition to U.S. common stocks, corporate and government bonds, preferred stocks, real estate and other consumer durables. He finds that tests of the CAPM are not sensitive to expanding the market proxy beyond common stocks, basically because the volatility of expanded market returns is dominated by the volatility of stock returns.

One need not be convinced by Stambaugh's (1982) results since his market proxies are limited to U.S. assets. If international capital markets are open and asset prices conform to an international version of the CAPM, the market portfolio

should include international assets. Fama and French (1998) find, however, that betas for a global stock market portfolio cannot explain the high average returns observed around the world on stocks with high book-to-market or high earnings-price ratios.

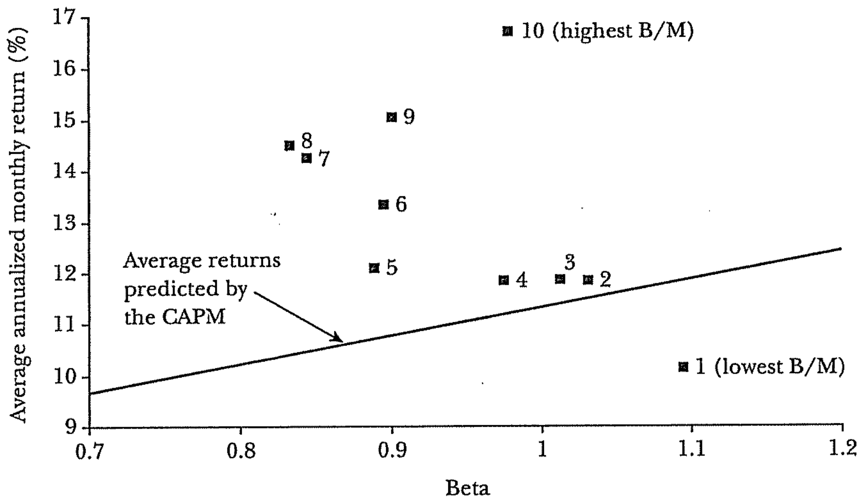
A major problem for the CAPM is that portfolios formed by sorting stocks on price ratios produce a wide range of average returns, but the average returns are not positively related to market betas (Lakonishok, Shleifer and Vishny, 1994; Fama and French, 1996, 1998). The problem is illustrated in Figure 3, which shows average returns and betas (calculated with respect to the CRSP value-weight portfolio of NYSE, AMEX and NASDAQ stocks) for July 1963 to December 2003 for ten portfolios of U.S. stocks formed annually on sorted values of the book-to-market equity ratio (B/M).[6]

Average returns on the B/M portfolios increase almost monotonically, from 10.1 percent per year for the lowest B/M group (portfolio 1) to an impressive 16.7 percent for the highest (portfolio 10). But the positive relation between beta and average return predicted by the CAPM is notably absent. For example, the portfolio with the lowest book-to-market ratio has the highest beta but the lowest average return. The estimated beta for the portfolio with the highest book-to-market ratio and the highest average return is only 0.98. With an average annualized value of the riskfree interest rate, R_f, of 5.8 percent and an average annualized market premium, $R_M - R_f$, of 11.3 percent, the Sharpe-Lintner CAPM predicts an average return of 11.8 percent for the lowest B/M portfolio and 11.2 percent for the highest, far from the observed values, 10.1 and 16.7 percent. For the Sharpe-Lintner model to "work" on these portfolios, their market betas must change dramatically, from 1.09 to 0.78 for the lowest B/M portfolio and from 0.98 to 1.98 for the highest. We judge it unlikely that alternative proxies for the market portfolio will produce betas and a market premium that can explain the average returns on these portfolios.

It is always possible that researchers will redeem the CAPM by finding a reasonable proxy for the market portfolio that is on the minimum variance frontier. We emphasize, however, that this possibility cannot be used to justify the way the CAPM is currently applied. The problem is that applications typically use the same

[6] Stock return data are from CRSP, and book equity data are from Compustat and the Moody's Industrials, Transportation, Utilities and Financials manuals. Stocks are allocated to ten portfolios at the end of June of each year t (1963 to 2003) using the ratio of book equity for the fiscal year ending in calendar year $t - 1$, divided by market equity at the end of December of $t - 1$. Book equity is the book value of stockholders' equity, plus balance sheet deferred taxes and investment tax credit (if available), minus the book value of preferred stock. Depending on availability, we use the redemption, liquidation or par value (in that order) to estimate the book value of preferred stock. Stockholders' equity is the value reported by Moody's or Compustat, if it is available. If not, we measure stockholders' equity as the book value of common equity plus the par value of preferred stock or the book value of assets minus total liabilities (in that order). The portfolios for year t include NYSE (1963–2003), AMEX (1963–2003) and NASDAQ (1972–2003) stocks with positive book equity in $t - 1$ and market equity (from CRSP) for December of $t - 1$ and June of t. The portfolios exclude securities CRSP does not classify as ordinary common equity. The breakpoints for year t use only securities that are on the NYSE in June of year t.

Figure 3
Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on B/M, 1963–2003



market proxies, like the value-weight portfolio of U.S. stocks, that lead to rejections of the model in empirical tests. The contradictions of the CAPM observed when such proxies are used in tests of the model show up as bad estimates of expected returns in applications; for example, estimates of the cost of equity capital that are too low (relative to historical average returns) for small stocks and for stocks with high book-to-market equity ratios. In short, if a market proxy does not work in tests of the CAPM, it does not work in applications.

Conclusions

The version of the CAPM developed by Sharpe (1964) and Lintner (1965) has never been an empirical success. In the early empirical work, the Black (1972) version of the model, which can accommodate a flatter tradeoff of average return for market beta, has some success. But in the late 1970s, research begins to uncover variables like size, various price ratios and momentum that add to the explanation of average returns provided by beta. The problems are serious enough to invalidate most applications of the CAPM.

For example, finance textbooks often recommend using the Sharpe-Lintner CAPM risk-return relation to estimate the cost of equity capital. The prescription is to estimate a stock's market beta and combine it with the risk-free interest rate and the average market risk premium to produce an estimate of the cost of equity. The typical market portfolio in these exercises includes just U.S. common stocks. But empirical work, old and new, tells us that the relation between beta and average return is flatter than predicted by the Sharpe-Lintner version of the CAPM. As a

result, CAPM estimates of the cost of equity for high beta stocks are too high (relative to historical average returns) and estimates for low beta stocks are too low (Friend and Blume, 1970). Similarly, if the high average returns on value stocks (with high book-to-market ratios) imply high expected returns, CAPM cost of equity estimates for such stocks are too low.[7]

The CAPM is also often used to measure the performance of mutual funds and other managed portfolios. The approach, dating to Jensen (1968), is to estimate the CAPM time-series regression for a portfolio and use the intercept (Jensen's alpha) to measure abnormal performance. The problem is that, because of the empirical failings of the CAPM, even passively managed stock portfolios produce abnormal returns if their investment strategies involve tilts toward CAPM problems (Elton, Gruber, Das and Hlavka, 1993). For example, funds that concentrate on low beta stocks, small stocks or value stocks will tend to produce positive abnormal returns relative to the predictions of the Sharpe-Lintner CAPM, even when the fund managers have no special talent for picking winners.

The CAPM, like Markowitz's (1952, 1959) portfolio model on which it is built, is nevertheless a theoretical tour de force. We continue to teach the CAPM as an introduction to the fundamental concepts of portfolio theory and asset pricing, to be built on by more complicated models like Merton's (1973) ICAPM. But we also warn students that despite its seductive simplicity, the CAPM's empirical problems probably invalidate its use in applications.

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[7] The problems are compounded by the large standard errors of estimates of the market premium and of betas for individual stocks, which probably suffice to make CAPM estimates of the cost of equity rather meaningless, even if the CAPM holds (Fama and French, 1997; Pastor and Stambaugh, 1999). For example, using the U.S. Treasury bill rate as the risk-free interest rate and the CRSP value-weight portfolio of publicly traded U.S. common stocks, the average value of the equity premium $R_{Mt} - R_{ft}$ for 1927–2003 is 8.3 percent per year, with a standard error of 2.4 percent. The two standard error range thus runs from 3.5 percent to 13.1 percent, which is sufficient to make most projects appear either profitable or unprofitable. This problem is, however, hardly special to the CAPM. For example, expected returns in all versions of Merton's (1973) ICAPM include a market beta and the expected market premium. Also, as noted earlier the expected values of the size and book-to-market premiums in the Fama-French three-factor model are also estimated with substantial error.

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ORIGINAL ARTICLE

New approach to estimating the cost of common equity capital for public utilities

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Abstract The regulatory process for setting public utilities' allowed rate of return on common equity has generally used the Gordon DCF, CAPM and Risk Premium specifications to estimate the cost of common equity. Despite the widely known problems with these models, there has been little movement to adopt more recently developed asset pricing models to provide additional evidence for estimating the cost of capital. This paper presents, validates empirically and applies a general yet simple consumption-based asset pricing specification to model the risk-return relationship for stocks and estimate the cost of common equity for public utilities. The model is not necessarily superior to other models in its practical results, yet these results do indicate that it should be used to provide additional estimates of the cost of common equity. Additionally, the model raises doubts as to whether assets such as utility stocks are a consumption (business cycle) hedge.

Keywords Public utilities · Cost of capital · GARCH · Consumption asset pricing model

JEL Classification G12 · L94 · L95

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1 Introduction

Following electricity deregulation with the National Energy Policy Act of 1992, the estimation of the cost of common equity capital remains a critical component of the utility rate-of-return regulatory process. Since the cost of common equity is not observable in capital markets, it must be inferred from asset pricing models. The models that are commonly applied in regulatory proceedings are the Gordon (1974) Discounted Cash Flow (DCF), the Capital Asset Pricing (CAPM) and Risk Premium Models. There are other tools used to estimate the cost of common equity such as comparable earnings or earnings-to-price ratios, but they are not asset pricing models. The empirical literature on the CAPM is vast {Fama and French (2004)} and the CAPM is used by a number of US regulatory jurisdictions. The DCF model has not been empirically tested to the same extent as the CAPM, yet it is considered by many US regulatory jurisdictions.

The purpose of this paper is to present, test empirically and apply a recently developed general consumption-based asset pricing model that estimates the risk-return relationship directly from asset pricing data and, when estimated with recently developed time series methods, produces a prediction of the equity risk premium that is driven by its predicted volatility. The predicted risk premium is then added to a risk-free rate of return to provide an estimate of the cost of common equity. We predict two forms of the equity risk premium with the model, the risk premium net of the risk-free rate and the equity-to-debt risk premium (equity risk premium net of the relevant bond yield for the company's stock). Either can be applied to predict the common equity cost of capital for a public utility. Although the model is tested and applied to public utilities for rate of return regulation, it can be used to estimate the cost of capital for any stock. Section 2 reviews the asset pricing models typically used in public utility rate cases and the generalized consumption asset pricing model we propose to estimate the cost of common equity. Section 3 discusses the data and the empirical testing of the consumption asset pricing model. Section 4 reviews the application of the model and compares it with the DCF and CAPM results. Section 5 is the conclusion.

2 DCF, CAPM and consumption asset pricing model

2.1 DCF and CAPM approaches

The standard DCF model frequently used in estimative the cost rate of common equity in regulatory proceedings is defined by the following equation:

$$k = D_0\,(1 + g)\,/P_0 + g,$$

where k is the expected return on common equity; D_0 is the current dividend per share; g is the expected dividend per share growth rate; and P_0 is the current market price.

The DCF was developed by Gordon (1974) specifically for regulatory purposes. Underlying the DCF model is the theory that the present value of an expected future stream of net cash flows during the investment holding period can be determined

by discounting those cash flows at the cost of capital, or the investors' capitalization rate. DCF theory indicates that an investor buys a stock for an expected total return rate which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate) over the investment holding period. Mathematically, the expected dividend yield $(D_0(1+g)/P_0)$ on market price plus an expected growth rate equals the capitalization rate, i.e., the expected return on common equity.

The standard DCF contains several restrictive assumptions, the most contentious of which during utility cost of capital proceedings is typically that dividends per share (DPS), book value per share (BVPS), earnings per share (EPS) as well as market price grow at the same rate in perpetuity. There is also considerable contention over the proper proxy for g, prospective or historical growth in DPS, BVPS, EPS and market price and over what time period. In addition, although the standard DCF described above is a single stage annual growth model, there is considerable discussion over the use of multiple stage growth models during regulatory proceedings. Some analysts use the discrete version and others use the continuous version of the DCF model. Solving these models for k, the cost of common equity, results in differing equations to solve for k. The equation above is from the discrete version. The continuous version uses the current dividend yield and is not adjusted by g, which results in a lower estimate for k. Because of these and other restrictive assumptions that require numerous subjective judgments in application, it is often difficult for regulatory commissions to reconcile the frequently large disparities in rates of return on common equity recommended by various parties in a public utility rate case.

The CAPM model is defined by the following equation:

$$k = R_f + \beta\left(R_m - R_f\right),$$

where k is the expected return on common equity; R_f is the expected risk-free rate of return; β is the expected beta; and R_m is the expected market return.

CAPM theory defines risk as the co-variability of a security's returns with the market's returns or β, also known as systematic or market risk, with the market beta being defined as 1.0. Because CAPM theory assumes that all investors hold perfectly diversified portfolios, they are presumed to be exposed only to systematic risk and the market (according to the model) will not reward them a risk premium for unsystematic or non-market risk. In other words, the CAPM presumes that investors require compensation only for systematic or market risks which are due to macroeconomic and other events that affect the returns on all assets. Mathematically, the CAPM is applied by adding a forward-looking risk-free rate of return to an expected market equity risk premium adjusted proportionately by the expected beta to reflect the systematic risk.

As with the DCF, there is considerable contention during regulatory cost of capital proceedings as to the proper proxies for all components of the CAPM: the R_f, the R_m, as well as β. In addition, the CAPM assumption that the market will only reward investors for systematic or market risk is extremely restrictive when estimating the expected return on common equity for a single asset such as a single jurisdictional regulated operating utility. Additionally, this assumption requires that the investor have a perfectly diversified portfolio, that is, one with no unsystematic risk. Since

this assumption is not applicable, estimating the cost of common equity capital for a single utility's common equity undoubtedly will not reflect the risk actually faced by the imperfectly diversified investor.

As will be discussed in the next section, our application of the risk premium approach, the consumption asset pricing model and GARCH[1] rest on minimal assumptions and restrictions and therefore requires considerably less judgment in its application.

2.2 Risk premium approach, consumption asset pricing models, and GARCH

A widely used model to estimate the cost of common equity capital for public utilities is the risk premium approach. This approach often estimates the expected rate of return as the long-term historic mean of the realized risk premium above an historic yield plus the current yield of the relevant bond applicable to a specific utility or peer group of utilities. Litigants in public utility rate proceedings debate the choice of inputs to estimate the risk premium as well as how far back to reach into history to collect data for calculating an average that is representative of a forward-looking premium.

It is surprising that, as popular as the risk premium method is in public utility rate cases, the intuitively appealing general consumption-based asset pricing model, with its minimal assumptions and strong theoretical foundation, has not been applied to estimate the cost of common equity capital for public utilities. The model provides projections of the conditional expected risk premium on an asset based on its relation to its predicted conditional volatility. This model generalizes the well known special case asset pricing models such as the Merton (1973) intertemporal capital asset pricing model, Campbell (1993) intertemporal asset pricing model, and the habit-persistence model of Campbell and Cochrane (1999), which are special cases of the general model. The relation of the model to their specialized cases can be found in Cochrane (2006) and Cochrane (2007). The approach of consumption asset pricing models is to make investment decisions that maximize investors' utility from the consumption that they ultimately desire, not returns.

Even if the model is not used to project directly the expected risk premium, it can, at a minimum, be used to verify that the risk premia data chosen for estimating the cost of capital is empirically validated by fitting the model well. The model can be used to predict the equity risk premia net of the risk-free rate (equity risk premium) or to predict the equity-to-debt risk premium for a firm. We perform both of these empirical tests in this paper. The general consumption-based asset pricing model developed in Michelfelder and Pilotte (2011) and based on Cochrane (2004) provides the relationship of the ex ante risk premium to an asset's own volatility in return:

$$E_t[R_{i,t+1}] - R_{f,t} = -\frac{vol_t[M_{t+1}]}{E_t\left[M_{t+1}\right]} vol_t[R_{i,t+1}] corr_t[M_{t+1}, R_{i,t+1}]. \qquad (1)$$

[1] GARCH refers to the generalized autoregressive conditional heteroskedasticity regression model which is discussed below.

where vol_t is the conditional volatility, $corr_t$ is the conditional correlation, and M_{t+1} is the stochastic discount factor (SDF).

The SDF is the intertemporal marginal rate of substitution in consumption, or, $M_{t+1} = \beta \frac{U_{c,t+1}}{U_{c,t}}$, where the U_c's are the marginal utilities of consumption in the next period, $t+1$, and the current period, t, and β is the discount factor for period t to $t+1$. Equation 1 shows that the algebraic sign of the relation between the expected risk premium and the conditional volatility of an asset's risk premium is determined by the correlation between the asset's return and the SDF. That is, the direction of the relation between the asset return and the ratio of intertemporal marginal utilities in consumption inversely determines the relation between the expected risk premium and conditional volatility. When the correlation is equal to negative one, the asset's conditional expected risk premium is perfectly positively correlated with its conditional volatility. A positive relation between the conditionally expected risk premium and volatility obtains when $-1 < corr_t < 0$. A negative relation obtains when $0 < corr_t < 1$. For an asset that represents a perfect hedge against shocks to the marginal utility of consumption, with $corr_t = 1$, there will be a perfect negative correlation between the conditionally expected risk premium and its volatility.[2] Therefore, estimates of the relation between the first two conditional moments of a public utility stock's returns provide a direct test of the effectiveness of a public utility stock, or any asset, as a consumption hedging asset. In Eq. 1, $vol_t[M_{t+1}]/E_t[M_{t+1}]$ is the slope of the mean-variance frontier. If this slope changes over time, the estimated relation between the stock's risk and return will vary over time. This model can also be viewed simplistically as the projected expected risk premium as a function of its own projected risk, given information available at time t.

Note that the model allows for the expected risk premium to be negative if the asset hedges shocks to the marginal utility of consumption. Investors are willing to accept an expected rate of return lower than the risk-free rate of return if the pattern of volatility is such that returns are expected to rise with expected reductions in consumption. Simply, investors are willing to *pay* a premium for a higher level of returns volatility that has the desired pattern of returns. These desired returns patterns have a tendency to offset drops in consumption. Therefore, this model shows that investors may not be averse to volatility, but rather to the timing of expected changes in returns.

Summarizing, several conclusions can be drawn from the general model of asset pricing. First, the sign of the relation between a stock's risk premium and conditional volatility depends on the extent to which the stock serves as an intertemporal hedge against shocks to the marginal utility of consumption. Second, the relation between stock risk and return may be time-varying depending on changes in the slope of the mean-variance frontier. Third, hedging assets have desired patterns of volatility that result in expected rates of return that are less than the risk-free rate. We do not expect

[2] A hedging asset is one that has a positive increase in returns that is coincident with a positive shock in the ratio of intertemporal marginal utilities of consumption. Note that if we assume a concave utility function in consumption, as consumption declines, the marginal utility of consumption rises relative to last period marginal utility. If we think of a decline in consumption as a contraction in the business cycle, the hedging asset delivers positive changes in returns when the business cycle is moving into a contraction, and therefore the asset is a business cycle hedge.

that public utility stocks serve as a hedging asset as they are not viewed as defensive stocks (they do not rise in value during downturns in the stock market) due to asymmetric regulation and returns as discussed in detail in Kolbe and Tye (1990). Under asymmetric regulation, utility regulators have a tendency to allow the return on equity to fall below the allowed return during downturns in the business cycle and to reduce the return should it rise above the allowed return during expansions. Therefore we expect that the parameter estimates of the return-risk relationship to be positive as utility stocks are hypothesized to not be hedges.

We use the GARCH model to estimate the general asset pricing model since the GARCH model accommodates ARCH effects that improve the efficiency of the parameter estimates. It also provides a volatility forecasting model for the conditional volatility of the asset's risk premium. The conditional volatility projection is used, in turn to predict the expected risk premium. We also use the GARCH-in-Mean model (GARCH-M) since it specifies that the conditional expected risk premium is a linear function of its conditional volatility. There is a vast body of literature that estimates asset pricing models with the GARCH and GARCH-M methods and therefore we will not attempt to summarize them here.

The GARCH-M model was initially developed and tested by Engle et al. (1987) to estimate the relationship between US Treasury and corporate bond risk premia and their expected volatilities. The GARCH-M model is specified as:

$$R_{t+1} - R_{f,t+1} = \alpha\sigma_{t+1}^2 + \varepsilon_{t+1} \quad (2)$$

$$\sigma_{t+1}^2 = \beta_0 + \beta_1\sigma_t^2 + \beta_2\varepsilon_t^2 + \eta_{t+1} \quad (3)$$

$$\varepsilon_t \,|\psi_{t-1} \sim T(0, \sigma_t^2) \quad (4)$$

where R_{t+1} is the expected total return on the public utility stock index or individual utility stock; $R_{f,t+1}$ is the risk-free rate of return or the yield on an index of public utility bonds of a specified bond rating for the equity-to-debt premium; σ_{t+1}^2 is the conditional or predicted variance of the risk premium that is conditioned on past information (ψ_{t-1}); and ε_t is the error term that is conditional on ψ_{t-1}.

The conditional distribution of the error term is specified as the non-unitary variance T-distribution due to the thick-tailed distribution of the risk premia data. If the error distribution is thick-tailed, using an approximating distribution that accommodates thick tails improves the efficiency of the estimates. The parameter, α, is the return-to-risk coefficient as specified in Eq. 1 as:

$$\alpha = -\frac{vol_t[M_{t+1}]}{E_t\left[M_{t+1}\right]} corr_t[M_{t+1}, R_{i,t+1}] \quad (5)$$

Note that the coefficient will be positive if the conditional correlation between the SDF and the asset return is negative, indicating that the stock is not a hedging asset. Recall that the SDF is the ratio of intertemporal marginal utilities. Assuming a concave utility function, an upward shock in the ratio implies falling consumption, therefore an associated rise (positive correlation) in the return (R_i) would offset the reduction

in consumption, thereby causing the sign of α to be negative. The parameter, α, is also the ratio of risk premium to variance, or, the Sharpe ratio.

The intercept in Eq. 2 is restricted to zero as specified by the general asset pricing model specification. The restriction on the intercept equal to zero has been found to be robust in producing consistently positive and significant relationships between equity risk premia and risk in GARCH-M models. This is discussed in Lanne and Saikkonen (2006) and Lanne and Luoto (2007). We have found the same results in our modeling in this paper, although we have excluded these results for brevity (available upon request). Therefore we specify the prior assumption that the intercept or the "excess" return, i.e., the return not associated with risk to be equal to zero and drop the intercept from the model.

The consumption asset pricing model is estimated in the empirical section of the paper and applied in the applications section of the paper. The model is tested to (1) determine if equity-to-debt risk premium indices for utilities of differing risk specified by differing bond ratings are validated by the asset pricing model and therefore have some empirical support for risk premium prediction and application to utility cost of capital estimation, (2) determine whether equity risk premia can be predicted and fit the model and therefore be used to estimate the cost of common equity, (3) empirically test the consumption asset pricing model, and (4) ascertain whether utility stocks are assets that hedge shocks to the marginal utility of consumption.

If utility stocks are hedging assets then the cost of common equity should reflect a downward adjustment to a specified risk-free rate to reflect investors' preferences for a hedge and the compensation that they are willing to pay for it.

3 Data and empirical results

We use portfolios as represented by public utility stock and bond indices to estimate the conditional return-risk relationship for the equity-to-debt premium. The equity-to-debt risk premium data employed for estimating Eq. 1 with the GARCH-M conditional return-risk regressions are monthly total returns on the Standard and Poor's Public Utilities Stock Index (utility portfolio), and the monthly Moody's Public Utility Aa, A, and Baa yields for the debt cost. We also obtained equity risk premia for the utility portfolio using the Fama-French specified risk-free rate of return, which is the holding period return on a 1-month US Treasury Bill. The data range from January 1928 to December 2007 with 960 observations. The return-risk relationships for the equity-to-debt premia are risk-differentiated by their own bond rating.

As a check, we also estimate Eq. 1 with the GARCH-M for large common stock returns using the monthly Ibbotson Large Company Common Stocks Portfolio total returns and the Ibbotson US Long-Term Government income returns as the risk-free rate. Additionally, as another check, we do the same for the University of Chicago's Center for Research in Security Prices value-weighted stock index (CRSP) using the Fama-French risk-free rate. This is the Fama-French specification of the market equity risk premium. The data range from January 1926 to December 2007 with 984 observations for the Large Company Common Stock estimation and the data ranges

Table 1 Descriptive statistics: public utility and large company common stocks equity-to-debt and equity risk premia

Utility bond rating	Mean	Std. Dev.	Skewness	Kurtosis	JB
Aa	0.0037	0.0568	0.0744	10.07	2,001.2***
A	0.0035	0.0568	0.0632	10.06	1,991.8***
Baa	0.0031	0.0568	0.0375	10.02	1,973.6***
Ibbotson					
Large common stocks	0.0054	0.0554	0.4300	12.84	3,954.7***
CRSP value-weighted stock index	0.0062	0.0544	0.2309	10.92	2,519.1***

The public utility equity-to-debt risk premia monthly time series is from January 1928 to December 2007 with 960 observations. The equity risk premium monthly time series for the Large Common Stocks and the CRSP index are January 1926 to December 2007 with 984 observations, and January 1926 to December 2007 with 984 observations, respectively. The public utility stocks equity-to-debt risk premia are calculated as the total return on the S&P Public Utilities Index of stocks minus the Moody's Public Utility Aa, A, and Baa Indices yields to maturity. The Large Company Common Stock equity risk premia are the monthly total returns on the Ibbotson Large Company Common Stocks Portfolio minus the Ibbotson Long-Term US Government Bonds Portfolio income yield. The CRSP equity risk premia, or the Fama-French market risk premia are the CRSP total returns on the value-weighted equity index minus the 1-month holding period return on a 1 month Treasury Bill. The Jarque-Bera (JB) statistic is a goodness-of-fit measure of the departure of the distribution of a data series from normality, based on the levels of skewness and excess kurtosis. The JB statistic is χ^2 distributed with 2° of freedom. *** Significant at 0.01 level, one-tailed test

from January 1928 to January 2007 with 960 observations (same as the utilities) for the CRSP estimation.

Table 1 displays the descriptive statistics for these data. We have estimated the mean, standard deviation, skewness and kurtosis parameters, as well as the Jarque-Bera (JB) statistic to test the distribution of the data. The means of the utility equity-to-debt risk premia fall as the risk (bond rating) declines. This is consistent with the notion that larger yields are subtracted from stock returns the lower the bond rating. Intertemporally, there is an inverse relationship between risk premia and interest rates (See Brigham et al. (1985) and Harris et al. (2003)). The mean for risk premia will have a tendency to be larger during low interest rate periods.

Not surprisingly, large company common stocks have the highest mean risk premia as the majority of these firms are not rate-of-return regulated firms with a ceiling on their ROE's close to their cost of capital. Interestingly, the standard deviations of the utility stock returns are similar and slightly higher than large company common stocks. Skewness coefficients are small and positive except for Ibbotson large company common stock returns and CRSP returns that have large positive skewness. This suggests that large unregulated stocks have a tendency to have more and larger positive shocks in returns than do utilities that are rate of return regulated. The kurtosis values show that all of the risk premia are thick-tail distributed. This is also found in the significant JB statistics that test the null hypothesis that the data are normally distributed. The null hypothesis is rejected for all assets. The high kurtosis, low skewness, and significant JB statistics show that the risk premia data are substantially thick-tailed, except for non-utility stocks that are both skewed and thick-tailed. Therefore, robust estimation methods are required to produce efficient regression estimates with non-normal data. Additionally, although not shown but available upon request, the serial correlation and

ARCH Lagrange Multiplier tests show that residuals from OLS regressions of risk premia on volatilities follow an ARCH process. Therefore, the GARCH-M method will improve the efficiency of the estimates. We specify the regression error distribution as a non-unitary variance T-distribution so that thick-tails could be accommodated in the estimation and therefore produce increasingly efficient parameter estimates.

We used maximum likelihood estimation with the likelihood function specified with the non-unitary-variance T-distribution as the approximating distribution of the residuals to accommodate the thick-tailed nature of the error distribution. The equations are estimated as a system using the Marquardt iterative optimization algorithm. The chosen software for estimating the model was EViews© version 6.0 (2007).

Table 2 shows the GARCH-M estimations for the consumption asset pricing Eq. 1. We have estimated Eq. 1 for the utility equity risk premia using the Fama-French risk-free rate in addition to the equity-to-debt risk premia risk-differentiated by bond ratings and the two measures of the market equity risk premium. The chosen measure of volatility is the variance of risk premium (in contrast to other such measures such as the standard deviation or the log of variance. Although these results are not shown for brevity, they are robust to these other measures of volatility). The slope, which is the predicted return-to-predicted risk coefficient and Sharpe ratio, is positive and significant at the 99% level for all assets except the utility stock returns with Baa bonds, which is significant at the 95% level. Given that all slopes are positive, public utility stocks are not found to hedge shocks to the marginal utility of consumption. Note that the reward-to-risk slope rises as bond rating rises. This suggests that lower risk utility stocks provide a higher incremental risk-premium for an increase in conditional volatility. This is consistent with other studies that find that lower risk assets, such as shorter maturity bonds, have higher Sharpe Ratios than long-term bonds and stocks. See Pilotte and Sterbenz (2006) and Michelfelder and Pilotte (2011).

The variance equation shows that all GARCH coefficients (β's) are significant at the 1% level and the sums of β_1 and β_2 are close to, but less than 1.0, indicating that the residuals of the risk premium equation follow a GARCH process and that the persistence of a volatility shock on returns and stock prices for utility stocks is temporary. The estimates of the non-unitary variance T-distribution degrees of freedom parameter are low and statistically significant, indicating that the residuals are well approximated by the T. Similar values for the log-likelihood functions (Log-L) show that each of the regressions has a similar goodness-of-fit. Chi-squared distributed likelihood ratio tests (not shown but available upon request) that compare the goodness of fit among the T and normal specifications of the likelihood function of the GARCH-M regressions show that the T has a significantly better fit than the normal distribution.

The GARCH-M results for the large company common stocks portfolio are similar to those of the utility stocks. Not surprisingly, large company common stocks do not hedge shocks to the marginal utility of consumption and volatility shocks temporarily affect their valuations. The exception is that the return-risk slope is substantially higher than utility stock slopes. This is partially due to the risk-free nature of the risk-free rates used with the non-utility equity risk premia compared to the

Table 2 Estimation of return-risk relation: public utility and large company common stocks

Utility bond rating	α	β_0	β_1	β_2	Log-L	T dist. D.F.
Aa	1.5183*** (0.5308)	0.0000** (0.0000)	0.8791*** (0.0230)	0.1031*** (0.0219)	1,604.4	9.9254*** (3.0272)
A	1.4536*** (0.5308)	0.0000** (0.0000)	0.8790*** (0.0230)	0.1033*** (0.0220)	1,605.0	9.9381*** (3.0408)
Baa	1.3318** (0.5303)	0.0000** (0.0000)	0.8789*** (0.0229)	0.1040*** (0.0220)	1,605.2	10.0*** (3.0540)
Fama-French R_f	2.1428*** (0.5318)	0.0000** (0.0000)	0.8811*** (0.0232)	0.0979*** (0.0212)	1,601.0	9.8773*** (2.9700)
Ibbotson						
Large company common stocks	2.7753*** (0.5513)	0.0001*** (0.0000)	0.8381*** (0.0269)	0.1186*** (0.0332)	1,620.8	8.8457*** (2.1613)
CRSP value-weighted stock index	3.3873*** (0.5673)	0.0001*** (0.0000)	0.8330*** (0.0270)	0.1149*** (0.0358)	1,598.9	8.8571*** (1.9505)

The results below are the GARCH-in-Mean regressions for the risk premium ($R_{t+1} - R_{f,t+1}$) on the conditional variance of the risk premium (σ^2_{t+1}) in the mean equation. The intercept in the mean equation is restricted to be equal to zero. The public utility equity-to-debt risk premia monthly time series is from January 1928 to December 2007 with 960 observations. The equity risk premium monthly time series for the Large Company Common Stocks and the CRSP index are January 1926 to December 2007 with 984 observations, and January 1926 to December 2007 with 984 observations, respectively. The public utility stocks equity-to-debt risk premia are calculated as the total return on the S&P Public Utilities Index of stocks minus the Moody's Public Utility Aa, A, and Baa Indices yields to maturity. The Large Company Common Stock equity risk premia are the monthly total returns on the Ibbotson Large Company Common Stocks Portfolio minus the Ibbotson Long-Term US Government Bonds Portfolio income yield. The CRSP equity risk premia, or the Fama-French market risk premia are the CRSP total returns on the value-weighted equity index minus the 1-month holding period return on a 1 month Treasury Bill. The estimated model is:

$$R_{t+1} - R_{f,t+1} = \alpha\sigma^2_{t+1} + \varepsilon_{t+1} \quad \text{where } \alpha = -\frac{vol_t[M_{t+1}]}{E_t[M_{t+1}]} corr_t[M_{t+1}, R_{i,t+1}]$$

$$\sigma^2_{t+1} = \beta_0 + \beta_1\sigma^2_t + \beta_2\varepsilon^2_t + \eta_{t+1}$$

The conditional distribution of the error term is the non-unitary variance T-distribution to accommodate the kurtosis of the risk premia and error term. Standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tail tests

utility bond yields that reflect risk. The utility stocks slope value of 2.1428 using the Fama-French risk-free rate is closer to the higher CRSP value of 3.3873 that is also based on the Fama-French risk-free rate. This is inconsistent with previous results herein and in other papers that find that Sharpe Ratios are lower for higher risk assets unless this finding can be interpreted as utility stocks having more risk than non-regulated stocks. The standard deviations on Table 1 suggest that utility stock return volatilities are as high as the stock returns of non-regulated firms. However, similar model estimates of portfolios of common stocks yield unstable results, such as negative as well as positive return-risk slopes when the intercept is not restricted to zero. See Campbell (1987), Glosten et al. (1993), Harvey (2001), and Whitelaw (1994).

Stock market results are highly sensitive to empirical model specification. Many studies do not consider the impact of a zero-intercept prior restriction on the stability of their results. This simple innovation has led to more consistent results in modeling stock market risk-return relationships, and therefore we have included it in this paper.

The estimation of the consumption asset pricing model for utility stock equity-debt risk premia shows that the use of bond-rating risk-differentiated risk premia are validated as their risk-return relationships are well-fitted by theoretical and empirical models of risk and return. Therefore, these data impound good representations of the risk and reward relationship.

One concern is the intertemporal stability of the alphas. Figure 1 plots the utility stock portfolio alpha (using the Fama-French R_f to calculate the premium) and its standard error for 240 month rolling regressions of the model estimated with GARCH-M in the same manner as described above to review the intertemporal stability of the alpha. A 20-year period was used for each estimation to trade off timeliness with sufficient observation of up and down stock market regimes and business cycles. This resulted in 720 estimated alphas from 1947 to 2007. The results show that the utility alpha is stable to the extent that the algebraic sign is always positive and generally significant, therefore the nature of utility stocks are assets that are not and have never been hedges during the second half of the twentieth century up to the present. The value of the alpha does change substantially. The mean of the alpha is 4.40 with a range from -0.11 (insignificantly different from 0) to 11.66. As a comparison, the alpha for the CRSP value-weighted stock index was also estimated with rolling regressions in the same manner and for the same time period. Figure 2 is a plot of the CRSP alpha and standard error. Note that the general stock market alpha is similar to that of utility stocks. They are all positive and almost all statistically significant and follow a strikingly similar cycle. Figure 3 plots both the utility and stock market alphas and demonstrates the similarity. The correlation coefficient between the utility and stock market alphas is 0.88. Recalling that the alpha is a Sharpe Ratio, we see that return to risk ratio does change substantially. This is consistent with the results in Pilotte and Sterbenz (2006).

One other interesting observation is that the standard errors of the alphas are highly stable over the study period and are very similar in magnitude regardless of the size of the corresponding alpha. Whereas the alpha follows a cyclical pattern, the volatility in alpha is highly stationary around a constant, long-run mean.

The GARCH-M model estimations of the consumption asset pricing model were specified with variance as the measure of volatility. We also performed the same model estimations with alternative specifications of volatility such as the standard deviation and the log of variance and the results were not sensitive to this specification.

4 Application

We apply the model in this section to compare the cost of common equity capital estimates with the DCF and CAPM models. Using EViews© Version 6.0, we estimated the model coefficients (α, $\beta's$) over rolling 24 month periods ending December 2008.

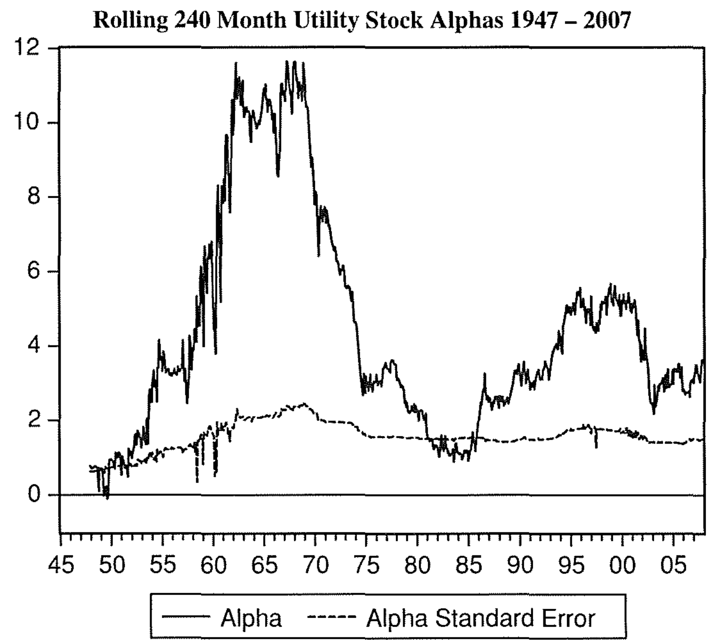


Fig. 1 Rolling 240 month utility stock alphas 1947–2007

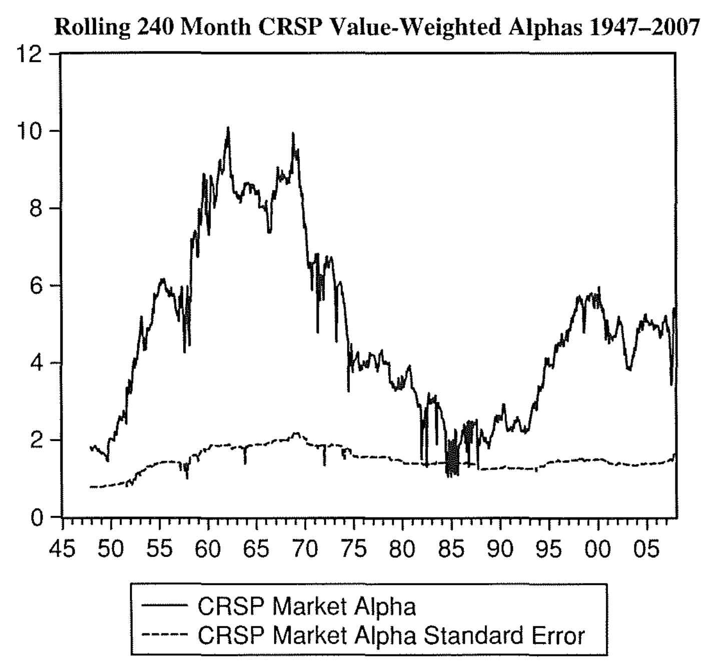


Fig. 2 Rolling 240 month CRSP value-weighted alphas 1947–2007

We repeated the estimation over 5, 10, 15, 20 and 79 year periods.[3] Predicted monthly variances (σ^2_{t+1}) were generated from these estimations to produce predicted risk premiums that were calculated by multiplying the predicted variance by the "α" slope

[3] We did not include the results of the 10 and 15 year estimations to abbreviate the amount of empirical results presented since they added no material insights beyond those already presented.

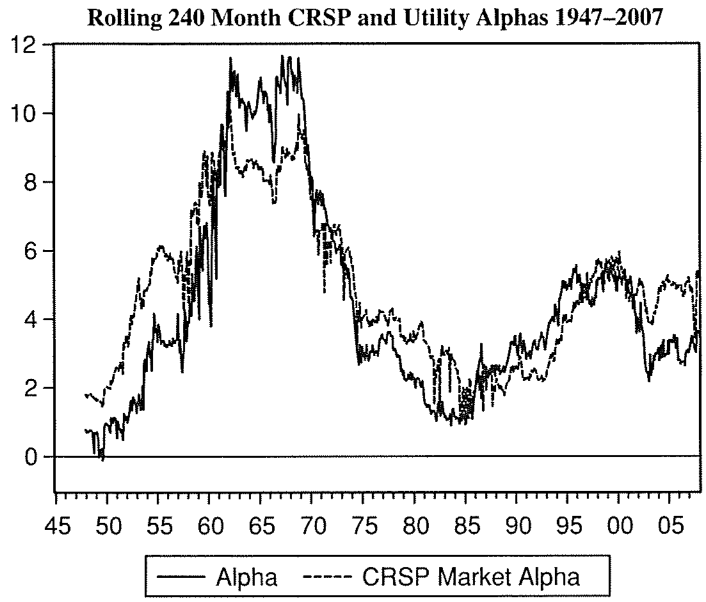


Fig. 3 Rolling 240 month CRSP and utility alphas 1947–2007

Table 3 Estimates of expected risk premia

	Mean (%)		Range (%)		Standard deviation (%)	
	Average	Spot	Average	Spot	Average	Spot
Ibbotson Associates data						
79-years	9.59	5.76	8.74–9.96	2.62–22.60	0.32	5.24
20-years	6.77	6.94	4.99–8.50	2.24–28.95	0.95	6.88
5-years	4.20	10.25	−98.49–11.62	−100.00–39.65	22.00	26.61
S&P Utility Index						
79-years	5.28	2.90	4.30–5.28	1.65–8.15	0.32	1.60
20-years	3.93	3.51	2.78–5.03	2.18–6.88	0.57	1.11
5-years	31.82	326.63	7.77–156.97	6.12–6465.74	31.47	1283.51

coefficient. To test the stability of the predicted risk premia over time, the predicted risk premia were calculated using either the predicted variance over each entire time period or the last monthly (spot) predicted variance. Table 3 presents the mean predicted risk premia, the range of predicted premia and the standard deviations for each time period. It is clear from the results that the risk premia are more stable over the rolling 24 month period when calculated using the average predicted variance compared with using the spot variance. Secondly, the 20 and 79 year means are substantially more stable and reasonable in magnitude than the 5 year means.

Next, given the lessons from the analyses above, we apply the model to mechanically[4] estimate the cost of common equity for 8 utility companies using the model and

[4] The term "mechanically" in this context means that the resulting values have been developed in a consistent manner with the same inputs across all utility stocks but no subjective judgment was used to develop final values for each specific utility stock application.

the DCF and CAPM as comparisons. We also calculated the realized market return for comparison. Two publicly-traded electric, electric and gas combination, gas, and water utilities respectively were chosen for the application. The Gordon (1974) DCF and CAPM models are used in many utility regulatory jurisdictions in the US.

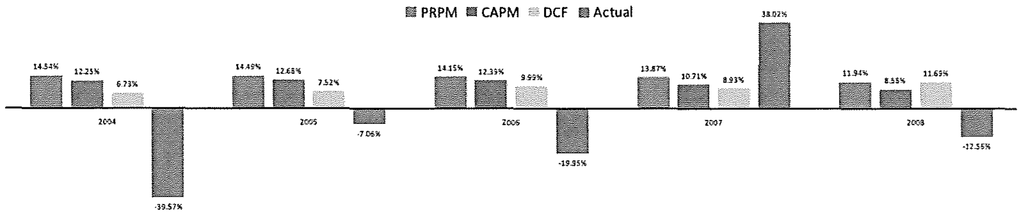
The DCF was applied using a dividend yield, D_0/P_0, derived by dividing the year-end indicated dividend per share (D_0) by the year-end spot market price (P_0). The dividend yield is grown by the year-end I/B/E/S five year projected earnings per share growth rate (g) to derive $D_0(1+g)/P_0$. The one-year predicted dividend yield is then added to the I/B/E/S five-year projected EPS growth rate to obtain the DCF estimate of the cost of common equity capital, k. This study was conducted for the 5 years ending 2008.

The CAPM was applied by multiplying the Value Line beta (β) available at year-end for each company by the long-term historic arithmetic mean market risk premium ($R_m - R_f$). $R_m - R_f$ is derived as the spread of the total return of large company common stocks over the income return on long-term government bonds from the Ibbotson SBBI 2009 Valuation Yearbook. The resulting company-specific market equity risk premium is then added to a projected consensus estimate of the yield on 30-year U.S. Treasury rate provided by Blue Chip Financial Forecasts as the risk-free rate (R_f) to obtain the CAPM result. This study was also conducted over the 5 years ending 2008.

Figures 4–11 show the histograms of the cost of common equity capital estimations for each of the eight public utility stocks and the realized market returns in the forthcoming year. The consumption asset pricing model appears to track more consistently with the CAPM than with the DCF which seems to produce generally lower values than the other methods. The consumption asset pricing model results are similar to the CAPM. The model and the CAPM compete as the best predictor of the rate of return on the book value of common equity (not shown but available upon request), but none of the expected returns were good predictors of market returns. That does not infer that they were not good predictors of *expected* market returns. These results are an initial indicator that the consumption asset pricing model provides reasonable and stable results. This paper does not suggest at this early juncture that the consumption asset pricing model is superior to the CAPM or DCF, although it is based on far less restrictive assumptions than these other models. For example, both the DCF and CAPM assume that markets are efficient. Many assume that the DCF requires that the market-to-book ratio to always equal one, whereas the long-term value for the Standard and Poor's 500 is equal to 2.34. The CAPM assumes that investors demand higher returns for higher volatility and that the minimum required return is the risk-free rate, whereas the consumption asset pricing model allows for investors to require returns less than the risk-free rate for stocks that may have relatively higher volatility but are hedging assets that have desirable return fluctuation patterns that offset downturns in the business cycle. Unlike the CAPM, the model prices the risk to which investors are actually exposed, whether it's systematic risk or not. Some investors are diversified and some are not; the model prices whatever risk to which the aggregate of investors of the specific stock is exposed.

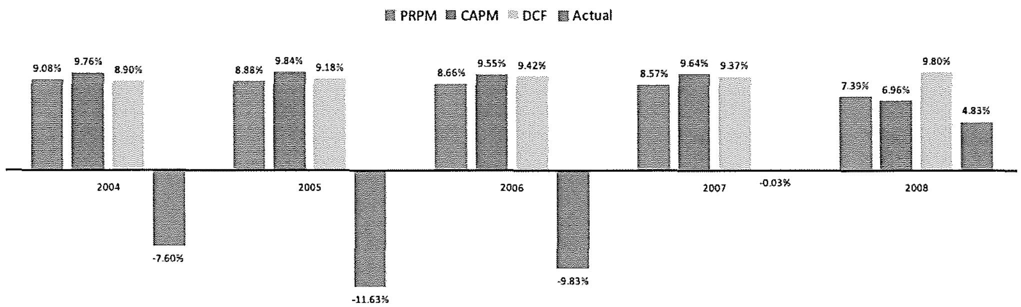
We find that the consumption asset pricing model should be used in combination with other cost of common equity pricing models as additional information in the devel-

Cost of Common Equity Results for Edison International Compared to Market Return*



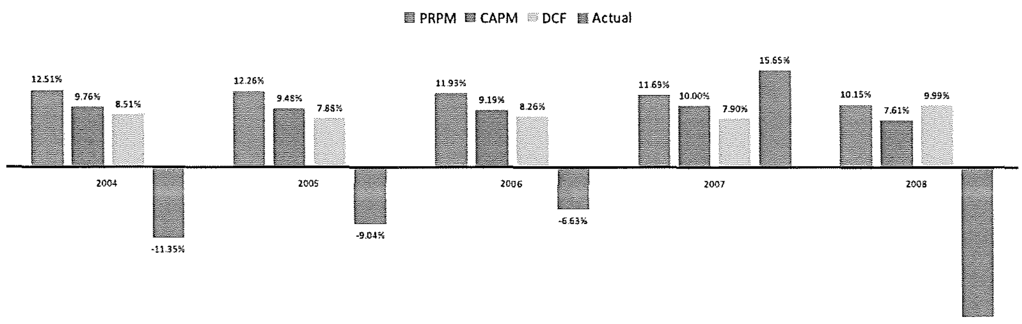
* Market returns calculated for the following years: 2005 -2009

Cost of Common Equity Results for Southern Company Compared to Market Return*



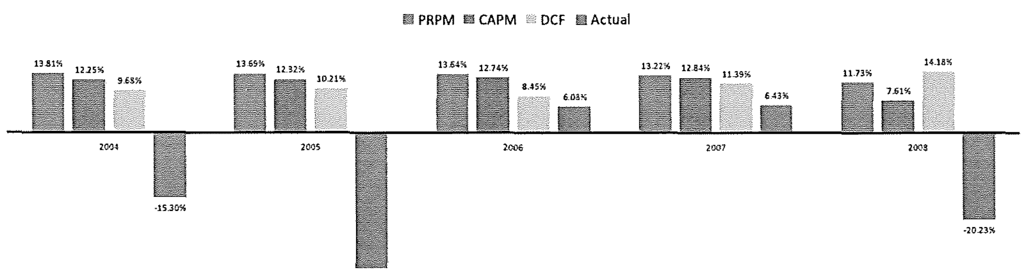
* Market returnscalculated for the following years: 2005 -2009

Cost of Common Equity Results for Consolidated Edison Compared to Market Return*



* Market returns calculated for the following years: 2005 - 2009

Cost of Common Equity Results for PG&E Corp Compared to Market Return*

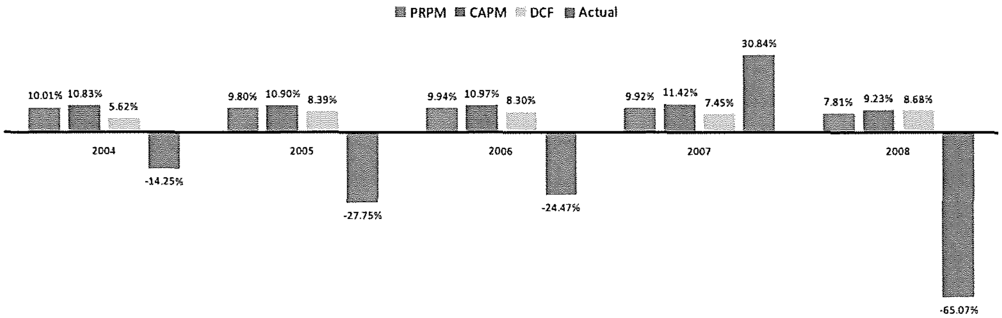


* Market returns calculated for the following years: 2005 -2009

Figs. 4–11 Comparison of the cost of common equity estimates and market

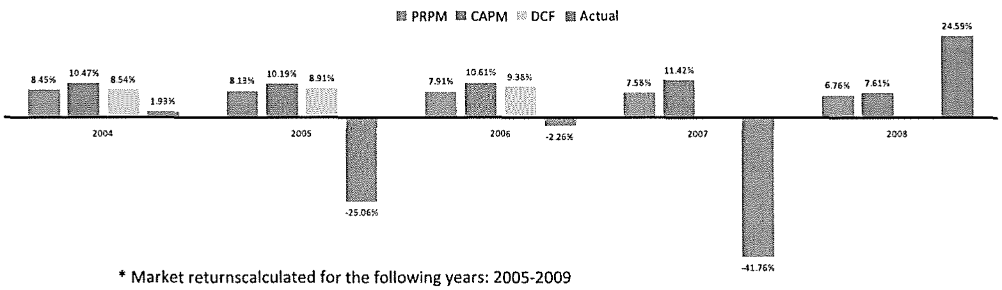
opment of a cost of common equity capital recommendation. Practitioners may find the modeling methods and the use of relatively advanced econometric methods rather cumbersome. The software for performing these estimations is readily available from EViews© and SAS©; two commonly available software packages at utilities, consult-

Cost of Common Equity Results for National Fuel Gas Co. Compared to Market Return*



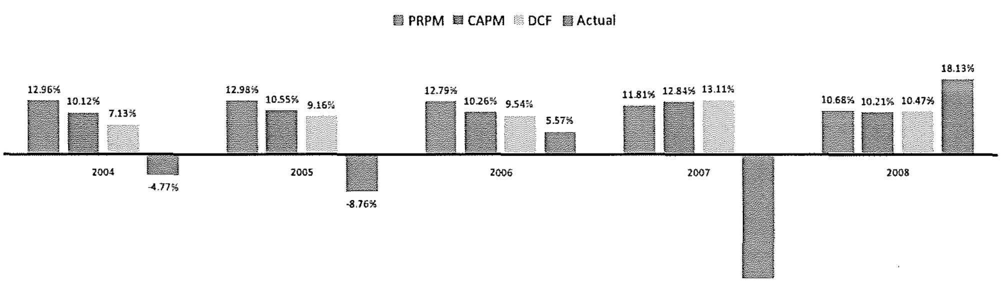
* Market returrnscalculated for the following years: 2005 -2009

Cost of Common Equity Results for Laclede Group Compared to Market Return*



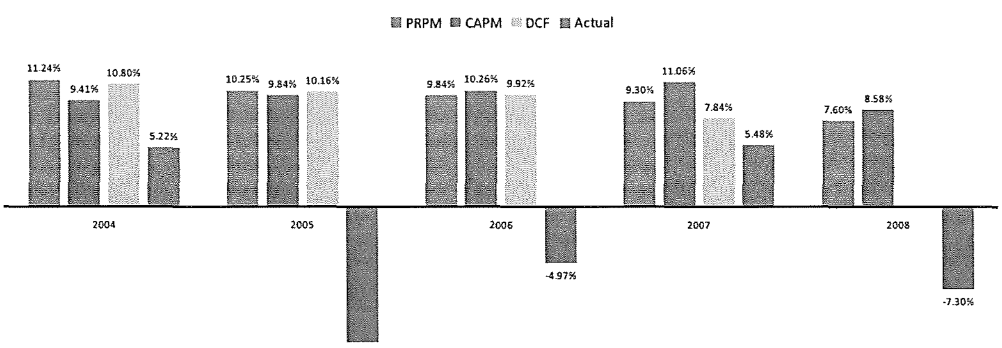
* Market returnscalculated for the following years: 2005-2009
Missing DCF Cost of Capital Estimates Due to Unavailable Growth Rate

Cost of Common Equity Results for California Water Service Group Compared to Market Return *



* Market returns calculated for the following years: 2005 -2009

Cost of Common Equity Results for Middlesex Water Company Compared to Market Return *



* Market returnscalculated for following years: 2005 -2009
Missing DCF Cost of Capital Estimate Due to Unavailable Growth Rate

Figs. 4–11 continued

ing firms and financial firms. Recent Ph.D. and M.S. holding members of research departments of investment and consulting firms have ready access to the model and methods discussed in this paper, although it will require years for these tools, like any "new" technology, to diffuse into standard use. Another problem is that the model requires a substantial time series history on stock returns data to develop stable estimates of risk premia This is problematic especially for the electric and gas utility industries that have consolidated with many mergers in the recent past. This problem can be addressed by developing and predicting the value-weighted risk premium of a portfolio of similar stocks such as electric utilities that have nuclear generating assets. The specific stock in question would be included in the returns index with a weight based on market capitalization that would go to 0 when the stock price history is no longer existent reaching back into the past.

5 Conclusion

The purpose of this paper is to introduce, test empirically and apply a general consumption based asset pricing model that is based on a minimum of assumptions and restrictions that can be used to predict the risk premium to be applied in estimating the cost of common equity for public utilities in regulatory proceedings. The results support the simple consumption-based asset pricing model that predicts the ex ante risk premium with a conditionally predicted volatility in risk premium. The estimates of the cost of common equity from the consumption asset pricing model compare well with rates of return on the book value of common equity and with the CAPM, although both the model and the CAPM results are substantially higher than the DCF. This is quite common in the practice of the cost of common equity in the utility industry. The results of the model are stable and consistent over time. Therefore the model should be considered as it provides additional evidence on the cost of common equity in general and specifically in public utility regulatory proceedings. Secondly, the use of bond-rated yields to predict risk differentiated equity-to-debt risk premia is supported by the empirical evidence and therefore should be applied in estimating the cost of common equity. Finally, the robust empirical evidence on the positive risk-return relationship also shows that utility stocks are not a consumption hedge and are not good hedging securities against contractions in the economy. The model and estimation methodology presented in this paper provide a relatively simple tool to determine whether any asset is a hedge to adverse changes in the business cycle through the level of consumption in the economy.

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Comparative Evaluation of the Predictive Risk Premium Model™, the Discounted Cash Flow Model and the Capital Asset Pricing Model for Estimating the Cost of Common Equity

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Abtract

The regulatory process for setting a utility's allowed rate of return on common equity has generally relied upon the Discounted Cash Flow Model and Capital Asset Pricing Model. Despite the widely known problems with these models, there has been little initiative to adopt more recently developed asset pricing models which have fewer limiting assumptions and require less subjective judgment. The December 2011 issue of the *Journal of Regulatory Economics* published the article "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities",[i] and introduced the Predictive Risk Premium Model™. The model is a general, yet simple, consumption-based asset pricing model of the risk / return relationship for common stocks which can be used to estimate the cost of common equity. The model produces stable, consistent and expectational results. This article presents in summary form exhaustive empirical testing of the PRPM™ for utilities by industry. The empirical testing confirms the *Journal of Regulatory Economics* article conclusion: the PRPM™ produces stable, consistent, and reasonable results for each of the electric, electric and gas, gas local distribution, and water utility industries.

Introduction

The lead article in the July 2008 issue of this *Journal*, "Integrating Renewables into the US Grid: Is it Sustainable," by Professors Peter Mark Jansson and Richard A. Michelfelder[ii], called for the reregulation of the electric utility industry and putting the planning of generation assets, whether renewable or not, back in the hands of the experts and those ultimately responsible for reliability, the electric utilities. During the last ten years or so, states have been backpedalling on deregulation and therefore methods for estimating the cost of common equity and the allowed rate of return have generated new interest as regulating rate of return is not going away as once thought.

The regulatory process for setting a public utility's allowed rate of return on common equity has generally relied upon the familiar Gordon Discounted Cash Flow Model (DCF) and Capital Asset Pricing Model (CAPM). Despite the widely known problems with these models, there has been little initiative to adopt more recently developed asset pricing models which have fewer limiting assumptions and require less subjective judgment than these traditional models. In December 2011, the article "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities",[iii] published in *The Journal of Regulatory Economics* introduced the Predictive Risk Premium Model™ (PRPM™). The PRPM™ is a general, yet simple, consumption-based asset pricing model of the risk / return relationship for common stocks which can be used to estimate the cost rate of common equity (ROE). The stability and consistency of the results of PRPM™

and the ex ante, i.e., expectational, nature of those results indicate that the model should be used to provide additional input into the process of determining an allowed rate of return on common equity for public utilities.

Since publication, more exhaustive empirical testing of the PRPM™ was conducted for the four utility industry groups which comprise the AUS Utility Reports©[iv] universe of publicly traded utilities: an electric utility group; a combination electric and natural gas distribution utility group; a natural gas distribution utility group; and, a water utility group. The empirical testing confirms the conclusion of the original *Journal of Regulatory Economics* article: the PRPM™ produces stable results which are consistent over time.

Development of the PRPM™

The cost rate of common equity is not directly observable in the capital markets and must be inferred using various financial models. The most commonly used cost of common equity models in the regulatory arena are the aforementioned DCF and the CAPM. Since these models are based upon many restrictive assumptions, they involve a significant amount of analyst subjectivity in their application, resulting in much debate over the application and results of these models.

The empirical approach to the PRPM™ is based upon the work of Robert F. Engle, Ph.D.[v] who shared the Nobel Prize in Economics in 2003 "for methods of analyzing economic *time series* with time-varying volatility (*ARCH*)"[vi], with "ARCH" standing for autoregressive conditional heteroskedasticity. In other

words, volatility (variance) changes over time and is related to itself from one period to the next, especially in financial markets. Engle discovered that the volatility (usually measured by variance) in prices and returns clusters over time. Therefore, volatility is highly predictable and can be used to predict future levels of risk. The theoretical asset pricing model was recently developed in the *Journal of Economics and Business* in December 2011 by Rutgers University professors Richard Michelfelder and Eugene Pilotte[vii].

In this study, the PRPM™ estimates the risk / return relationship directly using the outcomes of investors' historical pricing decisions and actual long-term U.S. Treasury security yields, with the predicted equity risk premium generated by the prediction of volatility, i.e., the risk, based upon the volatility of past equity risk premiums for the AUS Utility Reports universe of companies.

Estimation Method

The statistical details of the estimation method of the PRPM™ can be found in the original article in the *Journal of Regulatory Economics*, "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities". Essentially, there are two steps to the application of the PRPM™. First, predicted volatility, i.e., risk, is derived based upon previous volatility plus previous prediction error, because volatility is highly predictable and correlated over time. Second, the predicted volatility can then be used to generate the predicted equity risk premium (ERP) by multiplying it by the GARCH coefficient,

i.e., the slope of the predicted volatility. A risk-free rate is then added to the ERP to estimate the ROE, i.e., the market based cost of common equity.

Application of the PRPM™ to Publicly Traded Utility Companies

The PRPM™ was applied to the companies comprising the AUS Utility Reports©' utility industry groups: the electric, combination electric and natural gas distribution, natural gas distribution and water groups. The PRPM™ variances were calculated monthly for each individual utility beginning with the first available monthly data included for each individual utility in the University of Chicago Booth School of Business' Center for Research in Security Prices (CRSP®) and corresponding monthly long-term U.S. Treasury bond yields from Morningstar's *Ibbotson® SBBI® – 2012 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926-2011 (SBBI)* through 72 month ending periods, i.e., January 2006 through December 2011.

Using EViews© Version 7.2, the PRPM™ coefficients and predicted monthly variances were estimated as described in the *JRE* article for each time series of equity risk premiums. Consistent with the conclusion drawn in the *JRE* article, the predicted equity risk premiums were calculated using the averaged predicted volatilities (variances) over the entire time period for which CRSP data were available for each utility, multiplied by the GARCH, or slope, coefficient generated through EViews® for each time series. To calculate the PRPM™ cost rate of common equity for each utility, the average predicted utility specific equity risk premium through each month ending from January 2006 through December 2011 was then added to the projected consensus forecast of the expected yields

on 30-year U.S. Treasury bonds for the next six quarters by the reporting economists in the concurrent *Blue Chip Financial Forecasts (Blue Chip).*

The DCF was applied in a simple manner, using a dividend yield, D_0 / P_0, derived by dividing the month-end indicated dividend per share (D_0) by the month-end closing market price (P_0) for each utility. The dividend yield was then grown by the month-end I/B/E/S consensus five-year projected earnings per share (EPS) growth rate (g) to derive (D_0 (1 + g) / P_0). The one-month predicted dividend yield was then added to the concurrent month's I/B/E/S consensus five-year average projected EPS growth rate to obtain the DCF estimate of the cost of common equity capital, k. The DCF estimates were also calculated for each month from January 2006 through December 2011.

The CAPM was applied by multiplying *Value Line Inc.'s* beta (β)[viii], for each utility, by the long-term historical arithmetic mean market equity risk premium ($R_m - R_f$) through the previous year. ($R_m - R_f$) was derived as the spread of the total return of large company common stocks over the income return on long-term government bonds from the annual *SBBI Valuation Yearbooks* for the years ending 2005 through 2010. The resulting utility-specific equity risk premium was then added to the same projected consensus forecast of the expected yields on 30-year U.S. Treasury bonds for the next six quarters by the reporting economists in the concurrent *Blue Chip* discussed above, to obtain the CAPM estimate of the cost of common equity capital, k. The CAPM estimates were also calculated for each month from January 2006 through December 2011.

Finally, the results for each of the models, the PRPM™, DCF, and CAPM, were averaged for each utility group[ix]. Chart 1 presents the average PRPM™ results for each of the AUS Utility Reports© utility groups for each month from January 2006 through December 2011.

Chart 1

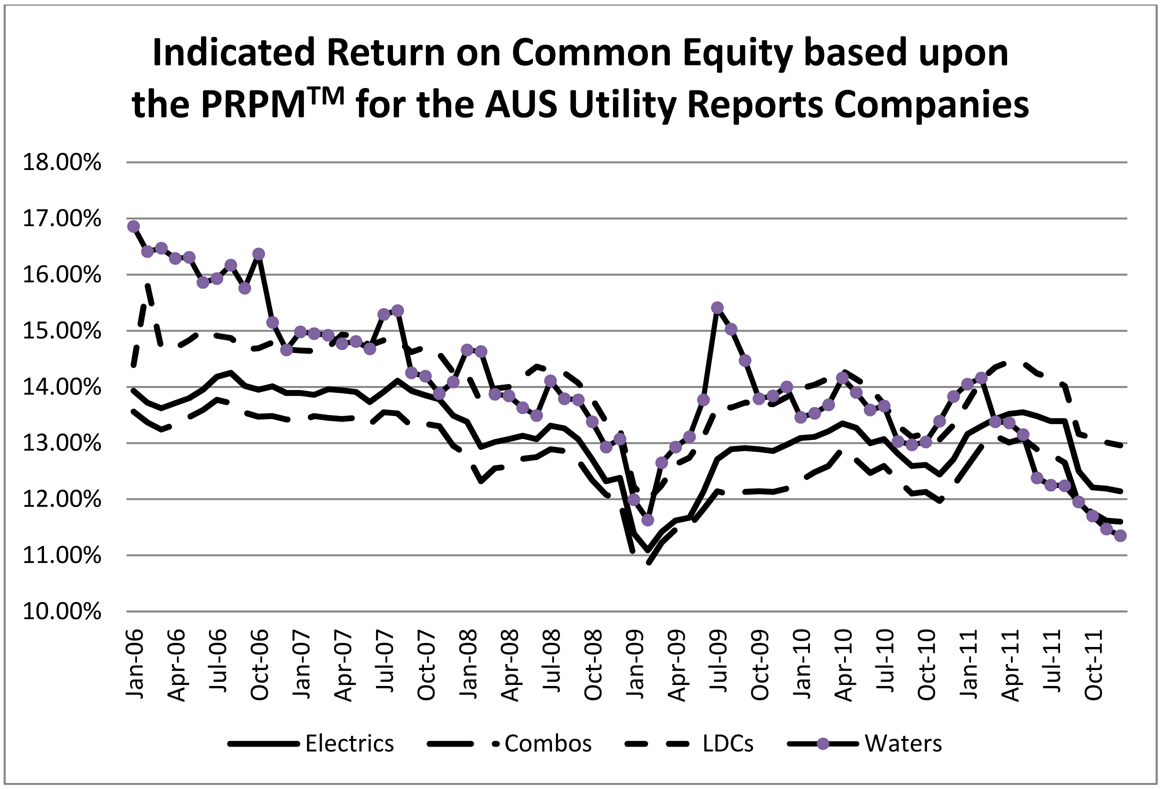


Chart 1 shows that indicated ROEs derived from the PRPM™ were stable for all utility groups until the global financial crisis of 2008 – 2009. During 2008 and 2009, the PRPM™ derived ROEs decline, which in the authors' opinion, was a result of a "flight to quality" by investors, i.e., the willingness of an investor to accept a lower, but more certain, return during financial downturns. Chart 1 also indicates that the PRPM™ derived ROEs for the electric, combination electric and natural gas distribution and natural gas distribution utility groups follow a

nearly identical pattern throughout the 72-month period, with the water utility group following a similar, but more volatile pattern.

Charts 2 through 5 present a comparison of the average PRPM™, DCF, and CAPM cost of common equity estimates for each AUS Utility Reports© utility industry group, i.e., the electric utility group; the combination electric and natural gas distribution utility group; the natural gas distribution utility group; and, the water utility group for each month from January 2006 through December 2011.

Chart 2

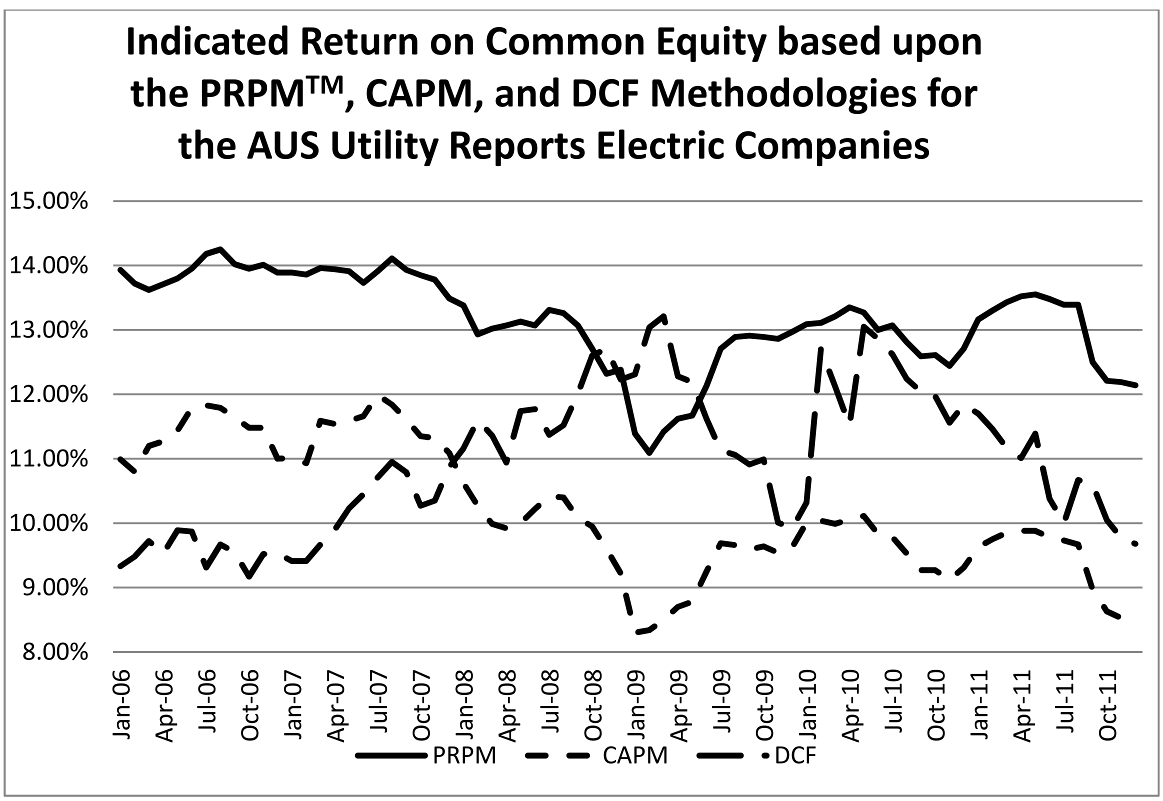


Chart 3

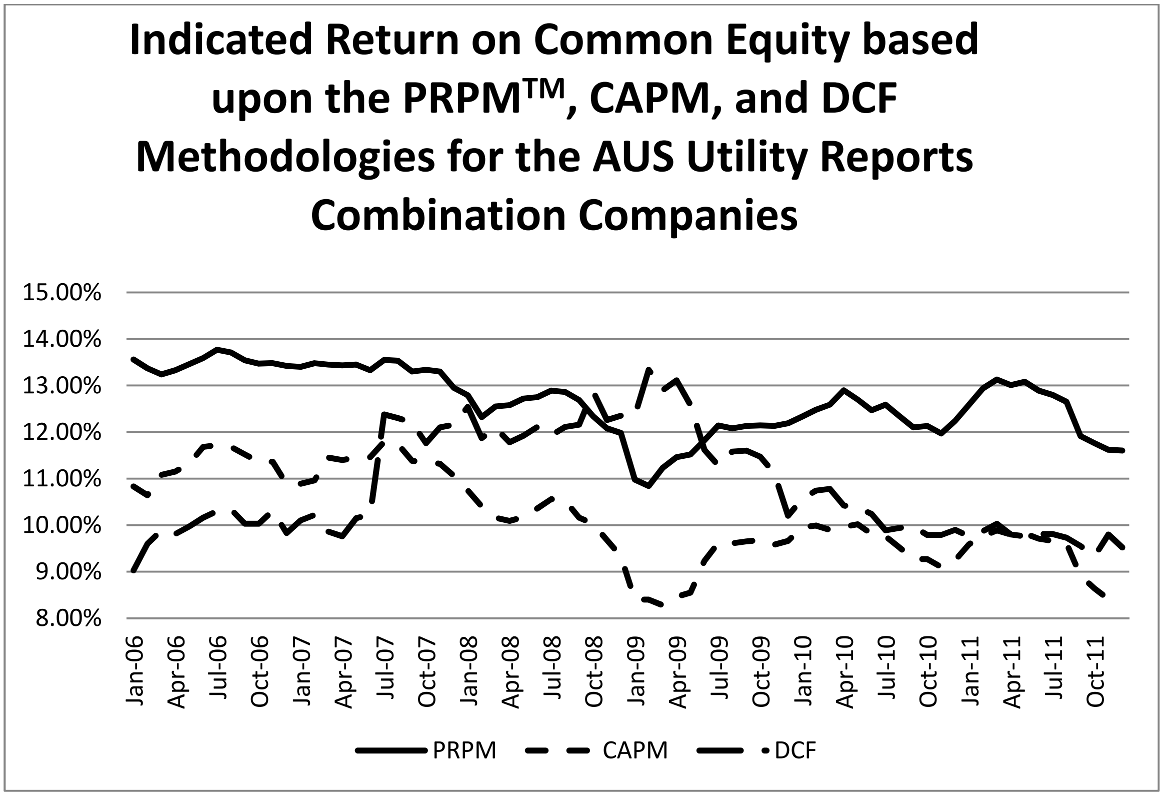


Chart 4

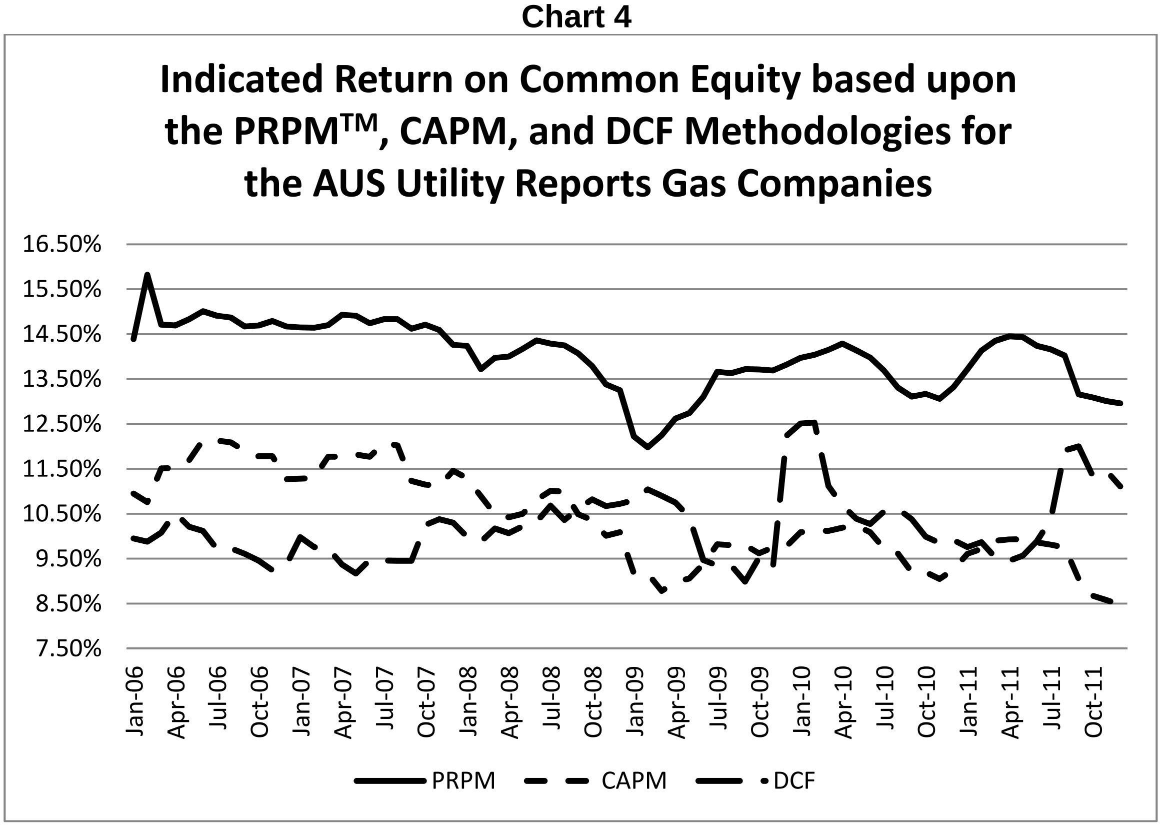
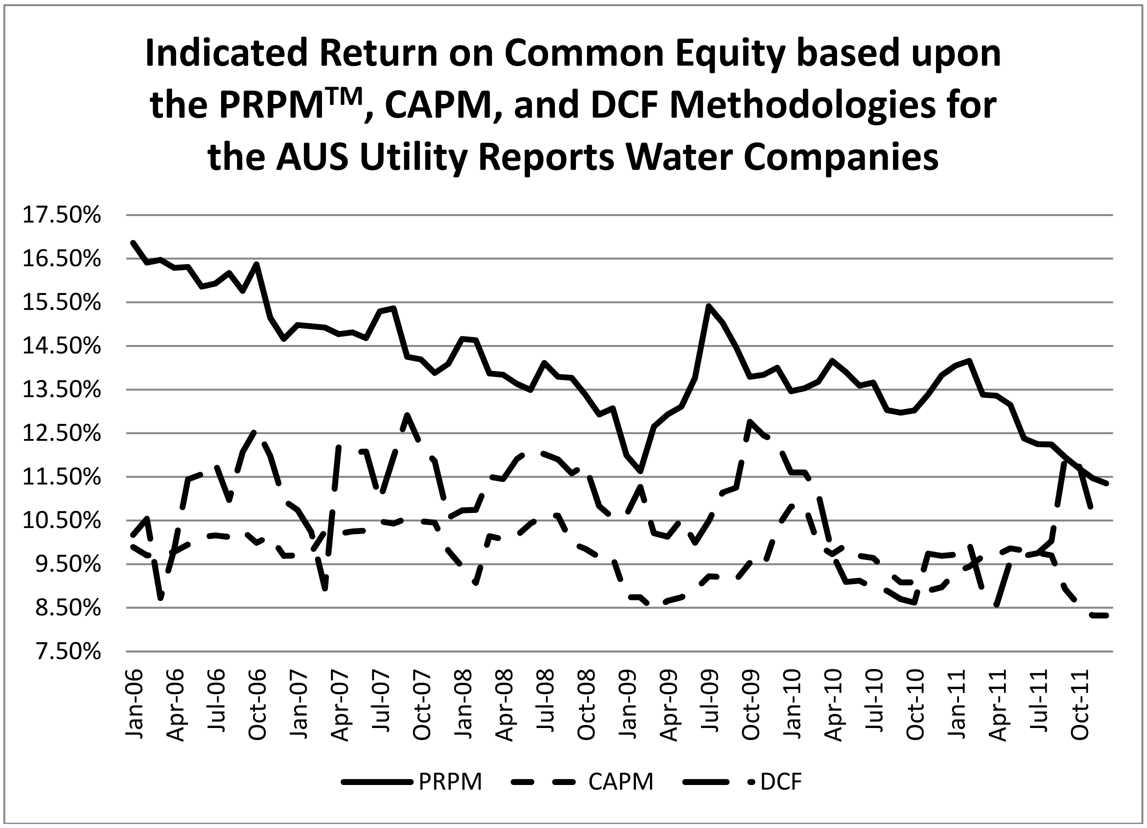


Chart 5



Charts 2 through 5 clearly show that, for the most part, the PRPM™ produces a higher average indicated ROE than both the DCF and CAPM. This is due to the fact that the PRPM™ prices <u>all</u> of the risk which investors actually face collectively. In contrast, the CAPM prices systematic risk (that investors face only if they have a perfectly diversified portfolio, which does not exist) and the DCF uses accounting, not market, based I/B/E/S consensus five-year projected EPS growth rates.

Conclusion

In the authors' opinion, the PRPM™ benefits ratemaking with an additional model to estimate ROE. To that end, the Principals of AUS Consultants have been including the PRPM™ in their rate of return testimonies and the model has been presented publicly in several venues.[x]

Its results are stable and consistent over time. It is not based upon restrictive assumptions, as are the DCF and CAPM. The PRPM™ is also not based upon an estimate of investor behavior, but rather, upon a statistical analysis of actual investor behavior by evaluating the results of that behavior, i.e., the volatility (variance) of historical equity risk premiums. In contrast, subjective decisions surround the choice of the inputs to both the DCF and CAPM, from the choice of the time period over which to measure the dividend yield for the DCF, the choice of the DCF growth rate (e.g., historical or projected, earnings per share or dividends per share, and the like), to the selection of the appropriate beta (e.g., adjusted or unadjusted), market equity risk premium (e.g., historical or projected) and the appropriate risk-free rate (e.g., historical or projected and/or long v. short term) for the CAPM. In addition, as previously discussed, the CAPM exclusively prices systematic risk. In contrast, the PRPM™ prices all of the risk actually faced collectively by investors, because the model does not assume that investors' portfolios are perfectly diversified containing no unsystematic risk.

In addition, the inputs to the PRPM™ are widely available. The GARCH coefficient is calculated with the relatively inexpensive EViews©, or other statistical, software, based upon the realized ERP, i.e., total returns minus the

risk-free rate. The only subjective decisions to be made when applying the PRPM™ relate to which risk-free rate to use, e.g., long-term or short-term, and over what time period to estimate the PRPM™ derived ROEs.

For all of these reasons, the authors conclude that the PRPM™ should be considered as appropriate additional evidence to measure the cost of common equity in regulatory rate setting for public utilities.

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i Ahern, Pauline M., Hanley, Frank J. and Michelfelder, Richard A., "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities," *Journal of Regulatory Economics* (2011) 40:261-278.

ii Jansson, Peter Mark, Michelfelder, Richard A., "Integrating Renewables into the US Grid: Is It Sustainable," The Electricity Journal (2008, July) 21: 9-21.

iii Ahern, Pauline M., Hanley, Frank J. and Michelfelder, Richard A., "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities," *Journal of Regulatory Economics* (2011) 40:261-278.

iv AUS Monthly Utility Reports is a monthly pocket reference book covering the electricity, combination electricity & natural gas distribution, natural gas distribution, and water companies which have publicly traded common stock. The monthly reports provide comprehensive information on key ratios and industry rankings based upon the financial statistics presented in the report.

v Professor Emeritus, University of California, San Diego and currently the Michael Armellino Professor in Management of Financial Services at New York University, Stern School of Business.

vi www.nobelprize.org.

vii Michelfelder, Richard, and Pilotte, Eugene, "Treasury Bond Risk and Return, the Implications for the Hedging of Consumption and Lessons for Asset Pricing," *Journal of Economics and Business* (2011) 63, 605-637.

viii Using a proprietary data base available at mid-March, June, September, and December at the end of each year, from 2006 – 2011 from Value Line, Inc.

ix The results shown in the accompanying charts represent AUS Utility group averages of only those utilities in each group for which it was possible to estimate all three models in any given month. For example, if ABC Utility did not have the I/B/E/S consensus growth rate necessary to calculate the DCF in a given month, that utility's PRPM™ and CAPM were not included in the group average for that month.

x Edison Electric Institute Cost of Capital Working Group (Webinar 10/12); NARUC Staff Subcommittee on Accounting & Finance (9/12 & 3/10); National Association of Water Companies Finance/Accounting/Taxation and Rates & Regulations Committees (3/12); NARUC Water Committee (2/12); Wall St. Utility Group (12/11); IN Utility Regulatory Commission Cost of Capital Task Force (9/10); Financial Research Inst. of the Univ. of Missouri Hot Topic Hotline Webinar (12/10); and Center for Research in Regulated Industries Annual Eastern Conference (5/10 & 5/09).

Author Biographies

Dr. Richard A. Michelfelder is Clinical Associate Professor of Finance at Rutgers University, School of Business, Camden. He earlier held a number of entrepreneurial and executive positions in the public utility industry, some of which the application of renewable and energy efficiency resources in utility planning and regulation. He was CEO and chairperson of the board of Quantum Consulting, Inc., a national energy efficiency and utility consulting firm, and Quantum Energy Services and Technologies, LLC, an energy services company that he co-founded. He also helped to co-found and build Comverge, Inc., currently one of the largest demand–response firms in the world that "IPOed" in 2006 on the NASDAQ. He was also an executive at Atlantic Energy, Inc. and Chief Economist at Associated Utilities Services, where he testified on the cost of capital for public utilities in a number of state jurisdictions and before the FERC. He holds a Ph.D. in Economics from Fordham University and has published numerous articles in academic journals.

Pauline M. Ahern is a Principal and Director with AUS Consultants located in Mount Laurel, New Jersey. She has served investor-owned and municipal utilities and authorities for nearly 25 years. A Certified Rate of Return Analyst (CRRA), she is responsible for the development of rate of return analyses, including the development of ratemaking capital structure ratios, senior capital cost rates and the cost rate of common equity and related issues for regulated public utilities. She has testified as an expert witness before 29 regulatory commissions in the U.S. and Canada. In addition, she supervises the production of the various AUS Utility Reports publications and maintains the benchmark index against which the American Gas Association's Mutual Fund performance is measured. She holds an MBA in finance from Rutgers University and a Bachelor of Arts Degree in Economics/Econometrics from Clark University. She has co-authored the article "A New Approach for Estimating the Equity Risk Premium for Public Utilities", co-authored with Frank J. Hanley and Richard A. Michelfelder, Ph.D. published *The Journal of Regulatory Economics* in December 2011.

Dylan W. D'Ascendis is Principal at AUS Consultants, located in Mt. Laurel, NJ. He is responsible for preparing fair rate of return studies for AUS Consultants' rate of return expert witnesses and assists in every aspect of the rate case procedural process. He is also a Certified Rate of Return Analyst (CRRA). Mr. D'Ascendis has testified before in rate cases in South Carolina and Pennsylvania relative to capital structure issues. Mr. D'Ascendis is the Editor of AUS Utility Reports and is responsible for the data collection and production of the AUS Monthly Utility Report, which provides comprehensive information on key ratios and industry rankings based upon financial statistics presented in the report for the electric, gas and water industries. He also assists in the calculation and production of the AGA Index, a market capitalization weighted index of the common stocks of the approximately 70 corporate members of the AGA. Mr. D'Ascendis also served as Research Assistant in the preparation of "New

Approach for Estimating the Cost of Common Equity Capital for Public Utilities" co-authored by AUS Consultants' colleagues Pauline M. Ahern, Frank J. Hanley and Richard A. Michelfelder, published in the *Journal of Regulatory Economics.* Mr. D'Ascendis is a member of the Society of Utility and Regulatory Financial Analysts and the National Association of Water Companies. He holds an M.B.A. in both Finance and International Business from Rutgers University and a Bachelor of Arts Degree in Economic History from the University of Pennsylvania.

Frank J. Hanley is a Principal of AUS Consultants located in Mt. Laurel, NJ. He joined the firm in 1971 as Vice President, was elected Senior Vice President in 1975, and President of the Utility Services Group in 1989. Mr. Hanley has testified on cost of capital and related financial issues in more than three hundred cases before thirty-three state regulatory commissions, the District of Columbia Public Service Commission, the Public Services Commission of the U.S. Virgin Islands, the Federal Energy Regulatory Commission, a U.S. District Court, a U.S. Bankruptcy Court and the U.S. Tax Court. He has represented a number of electric, natural gas distribution and transmission companies, oil pipeline companies, as well as steam heating, telephone, water and wastewater companies. Mr. Hanley is a graduate of Drexel University and is a Certified Rate of Return Analyst (CRRA). He is a member of the Society of Utility and Regulatory Financial Analysts. He is an Associate Member of the American Gas Association as well as a member of its Rate Committee; and an Associate Member of the Energy Association of Pennsylvania. Also, he is a member of the Executive Advisory Council of the Rutgers University School of Business at Camden as well as a member of the Advisory Council of New Mexico State University's Center for Public Utilities.

FINANCIAL QUARTERLY
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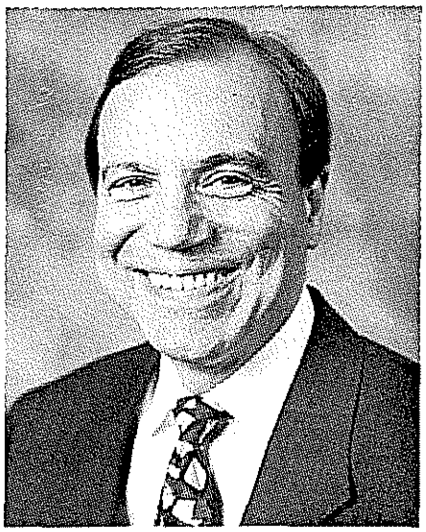
Comparable Earnings: New Life for an Old Precept

by
Frank J. Hanley
Pauline M. Ahern

Reprinted from the American Gas Association's *Financial Quarterly Review*
Summer 1994 edition, Arlington, Va.

Comparable Earnings: New Life for an Old Precept

Accelerating deregulation has greatly increased the investment risk of natural gas utilities. As a result, the authors believe it more appropriate than ever to employ the comparable earnings model. We believe our application of the model overcomes the greatest traditional objection to it — lack of comparability of the selected non-utility proxy firms. Our illustration focuses on a target gas pipeline company with a beta of 0.96 — almost equal to the market's beta of 1.00.



Frank J. Hanley is president of AUS Consultants — Utility Services Group. He has testified in several hundred rate proceedings on the subject of cost of capital before the Federal Energy Regulatory Commission and 27 state regulatory commissions. Before joining AUS in 1971, he was an assistant treasurer of a number of operating companies in the American Water Works System, as well as a financial planning officer with the Philadelphia National Bank. He is a Certified Rate of Return Analyst.

Pauline M. Ahern is a senior financial analyst with AUS Consultants — Utility Services Group. She has participated in many cost-of-capital studies. A former employee of the U.S. Department of the Treasury and the Federal Reserve Bank of Boston, she holds an MBA degree from Rutgers University and is a Certified Rate of Return Analyst.

Introduction

The comparable earnings model used to determine a common equity cost rate is deeply rooted in the standard of "corresponding risk" enunciated in the landmark *Bluefield* and *Hope* decisions of the U.S. Supreme Court.[1] With such solid grounding in the foundations of rate of return regulation, comparable earnings should be accepted as a principal model, along with the currently popular market-based models, provided that its most common criticism, non-comparability of the proxy companies, is overcome.

Our comparable earnings model overcomes the non-comparability issue of the non-utility firms selected as a proxy for the target utility, in this example, a gas pipeline company. We should note that in the absence of common stock prices for the target utility (as with a wholly-owned subsidiary), it is appropriate to use the average of a proxy group of similar risk gas pipeline companies whose common stocks are actively traded. As we will demonstrate, our selection process results in a group of domestic, non-utility firms that is comparable in total risk, the sum of business and financial risk, which reflects both non-diversifiable systematic, or market, risk as well as diversifiable unsystematic, or firm-specific, risk.

Embedded in the Landmark Decisions

As stated in *Bluefield* in 1922: "A public utility is entitled to such rates as will permit it to earn a return ... on investments in other business undertakings which are attended by corresponding risks and uncertainties ..."

In addition, the court stated in *Hope* in 1944: "By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks."

Thus, the "corresponding risk" precept of *Bluefield* and *Hope* predates the use of such market-based cost-of-equity models as the Discounted Cash Flow (DCF) and Capital Asset Pricing (CAPM), which were developed later and are currently popular in rate-base/rate-of-return regulation. Consequently, the comparable earnings model has a longer regulatory and judicial history. However, it has far greater relevance now than ever before in its history because significant deregulation has substantially increased natural gas utilities' investment risk to a level similar to that of non-utility firms. As a result, it is

Comparable Earnings *from page 4*

more important than ever to look to similar-risk non-utility firms for insight into common equity cost rate, especially in view of the deficiencies inherent in the currently popular market-based cost of common equity models, particularly the DCF model.

Despite the fact that the landmark decisions are still regarded as having set the standards for determining a fair rate of return, the comparable earnings model has experienced decreased usage by expert witnesses, as well as less regulatory acceptance over the years. We believe the decline in the popularity of the comparable earnings model, in large measure, is attributable to the difficulty of selecting non-utility proxy firms that regulators will accept as comparable to the target utility. Regulatory acceptance is difficult to gain when the selection process is arbitrary. Our application of the model is objective and consistent with fundamental financial tenets.

Principles of Comparable Earnings

Regulation is a substitute for the competition of the marketplace. Moreover, regulated public utilities compete in the capital markets with all firms, including unregulated non-utilities. The comparable earnings model is based upon the opportunity cost principle; i.e., that the true cost of an investment is the return that could have been earned on the next best available alternative investment of similar risk. Consequently, the comparable earnings model is consistent with regulatory and financial principles, as it is a surrogate for the competition of the marketplace, and investors seek the greatest available rate of return for bearing similar risk.

The selection of comparable firms is the most difficult step in applying the comparable earnings model, as noted by Phillips[2] as well as by Bonbright, Danielsen and Kamerschen.[3] The selection of non-utility proxy firms should result in a sufficiently broad-based group in order to minimize the effect of company-specific aberrations. However, if the selection process is arbitrary, it likely would result in a proxy group that is too broad-based, such as the Standard & Poor's 500 Composite Index or the Value Line Industrial Composite. The use of such groups would require subjective adjustments to the comparable earnings results to reflect risk differences between the group(s) and the target utility, a gas pipeline company in this example.

Authors' Selection Criteria

We base the selection of comparable non-utility firms on market-based, objective, quantitative measures of risk resulting from market prices that subsume investors' assessments of all elements of risk. Thus, our approach is based upon the principle of risk and return; namely, that firms of comparable risk should be expected to earn comparable returns. It is also consistent with the "corresponding risk" standard established in *Bluefield* and *Hope*. We measure total investment risk as the sum of non-diversifiable systematic and diversifiable unsystematic risk. We use the unadjusted beta as a measure of systematic risk and the standard error of the estimate (residual standard error) as a measure of unsystematic risk. Both the unadjusted beta and the residual standard error are derived from a regression of the target utility's security returns relative to the market's returns, which takes the general form:

$$r_{it} = a_i + b_i r_{mt} + e_{it}$$

where:

r_{it} = tth observation of the ith utility's rate of return

r_{mt} = tth observation of the market's rate of return

e_{it} = tth random error term

a_i = constant least-squares regression coefficient

b_i = least-squares regression slope coefficient, the unadjusted beta.

As shown by Francis,[4] the total variation or risk of a firm's return, Var (r_i), comes from two sources:

Var (r_i) = total risk of ith asset

= var$(a_i + b_i r_m + e)$ substituting $(a_i + b_i r_m + e)$ for r_i

= var$(b_i r_m)$ + var (e) since var$(a_i) = 0$

= b_i^2 var(r_m) + var (e) since var$(b_i r_m) = b_i^2$ var(r_m)

= systematic + unsystematic risk

Francis[5] also notes: "The term $\sigma^2(r_i|r_m)$ is called the *residual variance around the regression line* in statistical terms or *unsystematic risk* in capital market theory language. $\sigma^2(r_i|r_m) = \ldots$ = var (e). The residual variance is the squared standard error in regression language, a measure of unsystematic risk." Application of these criteria results in a group of non-utility firms whose average total investment risk is indeed comparable to that of the target gas pipeline.

As a measure of systematic risk, we use the Value Line unadjusted beta. Beta measures the extent to which market-wide or macro-economic events affect a firm's stock price. We use the unadjusted beta of the target utility as a starting point because it results from the regression of the target utility's security returns relative to the market's returns. Thus, the resulting standard deviation of beta relates to the unadjusted beta. We use the standard deviation of the unadjusted beta to determine the range around it as the selection criterion based on systematic risk.

We use the residual standard error of the regression as a measure of unsystematic risk. The residual standard error reflects the extent to which events specific to the firm's operations affect a firm's stock price. Thus, it is a measure of diversifiable, unsystematic, firm-specific risk.

An Illustration of Authors' Approach

Step One: We begin our approach by establishing the selection criteria as a range of both unadjusted beta and residual standard error of the target gas

continued on page 6

Comparable Earnings *from page 5*

pipeline company.

As shown in table 1, our target gas pipeline company has a Value Line unadjusted beta of 0.90, whose standard deviation is 0.1250. The selection criterion range of unadjusted beta is the unadjusted beta plus (+) and minus (-) three of its standard deviations. By using three standard deviations, 99.73 percent of the comparable unadjusted betas is captured.

Three standard deviations of the target utility's unadjusted beta equals 0.38 (0.1250 x 3 = 0.3750, rounded to 0.38). Consequently, the range of unadjusted betas to be used as a selection criteria is 0.52 - 1.28 (0.52 = 0.90 - 0.38) and (1.28 = 0.90 + 0.38).

Likewise, the selection criterion range of residual standard error equals the residual standard error plus (+) and minus (-) three of its standard deviations. The standard deviation of the residual standard error is defined as: $\sigma/\sqrt{2N}$.

As also shown in table 1, the target gas pipeline company has a residual standard error of 3.7867. According to the above formula, the standard deviation of the residual standard error would be 0.1664 ($0.1664 = 3.7867/\sqrt{2(259)} = 3.7867/22.7596$, where 259 = N, the number of weekly price change observations over a period of five years). Three standard deviations of the target utility's residual standard error would be 0.4992 (0.1664 x 3 = .4992). Consequently, the range of residual standard errors to be used as a selection criterion is 3.2875 - 4.2859 (3.2875 = 3.7867 - 0.4992) and (4.2859 = 3.7867 + 0.4992).

Step Two: The step one criteria are applied to Value Line's data base of nearly 4,000 firms for which Value Line derives unadjusted betas and residual standard errors on a weekly basis. All firms with unadjusted betas and residual standard errors within the criteria ranges are then selected.

Step Three: In the regulatory ratemaking environment, authorized common equity return rates are applied to a book-value rate base. Thus, the earnings rates on book common equity, or net worth, of competitive, non-utility firms are highly relevant provided those firms are indeed comparable in total risk to the target gas pipeline. The use of the return rates of other utilities has no relevance because their allowed, and hence subsequently achieved, earnings rates are dependent upon the regulatory

table 1

Summary of the Comparable Earnings Analysis for the Proxy Group of 248 Non-Utility Companies Comparable in Total Risk to the Target Gas Pipeline Company[1]

	1	2	3	4	5	6	7	8
			residual	rate of return on net worth				
	adj. beta	unadj. beta	standard error	3-year average[2]	4-year average[2]	5-year average[2]	5-year projected[3]	
average for the proxy group of 248 non-utility companies comparable in total risk to the target gas pipeline company	0.97	0.92	3.7705					
target gas pipeline company	0.96	0.90[4]	3.7867					
median				11.7%	12.0%	12.6%	15.5%	
average of the median historical returns					12.1%			
conclusion[5]								13.8%

[1]The criteria for selection of the non-utility group was that the non-utility companies be domestic and included in *Value Line Investment Survey*. The non-utility group was selected based on an unadjusted beta range of 0.52 to 1.28 and a residual standard error range of 3.2875 to 4.2859.
[2]Ending 1992.
[3]1996-1998/1997-1999.
[4]The average standard deviation of the target gas pipeline company's unadjusted beta is 0.1250.
[5]Equal weight given to both the average of the 3-, 4- and 5-year historical medians (12.1%) and 5-year projected median rate of return on net worth (15.5%). Thus, 13.8% = (12.1% + 15.5% / 2).
Source: Value Line Inc., March 15, 1994
Value Line Investment Survey

Comparable Earnings *from page 6*

process. Consequently, we believe all utilities must be eliminated to avoid circularity. Moreover, we believe non-domestic firms must be eliminated because their reporting methods differ significantly from U.S. firms.

Step Four: We then eliminated those firms for which Value Line does not publish a "Ratings & Report" in *Value Line Investment Survey* so that the historical and projected returns on net worth[6] are from a consistent source. We use historical returns on net worth for the most recent five years, as well as those projected three to five years into the future. We believe it is logical to evaluate both historical and projected return rates because it is reasonable to assume that investors avail themselves of both when they are available from widely disseminated information services, such as Value Line Inc. The use of Value Line's return rates on net worth understates the common equity return rates for two reasons. First, preferred stock is included in net worth. Second, the net worth return rates are as of the end of each period. Thus, the use of average common equity return rates would yield higher results.

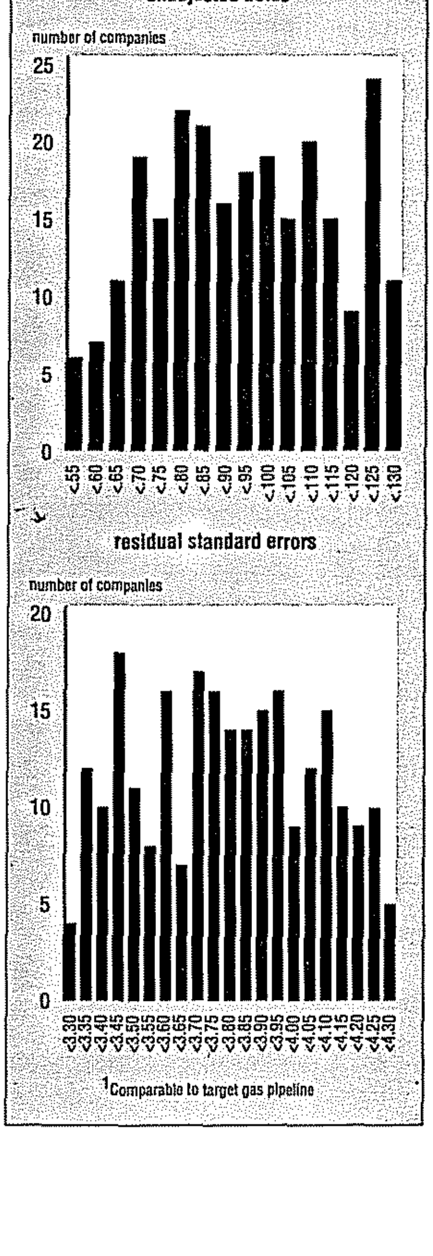
Step Five: Median returns based on the historical average three, four and five years ending 1992 and projected 1996-1998 or 1997-1999 rates of return on net worth are then determined as shown in columns 4 through 7 of table 1. The median is used due to the wide variations and skewness in rates of return on net worth for the non-utility firms as evidenced by the frequency distributions of those returns as shown in illustration 1.

However, we show the average unadjusted beta, 0.92, and residual standard error, 3.7705, for the proxy group in columns 2 and 3 of table 1 because their frequency distributions are not significantly skewed, as shown in illustration 2.

Step Six: Our conclusion of a com-

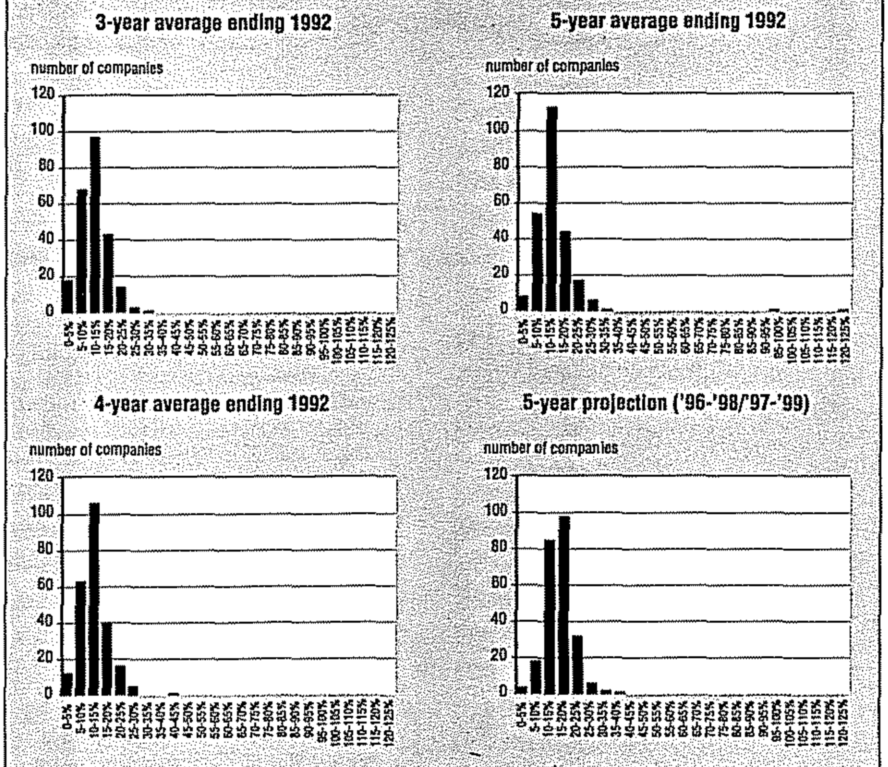
continued on page 8

Illustration 2
Unadjusted Betas and Residual Standard Errors for the Proxy Group of 248 Non-Utility Companies[1]



[1]Comparable to target gas pipeline

Illustration 1
Rates of Return on Net Worth for the Proxy Group of 248 Non-Utility Companies[1]



[1]Comparable to target gas pipeline

Comparable Earnings *from page 7*

parable earnings cost rate is based upon the mid-point of the average of the median three-, four- and five-year historical rates of return on net worth of 12.1 percent as shown in column 5 and the median projected 1996-1998/1997-1999 rate of return on net worth of 15.5 percent as shown in column 7 of table 1. As shown in column 8, it is 13.8 percent.

Summary

Our comparable earnings approach demonstrates that it is possible to select a proxy group of non-utility firms that is comparable in total risk to a target utility. In our example, the 13.8 percent comparable earnings cost rate is very conservative as it is an expected achieved rate on book common equity (a regulatory allowed rate should be greater) and because it is based on end-of-period net worth. A similar rate on average net worth would be about 20 to 40 basis points higher (i.e., 14.0 to 14.2 percent) and still understate the appropriate regulatory allowed rate of return on book common equity.

Our selection criteria are based upon measures of systematic and unsystematic risk, specifically unadjusted beta and residual standard error. They provide the basis for the objective selection of comparable non-utility firms. Our selection criteria rely on changes in market prices over approximately five years. We compare the aggregate total risk, or the sum of systematic and unsystematic risk, which reflects investors' aggregate assessment of both business and financial risk. Thus, no adjustments are necessary to the proxy group results to compensate for the differences in business risk and financial risk, such as accounting practices and debt/equity ratios. Moreover, it is inappropriate to attempt a comparison of the target utility with any individual firm, or subset of firms, in the proxy group because only the average firm of the group is relevant.

Because the comparable earnings model is firmly anchored in the "corresponding risk" precept established in the landmark court decisions, it is worthy of consideration as a principal model for use in estimating the cost rate of common equity capital of a regulated utility. Our approach to the comparable earnings model produces a proxy group that is indeed comparable in total risk because the selection process is objective and quantitative. It therefore overcomes criticism linked to arbitrary selection processes.

All cost-of-common-equity models, including the DCF and CAPM, are fraught with deficiencies, usually stemming from the many necessary but unrealistic assumptions that underlie them. The effects of the deficiencies of individual models can be mitigated by using more than one model when estimating a utility's common equity cost rate. Therefore, when the non-comparability issue is overcome, the comparable earnings model deserves to receive the same consideration as a primary model, as do the currently popular market-based models. ■

[1]*Bluefield Water Works Improvement Co. v. Public Service Commission*. 262 U.S. 679 (1922) and *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 519 (1944).
[2]Charles F. Phillips Jr., The Regulation of Public Utilities: Theory and Practice. Public Utilities Reports Inc., 1988, p. 379
[3]James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utilities Rates. 2nd edition. Public Utilities Reports Inc. 1988, p. 329
[4]Jack Clark Francis, Investments: Analysis and Management, 3rd edition. McGraw-Hill Book Co., 1980, p. 363
[5]Id., p. 548.
[6]Returns on net worth must be used when relying on Value Line data because returns on book common equity for non-utility firms are not available from Value Line

Report Lists Pipeline, Storage Projects

More than $9 billion worth of projects to expand the nation's natural gas pipeline network are in various stages of development, according to an A.G.A. report. These projects involve nearly 8,000 miles of new pipelines and capacity additions to existing lines and represent 15.3 billion cubic feet (Bcf) per day of new pipeline capacity.

During 1993 and early 1994, construction on 3,100 miles of pipeline was completed or under way, at a cost of nearly $4 billion, says A.G.A. These projects are adding 5.4 Bcf in daily delivery capacity nationwide.

Among the projects completed in 1993 were Pacific Gas Transmission Co.'s 805 miles of looping that allows increased deliveries of Canadian gas to the West Coast; Northwest Pipeline Corp.'s addition of 433 million cubic feet of daily capacity for customers in the Pacific Northwest and Rocky Mountain areas; and the 156-mile Empire State Pipeline in New York.

In addition, major construction projects were started on the systems of Texas Eastern Transmission Corp. and Algonquin Gas Transmission Co. — both subsidiaries of Panhandle Eastern Corp. — and along Florida Gas Transmission Co.'s pipeline.

The report goes on to discuss another $5 billion in proposed projects, which, if completed, will add nearly 5,000 miles of pipeline and 9.8 Bcf per day in capacity, much of it serving Florida and West Coast markets.

A.G.A. also identifies 47 storage projects and says that if all of them are built, existing storage capacity will increase by more than 500 Bcf, or 15 percent.

For a copy of *New Pipeline Construction: Status Report 1993-94* (#F00103), call A.G.A. at (703) 841-8490. Price per copy is $6 for employees of member companies and associates and $12 for other customers.

United Water Rhode Island, Inc.
Brief Summary of Common Equity Cost Rate

No.	Principal Methods	Proxy Group of Nine Water Companies
1.	Discounted Cash Flow Model (DCF) (1)	8.48 %
2.	Risk Premium Model (RPM) (2)	11.33
3.	Capital Asset Pricing Model (CAPM) (3)	9.36
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	10.67
5.	Indicated Common Equity Cost Rate before Adjustment for Business Risks	10.00 %
7	Business Risk Adjustment (5)	0.55
8.	Recommended Common Equity Cost Rate	10.55 %

Notes: (1) From page 2 of this Schedule.
(2) From page 12 of this Schedule.
(3) From page 22 of this Schedule.
(4) From page 24 of this Schedule.
(5) Business risk adjustment to reflect United Water Rhode Island, Inc.'s greater business risk due to its small size relative to the proxy group as detailed in Ms. Ahern's accompanying direct testimony.

United Water Rhode Island, Inc.
Indicated Common Equity Cost Rate Using the Discounted Cash Flow Model for
the Proxy Group of Nine Water Companies

	1	2	3	4	5	6	7	8
Proxy Group of Nine Water Companies	Average Dividend Yield (1)	Value Line Projected Five Year Growth in EPS (2)	Reuters Mean Consensus Projected Five Year Growth Rate in EPS	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth in EPS (3)	Adjusted Dividend Yield (4)	Indicated Common Equity Cost Rate (5)
American States Water Co.	2.87 %	7.00 %	1.00 %	2.00 %	1.00 %	2.75 %	2.91 %	5.66 %
American Water Works Co., Inc.	2.69	8.50	8.90	7.20	6.90	7.88	2.80	10.68
Aqua America, Inc.	2.56	10.00	7.40	5.60	5.80	7.20	2.65	9.85
Artesian Resources Corp.	3.64	NA	NA	NA	4.00	4.00	3.71	7.71
California Water Service Group	2.84	7.00	NA	6.00	6.00	6.33	2.93	9.26
Connecticut Water Service, Inc.	2.90	6.50	NA	5.00	5.00	5.50	2.98	8.48
Middlesex Water Company	3.61	4.00	NA	NA	2.70	3.35	3.67	7.02
SJW Corporation	2.57	7.50	NA	NA	14.00	10.75	2.71	13.46
York Water Company	2.66	6.50	NA	NA	4.90	5.70	2.74	8.44
Average								8.95 %
Median								8.48 %

NA= Not Available
NMF = Not Meaningful Figure

Notes:
(1) Indicated dividend at 02/04/2014 divided by the average closing price of the last 60 trading days ending 02/04/2014 for each company.
(2) From pages 3 through 11 of this Schedule.
(3) Average of columns 2 through 5 excluding negative growth rates.
(4) This reflects a growth rate component equal to one-half the conclusion of growth rate (from column 6) x column 1 to reflect the periodic payment of dividends (Gordon Model) as opposed to the continuous payment. Thus, for American States Water Co. , 2.87% x (1+(1/2 x 2.75%)) = 2.91%.
(5) Column 6 + column 7.

Source of Information:
Value Line Investment Survey
www.reuters.com Downloaded on 02/05/2014
www.zacks.com Downloaded on 02/05/2014
www.yahoo.com Downloaded on 02/05/2014

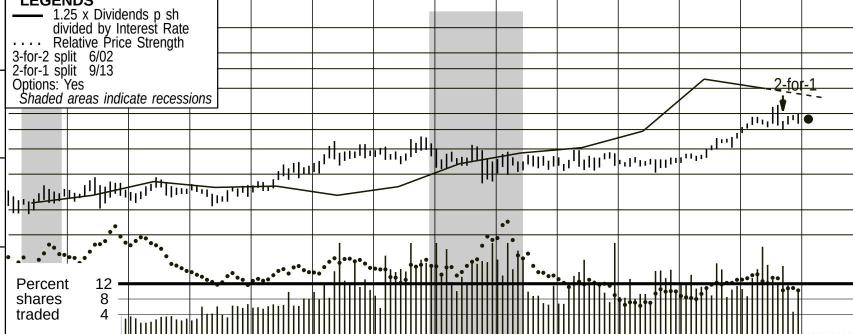
AMER. STATES WATER NYSE-AWR

RECENT PRICE **28.15** | P/E RATIO **18.5** (Trailing: 17.9 / Median: 22.0) | RELATIVE P/E RATIO **0.99** | DIV'D YLD **3.1%** | VALUE LINE

TIMELINESS 3 Lowered 8/16/13
SAFETY 2 Raised 7/20/12
TECHNICAL 1 Raised 1/10/14
BETA .65 (1.00 = Market)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
High:	14.5	14.5	13.4	17.3	21.9	23.1	21.0	19.4	19.8	18.2	24.1	33.1
Low:	10.1	10.8	10.4	12.2	15.1	16.8	13.5	14.9	15.6	15.3	17.0	24.0

LEGENDS
—— 1.25 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-2 split 6/02
2-for-1 split 9/13
Options: Yes
Shaded areas indicate recessions



Target Price Range
2016 | 2017 | 2018
80
60
50
40
30
25
20
15
10
7.5

2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	40	(+40%)	12%
Low	30	(+5%)	5%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	2	1	0	0	1	0
Options	0	0	1	4	4	0	0	0	0
to Sell	0	0	0	5	5	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	93	98	72
to Sell	59	70	90
Hld's(000)	24964	24268	23953

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	23.0	38.4
3 yr.	82.5	52.8
5 yr.	102.2	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
5.72	5.51	6.45	6.08	6.53	6.89	6.99	6.81	7.03	7.88	8.75	9.21	9.74	10.71	11.12	12.12	12.20	12.50	Revenues per sh	13.50
.92	1.02	1.13	1.10	1.26	1.27	1.04	1.11	1.32	1.45	1.65	1.69	1.70	2.11	2.13	2.48	2.50	2.65	"Cash Flow" per sh	2.95
.52	.54	.60	.64	.67	.67	.39	.53	.66	.67	.81	.78	.81	1.11	1.12	1.41	1.55	1.60	Earnings per sh A	1.80
.42	.42	.43	.43	.43	.44	.44	.44	.45	.46	.48	.50	.51	.52	.55	.64	.76	.84	Div'd Decl'd per sh B■	1.00
1.29	1.56	2.15	1.51	1.59	1.34	1.88	2.51	2.12	1.95	1.45	2.23	2.09	2.12	2.13	1.77	2.30	2.25	Cap'l Spending per sh	2.50
5.62	5.74	5.91	6.37	6.61	7.02	6.98	7.51	7.86	8.32	8.77	8.97	9.70	10.13	10.84	11.80	12.55	13.25	Book Value per sh	16.25
26.87	26.87	26.87	30.24	30.24	30.36	30.42	33.50	33.60	34.10	34.46	34.60	37.06	37.26	37.70	38.53	39.00	40.00	Common Shs Outst'g C	43.00
14.5	15.5	17.1	15.9	16.7	18.3	31.9	23.2	21.9	27.7	24.0	22.6	21.2	15.7	15.4	14.3	18.4		Avg Ann'l P/E Ratio	19.5
.84	.81	.97	1.03	.86	1.00	1.82	1.23	1.17	1.50	1.27	1.36	1.41	1.00	.97	.91	1.03		Relative P/E Ratio	1.30
5.5%	5.0%	4.2%	4.2%	3.9%	3.6%	3.5%	3.6%	3.1%	2.5%	2.5%	2.9%	2.9%	3.0%	3.2%	3.1%	2.7%		Avg Ann'l Div'd Yield	3.1%

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
212.7	228.0	236.2	268.6	301.4	318.7	361.0	398.9	419.3	466.9	475	500	Revenues ($mill)	580
11.9	16.5	22.5	23.1	28.0	26.8	29.5	41.4	42.0	54.1	59.0	63.0	Net Profit ($mill)	77.0
43.5%	37.4%	47.0%	40.5%	42.6%	37.8%	38.9%	43.2%	41.7%	39.9%	38.0%	40.0%	Income Tax Rate	40.0%
--	--	--	12.2%	8.5%	6.9%	3.2%	5.8%	2.0%	2.5%	2.5%	2.5%	AFUDC % to Net Profit	2.5%
52.0%	47.7%	50.4%	48.6%	46.9%	46.2%	45.9%	44.3%	45.4%	42.2%	40.5%	40.0%	Long-Term Debt Ratio	41.0%
48.0%	52.3%	49.6%	51.4%	53.1%	53.8%	54.1%	55.7%	54.6%	57.8%	59.5%	60.0%	Common Equity Ratio	59.0%
442.3	480.4	532.5	551.6	569.4	577.0	665.0	677.4	749.1	787.0	825	880	Total Capital ($mill)	1200
602.3	664.2	713.2	750.6	776.4	825.3	866.4	855.0	896.5	917.8	975	1000	Net Plant ($mill)	1100
4.6%	5.2%	5.4%	6.0%	6.7%	6.4%	5.9%	7.6%	7.1%	8.3%	8.0%	8.0%	Return on Total Cap'l	7.5%
5.6%	6.6%	8.5%	8.1%	9.3%	8.6%	8.2%	11.0%	10.3%	11.9%	12.0%	12.5%	Return on Shr. Equity	11.5%
5.6%	6.6%	8.5%	8.1%	9.3%	8.6%	8.2%	11.0%	10.3%	11.9%	12.0%	12.5%	Return on Com Equity	11.5%
NMF	1.0%	2.8%	2.7%	3.9%	3.1%	3.2%	5.8%	5.3%	6.6%	6.0%	6.0%	Retained to Com Eq	5.0%
113%	84%	67%	67%	58%	64%	61%	47%	49%	45%	49%	53%	All Div'ds to Net Prof	56%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $335.5 mill. **Due in 5 Yrs** $10.6 mill.
LT Debt $332.1 mill. **LT Interest** $16.0 mill.
(LT interest earned: 5.2x: total interest coverage: 4.9x) (41% of Cap'l)
Leases, Uncapitalized: Annual rentals $3.0 mill.
Pension Assets-12/12 $107.6 mill. **Oblig.** $163.2 mill.
Pfd Stock None.

Common Stock 38,717,549 shs. **as of 11/1/13**

MARKET CAP: $1.1 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	1.3	23.5	26.2
Other	164.3	160.5	176.4
Current Assets	165.6	184.0	202.6
Accts Payable	37.9	40.6	62.9
Debt Due	.3	3.3	3.4
Other	66.2	49.8	49.4
Current Liab.	104.4	93.7	115.7
Fix. Chg. Cov.	401%	442%	450%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	5.5%	7.5%	3.0%
"Cash Flow"	6.5%	9.0%	4.5%
Earnings	6.5%	11.5%	7.0%
Dividends	3.0%	4.5%	10.0%
Book Value	5.0%	5.5%	7.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	88.4	95.5	111.3	103.7	398.9
2011	94.3	109.8	119.9	95.3	419.3
2012	107.6	114.3	133.5	111.5	466.9
2013	110.5	120.7	130.9	112.9	475
2014	115	125	140	120	500

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.23	.24	.31	.33	1.11
2011	.19	.34	.42	.17	1.12
2012	.27	.40	.49	.26	1.41
2013	.35	.43	.53	.24	1.55
2014	.33	.42	.55	.30	1.60

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.13	.13	.13	.13	.52
2011	.13	.14	.14	.14	.55
2012	.14	.14	.1775	.1775	.64
2013	.1775	.1775	.2025	.2025	.76
2014					

BUSINESS: American States Water Co. operates as a holding company. Through its principal subsidiary, Golden State Water Company, it supplies water to more than 250,000 customers in 75 communities in 10 counties. Service areas include the greater metropolitan areas of Los Angeles and Orange Counties. The company also provides electric utility services to nearly 23,250 customers in the city of Big Bear Lake and in areas of San Bernardino County. Sold Chaparral City Water of Arizona (6/11). Has 728 employees. Officers & directors own 2.9% of common stock (4/12 Proxy). Chairman: Lloyd Ross. President & CEO: Robert J. Sprowls. Inc: CA. Addr: 630 East Foothill Boulevard, San Dimas, CA 91773. Tel: 909-394-3600. Internet: www.aswater.com.

American States Water's core water utility business probably just completed a highly profitable 2013. Through the September quarter, Golden Gate Water's contribution to share net rose a whopping 28%. This occurred despite higher administrative and purchased water costs and a smaller contribution from the company's nonutility business. These expenses were more than offset by increased revenue resulting from the implementation of higher rates.

We are relatively bullish on American States' nonutility business. The company runs the water systems at nine U.S. military bases through its ASUS subsidiary. There is ongoing debate on Wall Street regarding the future growth in this sector. Some feel that the company's earnings peaked in 2012 when they contributed almost $0.40 a share to the bottom line. We are on the other side of this argument. American States' long experience in running these operations will enable it to win more bids from army bases through 2016-2018, in our opinion. Currently, the utility is involved in the bidding for 10 installations that are looking to outsource these operations. Indeed, annual profits from this sector could grow to as high as $0.50 a share over the next three- to five-year period.

Finances are healthy. Internally generated funds should be sufficient to cover American States' construction budget for the foreseeable future. As a result, we think that the strong equity-to-total capital ratio should remain at a very solid 57%. Reflecting this is the company's Financial Strength rating of an A, the highest grade of any water utility.

The company's long-term dividend growth prospects are robust as well. The equity's yield is close to the norm for the water utility group. However, its dividend growth prospects of 9% through 2016-2018 are significantly above the industry average. Thus, investors currently don't have to pay as high a premium for the stock as they had to in the past. And, while the nonutility operations have lowered the company's earnings predictability compared to its peers, we think the stock is still attractive on a risk-return basis.

James A. Flood *January 17, 2014*

(A) Primary earnings. Excludes nonrecurring gains/(losses): '04, 7¢; '05, 13¢; '06, 3¢; '08, (14¢); '10, (23¢) '11, 10¢. Next earnings report due early February. Quarterly egs. may not add due to rounding.
(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for splits.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	75
Earnings Predictability	90

AMERICAN WATER NYSE-AWK

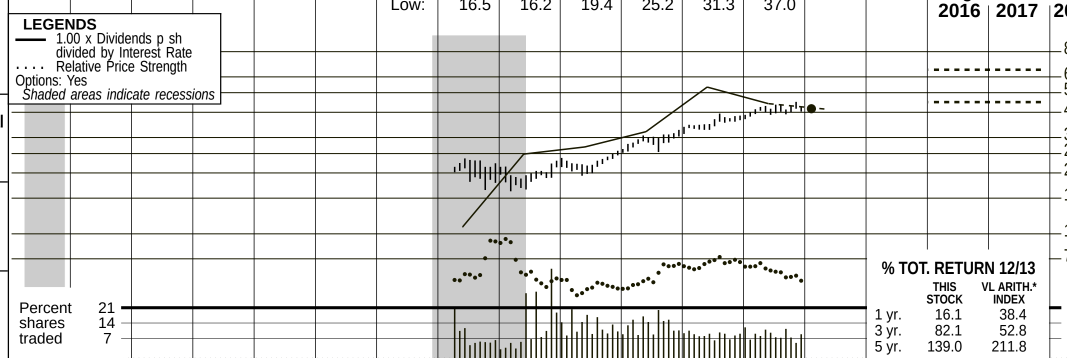
RECENT PRICE	P/E RATIO	(Trailing / Median)	RELATIVE P/E RATIO	DIV'D YLD
41.71	18.1	(Trailing: 20.5 Median: NMF)	0.97	2.8%

VALUE LINE

TIMELINESS 3 Raised 10/4/13
SAFETY 3 New 7/25/08
TECHNICAL 3 Lowered 8/9/13
BETA .65 (1.00 = Market)

	2008	2009	2010	2011	2012	2013
High:	23.7	23.0	25.8	32.8	39.4	45.1
Low:	16.5	16.2	19.4	25.2	31.3	37.0

Target Price Range
2016 | 2017 | 2018



2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	65	(+55%)	17%
Low	45	(+10%)	5%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	0	0	0	0	0
Options	0	8	0	3	0	0	0	0	0
to Sell	0	8	0	3	0	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	191	165	197
to Sell	186	209	176
Hld's(000)	145912	144834	144172

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	16.1	38.4
3 yr.	82.1	52.8
5 yr.	139.0	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006E	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
- -	- -	- -	- -	- -	- -	- -	- -	- -	13.08	13.84	14.61	13.98	15.49	15.18	16.25	16.15	17.20	Revenues per sh	20.00
- -	- -	- -	- -	- -	- -	- -	- -	- -	.65	d.47	2.87	2.89	3.56	3.73	4.27	4.45	4.70	"Cash Flow" per sh	5.25
- -	- -	- -	- -	- -	- -	- -	- -	- -	d.97	d2.14	1.10	1.25	1.53	1.72	2.11	2.20	2.40	Earnings per sh A	2.90
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	.40	.82	.86	.91	.96	1.06	1.20	Div'd Decl'd per sh B■	1.40
- -	- -	- -	- -	- -	- -	- -	- -	- -	4.31	4.74	6.31	4.50	4.38	5.27	5.25	5.15	5.50	Cap'l Spending per sh	5.50
- -	- -	- -	- -	- -	- -	- -	- -	- -	23.86	28.39	25.64	22.91	23.59	24.11	25.10	26.15	27.50	Book Value per sh D	31.85
- -	- -	- -	- -	- -	- -	- -	- -	- -	160.00	160.00	160.00	174.63	175.00	175.66	176.99	178.50	180.00	Common Shs Outst'g C	185.00
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	18.9	15.6	14.6	16.8	16.7	18.6		Avg Ann'l P/E Ratio	18.5
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1.14	1.04	.93	1.05	1.07	1.04		Relative P/E Ratio	1.25
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1.9%	4.2%	3.8%	3.1%	2.7%	2.6%		Avg Ann'l Div'd Yield	2.7%

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
- -	- -	- -	2093.1	2214.2	2336.9	2440.7	2710.7	2666.2	2876.9	2885	3100	Revenues ($mill)	3700
- -	- -	- -	d155.8	d342.3	187.2	209.9	267.8	304.9	375.0	390	430	Net Profit ($mill)	535
- -	- -	- -	- -	- -	37.4%	37.9%	40.4%	39.5%	40.7%	38.5%	38.0%	Income Tax Rate	38.0%
- -	- -	- -	- -	- -	- -	- -	- -	12.5%	6.2%	4.0%	8.0%	AFUDC % to Net Profit	8.0%
- -	- -	- -	56.1%	50.9%	53.1%	56.9%	56.8%	55.7%	53.8%	52.5%	52.0%	Long-Term Debt Ratio	51.5%
- -	- -	- -	43.9%	49.1%	46.9%	43.1%	43.2%	44.2%	46.0%	47.5%	48.0%	Common Equity Ratio	48.5%
- -	- -	- -	8692.8	9245.7	8750.2	9289.0	9561.3	9580.3	9652.7	9880	10400	Total Capital ($mill)	12200
- -	- -	- -	8720.6	9318.0	9991.8	10524	11059	11021	11739	12250	12750	Net Plant ($mill)	13550
- -	- -	- -	NMF	NMF	3.7%	3.8%	4.4%	4.8%	5.5%	5.5%	5.5%	Return on Total Cap'l	6.0%
- -	- -	- -	NMF	NMF	4.6%	5.2%	6.5%	7.2%	8.4%	8.5%	8.5%	Return on Shr. Equity	9.0%
- -	- -	- -	NMF	NMF	4.6%	5.2%	6.5%	7.2%	8.4%	8.3%	8.5%	Return on Com Equity	9.0%
- -	- -	- -	NMF	NMF	3.0%	1.8%	2.8%	3.5%	4.6%	4.5%	4.5%	Retained to Com Eq	4.5%
- -	- -	- -	- -	- -	34%	65%	56%	52%	45%	48%	50%	All Div'ds to Net Prof	48%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $5677.2 mil. **Due in 5 Yrs** $1034.0 mil.
LT Debt $5174.1 mil. **LT Interest** $301.0 mil.
(Total interest coverage: 4.4x) (53% of Cap'l)

Leases, Uncapitalized: Annual rentals $28.1 mill.
Pension Assets $1157.7 mill
Oblig. $1621.2 mill.
Pfd Stock $17.6 mill. **Pfd Div'd** $.7 mill

Common Stock 178,274,197 shs.
as of 10/31/13

MARKET CAP: $7.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	14.2	24.4	32.4
Other	1383.5	475.0	580.8
Current Assets	1397.7	499.4	613.2
Accts Payable	243.7	279.6	209.8
Debt Due	543.9	385.9	503.1
Other	701.5	329.3	428.6
Current Liab.	1489.1	994.8	1141.5
Fix. Chg. Cov.	256%	292%	300%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	- -	3.0%	4.0%
"Cash Flow"	- -	NMF	5.5%
Earnings	- -	- -	8.5%
Dividends	- -	- -	7.5%
Book Value	- -	-1.5%	4.5%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	588.1	671.2	786.9	664.5	2710.7
2011	596.7	668.8	760.9	639.8	2666.2
2012	618.7	745.6	831.8	680.8	2876.9
2013	636.1	724.3	829.2	695.4	2885
2014	675	775	900	750	3100

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.18	.42	.71	.23	1.53
2011	.23	.42	.73	.32	1.72
2012	.28	.66	.87	.30	2.11
2013	.32	.57	.84	.47	2.20
2014	.35	.65	1.00	.40	2.40

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.21	.21	.22	.22	.86
2011	.22	.23	.23	.23	.91
2012	.23	.23	.25	.25	.96
2013	.25	.25	.28	.28	1.06
2014					

BUSINESS: American Water Works Company, Inc. is the largest investor-owned water and wastewater utility in the U.S., providing services to over 14 million people in over 30 states and Canada. It's nonregulated business assists municipalities and military bases with the maintenance and upkeep as well. Regulated operations made up 89.1% of 2012 revenues. New Jersey is its biggest market accounting for 22.2% of revenues. Has roughly 7,000 employees. Depreciation rate, 2.6% in '12. BlackRock, Inc., owns 10.3% of the common stock outstanding. Off. & dir. own less than 1% (3/13 Proxy). President & CEO; Jeffry Sterba. Chairman; George Mackenzie. Address: 1025 Laurel Oak Road, Voorhees, NJ 08043. Telephone: 856-346-8200. Internet: www.amwater.com.

American Water Works dwarfs most of its peers. The company is larger by a wide margin than any of the other investor-owned utilities included in the industry group followed by *Value Line*. Indeed, the utility alone accounts for approximately 50% of the entire industry when measured by market capitalization.

Size matters in the water utility business. Currently, the market is made up of tens of thousands of small water utilities run by local municipalities. Due to financial pressures, most of these systems have not been properly maintained and are in dire need of modernization. Thus, it is more advantageous for these smaller entities to sell their operations to concerns that have both the financial wherewithal and managerial experience required to address the problems. American Water has added almost 20 new acquisitions over each of the past two years.

A decent amount of American Water's profit growth comes from the successful integration of acquisitions. With its large infrastructure, the company has consistently been able to reduce costs and squeeze efficiencies out of its purchases. For example, American Water has reduced its expense ratios from 42% in 2011 to close to 40% today. The company goal is to reduce this figure to 35% over the next five year period.

Excellent cost controls help American Water maintain good relationships with regulators. All utilities are exposed to the risk of harsh treatment by state authorities. By managing expenses so rigorously, the company has been able to considerably reduce the chance of this happening.

American Water offers good value vis-a-vis other water utilities. Historically, water stocks with above-average dividend growth prospects have much lower current yields than similar water stocks with sub-par dividend potential. (This is the premium that investors must pay for greater future cash flows.) In the recent past, the yield spreads between the high-and low-quality stocks has narrowed considerably. Thus, this is a good time to take positions in industry leaders such as American Water because they are cheap on a relative value basis.

James A. Flood *January 17, 2014*

(A) Diluted earnings. Excludes nonrecurring losses: '08, $4.62; '09, $2.63; '11, $0.07. Discontinued operations: '06, (4¢); '11, 3¢; '12, (10¢). Next earnings report due early February. Quarterly earnings may not sum due to rounding. (B) Dividends paid in March, June, September, and December. ■ Div. reinvestment available. (C) In millions. (D) Includes intangibles. In 2012: $1.207 billion, $6.82/share. (E) Pro forma numbers for '06 & '07.

Company's Financial Strength	B+
Stock's Price Stability	95
Price Growth Persistence	75
Earnings Predictability	20

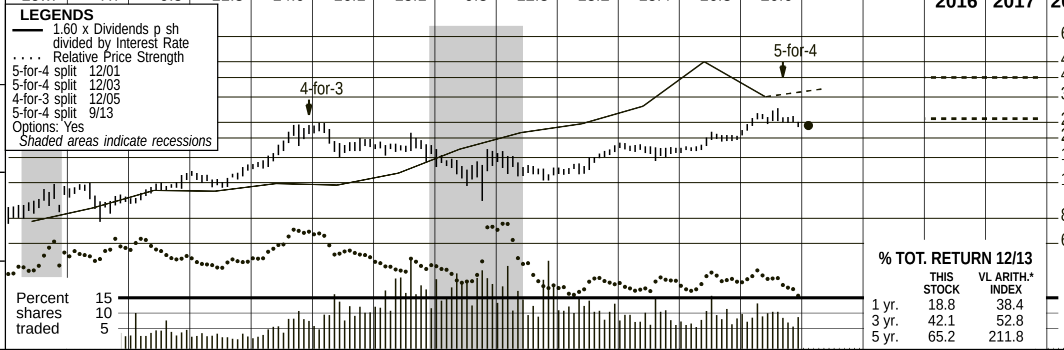
AQUA AMERICA NYSE-WTR

RECENT PRICE 23.09 | P/E RATIO 19.9 (Trailing: 20.6 Median: 24.0) | RELATIVE P/E RATIO 1.07 | DIV'D YLD 2.8% | VALUE LINE

TIMELINESS 3 Lowered 5/24/13
SAFETY 2 Raised 4/20/12
TECHNICAL 3 Raised 12/27/13
BETA .60 (1.00 = Market)

High:	12.0	13.4	14.8	23.4	23.8	21.3	17.6	17.2	18.4	19.0	21.5	28.1
Low:	7.7	9.5	11.3	14.0	16.1	15.1	9.8	12.3	13.2	15.4	16.8	20.6

LEGENDS
— 1.60 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
5-for-4 split 12/01
5-for-4 split 12/03
4-for-3 split 12/05
5-for-4 split 9/13
Options: Yes
Shaded areas indicate recessions



Target Price Range 2016 | 2017 | 2018

2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	40	(+75%)	17%
Low	25	(+10%)	5%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	0	0	0	0	0
Options	2	2	0	0	1	3	2	1	1
to Sell	0	0	0	0	2	0	0	1	1

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	136	141	153
to Sell	116	130	154
Hld's(000)	82403	82501	85173

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	18.8	38.4
3 yr.	42.1	52.8
5 yr.	65.2	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
1.61	1.67	1.93	1.97	2.16	2.28	2.38	2.78	3.08	3.23	3.61	3.71	3.93	4.21	4.10	4.32	4.55	4.60	Revenues per sh	4.95
.45	.49	.58	.61	.69	.76	.77	.87	.97	1.01	1.10	1.14	1.29	1.42	1.45	1.51	1.85	1.95	"Cash Flow" per sh	1.85
.27	.32	.33	.37	.41	.43	.46	.51	.57	.56	.57	.58	.62	.72	.83	.87	1.15	1.25	Earnings per sh A	1.45
.19	.20	.22	.23	.24	.26	.28	.29	.32	.35	.38	.41	.44	.47	.50	.54	.58	.64	Div'd Decl'd per sh B■	.86
.46	.65	.72	.93	.87	.96	1.06	1.23	1.47	1.64	1.43	1.58	1.66	1.89	1.90	1.98	1.90	1.90	Cap'l Spending per sh	2.15
2.27	2.57	2.74	3.08	3.32	3.49	4.27	4.71	5.04	5.57	5.85	6.26	6.50	6.81	7.21	7.90	8.60	9.45	Book Value per sh	11.50
84.33	90.25	133.50	139.78	142.47	141.49	154.31	158.97	161.21	165.41	166.75	169.21	170.61	172.46	173.60	175.43	177.00	179.50	Common Shs Outst'g C	184.00
17.8	22.5	21.2	18.2	23.6	23.6	24.5	25.1	31.8	34.7	32.0	24.9	23.1	21.1	21.3	21.9	21.4		Avg Ann'l P/E Ratio	22.5
1.03	1.17	1.21	1.18	1.21	1.29	1.40	1.33	1.69	1.87	1.70	1.50	1.54	1.34	1.34	1.40	1.20		Relative P/E Ratio	1.50
3.9%	2.9%	3.0%	3.3%	2.5%	2.5%	2.5%	2.3%	1.8%	1.8%	2.1%	2.8%	3.1%	3.1%	2.8%	2.8%	2.4%		Avg Ann'l Div'd Yield	2.6%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $1630.5 mill. **Due in 5 Yrs** $368.3 mill.
LT Debt $1439.3 mill. **LT Interest** $60.0 mill.
(LT interest earned: 5.0x; total interest coverage: 4.1x) (51% of Cap'l)
Pension Assets-12/12 $190.1 mill. **Oblig.** $303.1 mill.
Pfd Stock None
Common Stock 176,709,658 shares as of 10/24/13

MARKET CAP: $4.1 billion (Mid Cap)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
367.2	442.0	496.8	533.5	602.5	627.0	670.5	726.1	712.0	757.8	770	825	Revenues ($mill)	915
67.3	80.0	91.2	92.0	95.0	97.9	104.4	124.0	144.8	153.1	200	225	Net Profit ($mill)	265
39.3%	39.4%	38.4%	39.6%	38.9%	39.7%	39.4%	39.2%	32.9%	39.0%	22.0%	40.0%	Income Tax Rate	40.0%
--	--	--	--	--	--	--	--	2.9%	3.1%	1.5%	2.0%	AFUDC % to Net Profit	2.0%
51.4%	50.0%	52.0%	51.6%	55.4%	54.1%	55.6%	56.6%	52.7%	52.7%	51.0%	51.0%	Long-Term Debt Ratio	50.0%
48.6%	50.0%	48.0%	48.4%	44.6%	45.9%	44.4%	43.4%	47.3%	47.3%	49.0%	49.0%	Common Equity Ratio	50.0%
1355.7	1497.3	1690.4	1904.4	2191.4	2306.6	2495.5	2706.2	2646.8	2929.7	2975	3350	Total Capital ($mill)	4230
1824.3	2069.8	2280.0	2506.0	2792.8	2997.4	3227.3	3469.3	3612.9	3936.2	4150	4350	Net Plant ($mill)	4900
6.4%	6.7%	6.9%	6.4%	5.9%	5.7%	5.6%	5.9%	6.9%	6.6%	7.0%	6.0%	Return on Total Cap'l	6.5%
10.2%	10.7%	11.2%	10.0%	9.7%	9.3%	9.4%	10.6%	11.6%	11.0%	13.0%	13.0%	Return on Shr. Equity	12.5%
10.2%	10.7%	11.2%	10.0%	9.7%	9.3%	9.4%	10.6%	11.6%	11.0%	13.0%	13.0%	Return on Com Equity	12.5%
4.2%	4.6%	4.9%	3.7%	3.2%	2.8%	2.7%	3.7%	4.6%	4.3%	6.5%	6.0%	Retained to Com Eq	5.0%
59%	57%	56%	63%	67%	70%	72%	65%	60%	61%	50%	51%	All Div'ds to Net Prof	59%

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	8.2	5.5	6.4
Receivables	81.1	92.9	98.3
Inventory (AvgCst)	11.2	11.8	12.4
Other	220.0	150.7	94.5
Current Assets	320.5	260.9	211.6
Accts Payable	68.3	55.5	41.4
Debt Due	80.4	125.4	191.2
Other	277.0	93.3	85.7
Current Liab.	425.7	274.2	318.3
Fix. Chg. Cov.	367%	398%	398%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	8.0%	7.5%	2.5%
"Cash Flow"	8.5%	8.0%	4.0%
Earnings	6.5%	4.5%	10.0%
Dividends	7.5%	8.0%	9.5%
Book Value	9.0%	7.0%	8.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	160.5	178.5	207.8	179.3	726.1
2011	163.6	178.3	197.3	172.7	712.0
2012	164.0	191.7	214.6	187.5	757.8
2013	180.0	195.7	204.3	190	770
2014	190	215	225	200	830

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.13	.18	.26	.15	.72
2011	.18	.22	.24	.19	.83
2012	.15	.24	.29	.19	.87
2013	.26	.30	.36	.23	1.15
2014	.25	.32	.40	.28	1.25

Cal-endar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.116	.116	.116	.124	.47
2011	.124	.124	.124	.132	.50
2012	.132	.132	.132	.14	.54
2013	.14	.14	.152	.152	.58
2014					

BUSINESS: Aqua America, Inc. is the holding company for water and wastewater utilities that serve approximately three million residents in Pennsylvania, Ohio, North Carolina, Illinois, Texas, New Jersey, Florida, Indiana, and five other states. Acquired AquaSource, 7/03; Consumers Water, 4/99; and others. Water supply revenues '12: residential, 60.5%; commercial, 16.1%; industrial & other, 23.4%. Officers and directors own 1.4% of the common stock; Blackrock, Inc, 6.3%; State Street Capital Corp., 5.7%; Vanguard Group 5.6% (4/13 Proxy). Chairman & Chief Executive Officer: Nicholas DeBenedictis. Incorporated: Pennsylvania. Address: 762 West Lancaster Avenue, Bryn Mawr, Pennsylvania 19010. Telephone: 610-525-1400. Internet: www.aquaamerica.com.

Aqua America has exited the Florida market. In five separate transactions, the utility sold off all of its operations in the Sunshine State for a total of $90 million. This will allow the company to focus its attention in the states where most of its assets are concentrated.

Growth through acquisition will remain a keystone of the company's strategy. Aqua purchased 13 utilities last year and 18 in 2012. We think that this number will actually increase in the years ahead. That's because the U.S. is populated with thousands of small municipally-owned water utilities. Because cities across the country are struggling financially, they are having trouble financing the costs of repairing their aging water infrastructures. Many are finding it easier to sell their operations to larger investor-owned companies that have the financial wherewithal to fund the needed capital expenditures. Moreover, Aqua can run the operations at a much lower cost using its management expertise and economies of scale.

Aqua will follow up a strong 2013 with a solid 2014, in our opinion. Aided by the use of a "repair tax deduction", we think the company posted a gain in share net of over 30% last year. More impressive perhaps, would be the utility's ability to top last year's exceptional gain by 9% this year. Most of this will be due to a combination of cost reductions and the implementation of higher rates implemented by state regulators.

Hydraulic fracking provides opportunities for Aqua's nonregulated earnings. This drilling technique requires copious amounts of water. Aqua has entered into a joint venture on a pipeline that will bring water directly to the wells, eliminating the need for thousands of trucks laden with water choking the street traffic in Pennsylvania. When fully up and running, we think that this can add about $0.10 a share to the bottom line.

Aqua stock is attractive compared to other water utilities. While the yield is marginally lower than the group average, this is more than offset by the equity's strong dividend growth prospects. Therefore, conservative, income-seeking investors might find these shares of interest.

James A. Flood *January 17, 2014*

(A) Diluted egs. Excl. nonrec. gains (losses): '99, (9¢); '00, 2¢; '01, 2¢; '02, 4¢; '03, 3¢; '12, 18¢. Excl. gain from disc. operations: '12, 7¢; '13, 3¢. May not sum due to rounding. Next earnings report due early February.
(B) Dividends historically paid in early March, June, Sept. & Dec. ■ Div'd. reinvestment plan available (5% discount).
(C) In millions, adjusted for stock splits.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	70
Earnings Predictability	100

ARTESIAN RES. CORP. NDQ--ARTNA

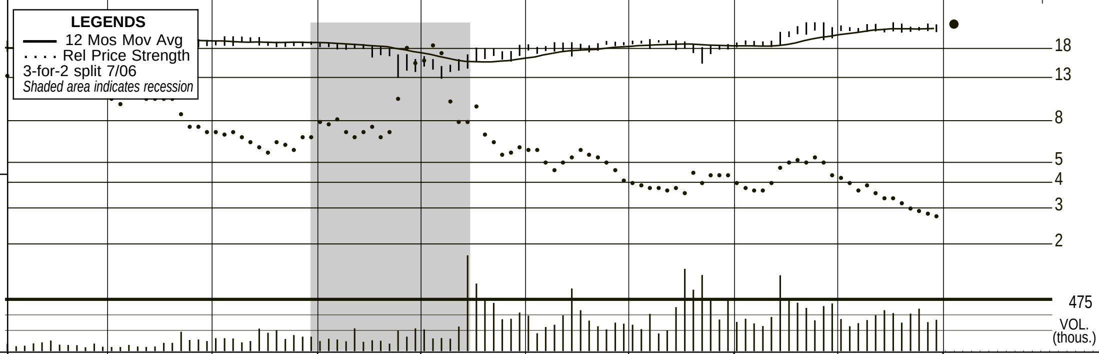
RECENT PRICE	TRAILING P/E RATIO	RELATIVE P/E RATIO	DIV'D YLD	
23.70	24.7	1.21	3.5%	VALUE LINE

RANKS

PERFORMANCE 3 *Average*
Technical 3 *Average*
SAFETY 3 *Average*
BETA .55 (1.00 = Market)

Financial Strength B
Price Stability 95
Price Growth Persistence 50
Earnings Predictability 85

	2005	2006	2007	2008	2009	2010	2011	2012	2013	
High	22.62	22.33	20.67	19.31	18.73	19.59	19.99	24.43	24.27	High
Low	17.20	17.90	18.26	13.00	12.81	16.43	15.16	18.20	21.52	Low



© VALUE LINE PUBLISHING LLC	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014/2015
SALES PER SH	7.52	7.77	7.20	7.59	8.11	8.48	7.56	8.10	--	
"CASH FLOW" PER SH	1.56	1.75	1.57	1.65	1.84	1.92	1.64	2.04	--	
EARNINGS PER SH	.81	.97	.90	.86	.97	1.00	.83	1.13	***1.02*** [A,B]	***1.23*** [C]***/NA***
DIV'DS DECL'D PER SH	.58	.61	.66	.71	.72	.75	.76	.79	--	
CAP'L SPENDING PER SH	3.35	5.08	3.66	6.09	2.32	2.57	1.83	2.36	--	
BOOK VALUE PER SH	9.60	10.15	11.66	11.86	12.15	12.44	13.12	13.57	--	
COMMON SHS OUTST'G (MILL)	6.02	6.09	7.30	7.40	7.51	7.65	8.61	8.71	--	
AVG ANN'L P/E RATIO	24.2	20.3	21.5	20.1	16.4	18.2	22.5	18.3	***23.2***	***19.3/NA***
RELATIVE P/E RATIO	1.28	1.10	1.14	1.21	1.09	1.16	1.41	1.17	--	
AVG ANN'L DIV'D YIELD	2.9%	3.1%	3.4%	4.1%	4.5%	4.1%	4.1%	3.8%	--	
SALES ($MILL)	45.3	47.3	52.5	56.2	60.9	64.9	65.1	70.6	--	***Bold figures are consensus earnings estimates and, using the recent prices, P/E ratios.***
OPERATING MARGIN	100.0%	45.6%	45.6%	45.1%	46.9%	46.5%	45.5%	48.7%	--	
DEPRECIATION ($MILL)	4.4	4.6	5.2	5.8	6.6	7.0	7.4	7.9	--	
NET PROFIT ($MILL)	5.0	6.1	6.3	6.4	7.3	7.6	6.7	9.8	--	
INCOME TAX RATE	39.9%	39.0%	39.8%	40.8%	40.1%	40.0%	40.8%	40.2%	--	
NET PROFIT MARGIN	11.1%	12.8%	11.9%	11.4%	11.9%	11.7%	10.4%	14.0%	--	
WORKING CAP'L ($MILL)	d1.8	d8.8	2.5	d20.9	d23.3	d27.9	d11.4	d11.4	--	
LONG-TERM DEBT ($MILL)	92.4	92.1	91.8	107.6	106.0	105.1	106.5	106.3	--	
SHR. EQUITY ($MILL)	57.8	61.8	85.1	87.8	91.2	95.1	113.0	118.2	--	
RETURN ON TOTAL CAP'L	5.3%	5.8%	5.3%	4.7%	5.2%	5.6%	4.6%	5.9%	--	
RETURN ON SHR. EQUITY	8.7%	9.8%	7.4%	7.3%	8.0%	8.0%	6.0%	8.3%	--	
RETAINED TO COM EQ	2.7%	3.8%	2.1%	1.4%	2.1%	2.0%	.5%	2.5%	--	
ALL DIV'DS TO NET PROF	69%	61%	71%	81%	74%	75%	92%	70%	--	

[A] No. of analysts changing earn. est. in last 3 days: 0 up, 0 down, consensus 5-year earnings growth not available. [B] Based upon 3 analysts' estimates. [C] Based upon 3 analysts' estimates.

ANNUAL RATES

of change (per share)	5 Yrs.	1 Yr.
Sales	1.5%	7.0%
"Cash Flow"	3.0%	24.0%
Earnings	2.0%	36.0%
Dividends	4.5%	4.0%
Book Value	4.5%	3.5%

Fiscal Year	QUARTERLY SALES ($mill.) 1Q	2Q	3Q	4Q	Full Year
12/31/11	14.8	16.5	17.7	16.1	65.1
12/31/12	16.7	17.9	19.0	17.0	70.6
12/31/13	16.3	17.8	18.1		
12/31/14					

Fiscal Year	EARNINGS PER SHARE 1Q	2Q	3Q	4Q	Full Year
12/31/10	.22	.24	.38	.16	1.00
12/31/11	.14	.23	.26	.20	.83
12/31/12	.28	.32	.33	.20	1.13
12/31/13	.19	.28	.29	***.24***	
12/31/14	***.20***	***.34***			

Cal-endar	QUARTERLY DIVIDENDS PAID 1Q	2Q	3Q	4Q	Full Year
2011	.19	.19	.19	.193	.76
2012	.193	.198	.198	.203	.79
2013	.203	.206	.206	.209	.82
2014					

INSTITUTIONAL DECISIONS

	1Q'13	2Q'13	3Q'13
to Buy	32	31	30
to Sell	26	30	27
Hld's(000)	3036	3029	3033

ASSETS ($mill.)	2011	2012	9/30/13
Cash Assets	.3	.6	.6
Receivables	8.6	8.7	8.8
Inventory	1.5	1.4	1.6
Other	2.9	2.8	3.7
Current Assets	13.3	13.5	14.7
Property, Plant & Equip, at cost	435.0	454.4	- -
Accum Depreciation	77.4	83.8	- -
Net Property	357.6	370.6	378.2
Other	7.8	7.6	7.5
Total Assets	378.7	391.7	400.4
LIABILITIES ($mill.)			
Accts Payable	2.8	3.5	3.7
Debt Due	13.8	12.6	10.9
Other	8.1	8.8	11.8
Current Liab	24.7	24.9	26.4

LONG-TERM DEBT AND EQUITY as of 9/30/13

Total Debt $116.6 mill. **Due in 5 Yrs.** NA
LT Debt $105.7 mill.
Including Cap. Leases NA
(47% of Cap'l)
Leases, Uncapitalized Annual rentals NA

Pension Liability $4.4 mill. in '12 vs. $.5 mill. in '11

Pfd Stock None **Pfd Div'd Paid** None

Common Stock 8,793,216 shares
(53% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: Artesian Resources Corporation, through its subsidiaries, provides water, wastewater, and other services on the Delmarva Peninsula. It distributes and sells water to residential, commercial, industrial, municipal, and utility customers in Delaware, Maryland, and Pennsylvania. The company also offers water for public and private fire protection to customers in its service territories. In addition, it provides contract water and wastewater services, water and sewer service line protection plans, and wastewater management services, as well as design, construction, and engineering services. As of December 31, 2012, the company served approximately 79,000 metered water customers through 1,162 miles of transmission and distribution mains. Has 229 employees. Chairman, C.E.O. & President: Dian C. Taylor. Address: 664 Churchmans Rd., Newark, DE 19702. Tel.: (302) 453-6900. Internet: http://www.artesianwater.com.

J.V.

January 17, 2014

TOTAL SHAREHOLDER RETURN

Dividends plus appreciation as of 12/31/2013

3 Mos.	6 Mos.	1 Yr.	3 Yrs.	5 Yrs.
4.10%	4.92%	6.13%	35.96%	76.91%

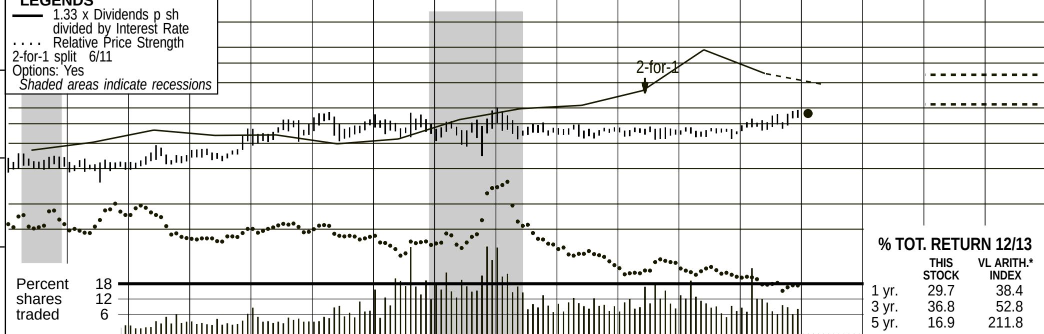
CALIFORNIA WATER NYSE-CWT

RECENT PRICE 22.47 | P/E RATIO 20.4 (Trailing: 22.9 Median: 21.0) | RELATIVE P/E RATIO 1.10 | DIV'D YLD 3.0% | VALUE LINE

TIMELINESS 3 Raised 11/1/13
SAFETY 3 Lowered 7/27/07
TECHNICAL 2 Raised 1/17/14
BETA .60 (1.00 = Market)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
High:	13.4	15.7	19.0	21.1	22.9	22.7	23.3	24.1	19.8	19.4	19.3	23.4	
Low:	10.2	11.8	13.0	15.6	16.4	17.1	13.8	16.7	16.9	16.7	16.8	18.4	

LEGENDS
— 1.33 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
2-for-1 split 6/11
Options: Yes
Shaded areas indicate recessions



Target Price Range 2016 | 2017 | 2018

2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	35	(+55%)	15%
Low	25	(+10%)	7%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	20	0	0	0	0	0	1	0
Options	0	0	0	0	0	0	1	0	0
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	86	61	60
to Sell	39	57	51
Hld's(000)	26409	26677	27841

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	29.7	38.4
3 yr.	36.8	52.8
5 yr.	16.9	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
7.74	7.38	7.98	8.08	8.13	8.67	8.18	8.59	8.72	8.10	8.88	9.90	10.82	11.05	12.00	13.34	*12.15*	*13.15*	Revenues per sh	*16.00*
1.46	1.30	1.37	1.26	1.10	1.32	1.26	1.42	1.52	1.36	1.56	1.86	1.93	1.93	2.07	2.32	*2.20*	*2.50*	"Cash Flow" per sh	*2.85*
.92	.73	.77	.66	.47	.63	.61	.73	.74	.67	.75	.95	.98	.91	.86	1.02	*.95*	*1.15*	Earnings per sh A	*1.40*
.53	.54	.54	.55	.56	.56	.56	.57	.57	.58	.58	.59	.59	.60	.62	.63	.64	*.68*	Div'd Decl'd per sh B ■	*.90*
1.30	1.37	1.72	1.23	2.04	2.91	2.19	1.87	2.01	2.14	1.84	2.41	2.66	2.97	2.83	3.04	*2.45*	*3.35*	Cap'l Spending per sh	*3.00*
6.50	6.69	6.71	6.45	6.48	6.56	7.22	7.83	7.90	9.07	9.25	9.72	10.13	10.45	10.76	11.28	*12.45*	*12.85*	Book Value per sh C	*14.75*
25.24	25.24	25.87	30.29	30.36	30.36	33.86	36.73	36.78	41.31	41.33	41.45	41.53	41.67	41.82	41.98	*47.75*	*48.00*	Common Shs Outst'g D	*50.0*
12.6	17.8	17.8	19.6	27.1	19.8	22.1	20.1	24.9	29.2	26.1	19.8	19.7	20.3	21.3	17.9	*21.6*		Avg Ann'l P/E Ratio	*22.0*
.73	.93	1.01	1.27	1.39	1.08	1.26	1.06	1.33	1.58	1.39	1.19	1.31	1.29	1.34	1.14	*1.44*		Relative P/E Ratio	*1.45*
4.6%	4.2%	4.0%	4.3%	4.4%	4.5%	4.2%	3.9%	3.1%	2.9%	3.0%	3.1%	3.1%	3.2%	3.4%	3.5%	3.1%		Avg Ann'l Div'd Yield	*3.0%*

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
277.1	315.6	320.7	334.7	367.1	410.3	449.4	460.4	501.8	560.0	*580*	*630*	Revenues ($mill) E	*800*
19.4	26.0	27.2	25.6	31.2	39.8	40.6	37.7	36.1	42.6	*45.0*	*55.0*	Net Profit ($mill)	*70.0*
39.9%	39.6%	42.4%	37.4%	39.9%	37.7%	40.3%	39.5%	40.5%	37.5%	*34.0%*	*39.0%*	Income Tax Rate	*39.0%*
10.3%	3.2%	3.3%	10.6%	8.3%	8.6%	7.6%	4.2%	7.6%	8.0%	*6.0%*	*8.5%*	AFUDC % to Net Profit	*10.0%*
50.2%	48.6%	48.3%	43.5%	42.9%	41.6%	47.1%	52.4%	51.7%	47.8%	*42.0%*	*44.0%*	Long-Term Debt Ratio	*47.5%*
49.1%	50.8%	51.1%	55.9%	56.6%	58.4%	52.9%	47.6%	48.3%	52.2%	*58.0%*	*56.0%*	Common Equity Ratio	*52.5%*
498.4	565.9	568.1	670.1	674.9	690.4	794.9	914.7	931.5	908.2	*1025*	*1100*	Total Capital ($mill)	*1400*
759.5	800.3	862.7	941.5	1010.2	1112.4	1198.1	1294.3	1381.1	1457.1	*1510*	*1565*	Net Plant ($mill)	*1725*
5.6%	6.1%	6.3%	5.2%	5.9%	7.1%	6.5%	5.5%	5.5%	6.3%	*6.0%*	*6.5%*	Return on Total Cap'l	*6.5%*
7.8%	8.9%	9.3%	6.8%	8.1%	9.9%	9.6%	8.6%	8.0%	9.0%	*7.5%*	*9.0%*	Return on Shr. Equity	*9.5%*
7.9%	9.0%	9.3%	6.8%	8.1%	9.9%	9.6%	8.6%	8.0%	9.0%	*7.5%*	*9.0%*	Return on Com Equity	*9.5%*
.7%	2.1%	2.1%	1.0%	1.8%	3.8%	3.8%	3.0%	2.3%	3.4%	*2.5%*	*3.5%*	Retained to Com Eq	*3.5%*
91%	77%	78%	86%	77%	61%	60%	66%	71%	62%	*67%*	*59%*	All Div'ds to Net Prof	*64%*

CAPITAL STRUCTURE as of 9/30/13
Total Debt $489.7 mill. **Due in 5 Yrs** $65.3 mill.
LT Debt $430.2 mill. **LT Interest** $29.5 mill.
(LT interest earned: 6.7x; total int. cov.: 6.0x)
(42% of Cap'l)
Pension Assets-12/12 $202.9 mill.
Oblig. $402.9 mill.
Pfd Stock None

Common Stock 47,739,024 shs.
as of 10/31/13

MARKET CAP: $1.1 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	27.2	38.8	48.8
Other	86.7	107.8	121.8
Current Assets	113.9	146.6	170.6
Accts Payable	48.9	46.8	60.4
Debt Due	53.7	136.3	59.5
Other	49.3	59.7	77.1
Current Liab.	151.9	242.8	197.0
Fix. Chg. Cov.	278%	297%	*325%*

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	4.0%	7.0%	*4.5%*
"Cash Flow"	5.5%	7.5%	*5.0%*
Earnings	5.0%	5.5%	*7.0%*
Dividends	1.0%	1.5%	*6.5%*
Book Value	5.0%	4.5%	*5.5%*

Cal-endar	QUARTERLY REVENUES ($ mill.) E Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	90.3	118.3	146.3	105.5	460.4
2011	98.1	131.4	169.3	103.0	501.8
2012	116.8	143.6	178.1	121.5	560.0
2013	111.4	154.6	184.4	*129.6*	*580*
2014	*130*	*160*	*200*	*140*	*630*

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.05	.25	.49	.12	.91
2011	.03	.29	.50	.04	.86
2012	.03	.31	.56	.12	1.02
2013	d.03	.28	.61	*.09*	*.95*
2014	*.05*	*.35*	*.60*	*.15*	*1.15*

Cal-endar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.149	.149	.149	.149	.60
2011	.154	.154	.154	.154	.62
2012	.1575	.1575	.1575	.1575	.63
2013	.16	.16	.16	.16	.64
2014					

BUSINESS: California Water Service Group provides regulated and nonregulated water service to roughly 471,900 customers in 83 communities in California, Washington, New Mexico, and Hawaii. Main service areas: San Francisco Bay area, Sacramento Valley, Salinas Valley, San Joaquin Valley & parts of Los Angeles. Acquired Rio Grande Corp; West Hawaii Utilities (9/08). Revenue breakdown, '12: residential, 66%; business, 18%; public authorities, 4%; industrial, 4%; other 8%. '12 reported depreciation rate: 2.8%. Has 1,131 employees. President, Chairman, and Chief Executive Officer: Peter C. Nelson. Inc.: Delaware. Address: 1720 North First Street, San Jose, California 95112-4598. Telephone: 408-367-8200. Internet: www.calwatergroup.com.

A final agreement between California Water Service Group and state regulators is all but finalized. Last quarter, the California Public Utility Commission's (CPUC) Office of Ratepayers Advocates (ORA) announced that a settlement has been reached with the utility. Though the CPUC doesn't have to go along with the ORA's decision, the chances of that appear to be virtually nil.

The deal appears to be fair to both California Water and its customers. According to the terms of the arrangement, California Water will be allowed to increase its gross revenues by $45 million in 2014, $10 million in 2015, and $10 million in 2016. In return, the utility would be required to invest $321 million in water system infrastructure improvements from 2013-2015. Moreover, should the utility invest an additional $126 million, it would be granted another $19 million rate hike at a later date. The CPUC is expected to release its decision early this year.

We expect the company's bottom line to rebound nicely in 2014. Due to the implementation of higher rates, we think California's share net can rise 21% this year. Comparisons would be even more impressive if 2013's results were not bolstered by a $0.09-a-share tax break.

California Water's next dividend announcement could break a long-term trend. Over the past five and 10 years, the annual payout has grown by 1.0% and 1.5%, respectively, levels that were substantially below that of the average water utility. We estimate that when the new dividend is announced in the first quarter, the hike can be anywhere from 6% to 9%.

These shares have been strong performers of late. The broad market averages rose sharply in last year's fourth quarter. Not surprisingly, conservative, income-oriented water utility stocks lagged. That is, all but California Water and one of its peers.

Our view on California Water shares has changed for the better. Assuming state regulators remain fair when the utility seeks higher rates in three years, we think that the stock, which has been a major under performer over the past one-three- and five-year periods, could turn in solid total returns through 2016-2018.

James A. Flood *January 17, 2014*

(A) Basic EPS. Excl. nonrecurring gain (loss): '00, (4¢); '01, 2¢; '02, 4¢; '11, 4¢. Next earnings report due mid-February.
(B) Dividends historically paid in late Feb., May, Aug., and Nov. ■ Div'd reinvestment plan available.
(C) Incl. intangible assets. In '12: $18.8 mill., $0.44/sh.
(D) In millions, adjusted for splits.
(E) Excludes non-reg. rev.

Company's Financial Strength	B++
Stock's Price Stability	100
Price Growth Persistence	50
Earnings Predictability	90

CONNECTICUT WATER NDQ-CTWS

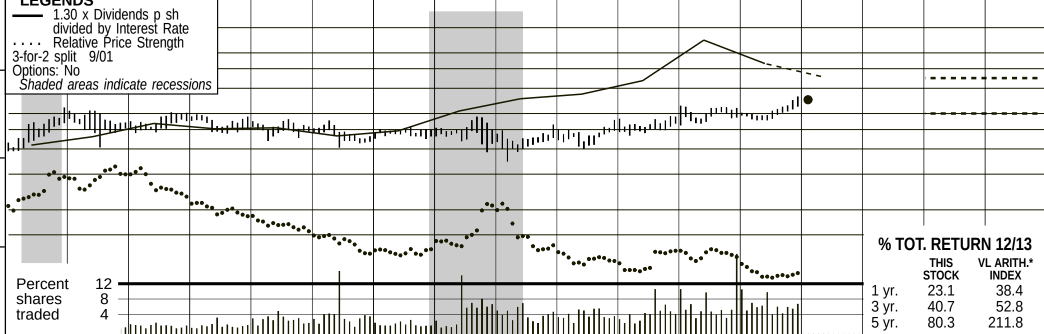
RECENT PRICE 35.09 | P/E RATIO 19.6 (Trailing: 21.3 Median: 23.0) | RELATIVE P/E RATIO 1.05 | DIV'D YLD 2.8% | VALUE LINE

TIMELINESS 2 Raised 12/13/13
SAFETY 3 New 1/18/13
TECHNICAL 3 Lowered 12/27/13
BETA .75 (1.00 = Market)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
High:	31.1	30.4	29.8	28.2	27.7	25.6	29.0	26.4	27.9	29.1	32.8	36.4
Low:	20.3	24.0	23.8	21.9	20.3	22.4	19.3	17.3	20.0	23.3	26.2	27.8

Target Price Range 2016 | 2017 | 2018

LEGENDS
— 1.30 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-2 split 9/01
Options: No
Shaded areas indicate recessions



2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	45	(+30%)	9%
Low	30	(-15%)	Nil

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	52	39	42
to Sell	21	39	31
Hld's(000)	4336	4492	4509

Percent shares traded 12 8 4

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	23.1	38.4
3 yr.	40.7	52.8
5 yr.	80.3	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
5.67	5.58	5.87	5.70	5.93	5.77	5.91	6.04	5.81	5.68	7.05	7.24	6.93	7.65	7.93	7.63	8.65	8.90	Revenues per sh	11.25
1.51	1.59	1.65	1.73	1.78	1.78	1.89	1.91	1.62	1.52	1.90	1.95	1.93	2.04	2.11	2.10	2.55	2.65	"Cash Flow" per sh	2.75
1.00	1.02	1.03	1.09	1.13	1.12	1.15	1.16	.88	.81	1.05	1.11	1.19	1.13	1.13	1.53	1.65	1.75	Earnings per sh A	1.85
.77	.78	.79	.79	.80	.81	.83	.84	.85	.86	.87	.88	.90	.92	.94	.96	.98	1.01	Div'd Decl'd per sh B■	1.12
1.99	1.12	1.42	1.43	1.86	1.98	1.49	1.58	1.96	1.96	2.24	2.44	3.28	3.06	2.61	2.34	2.75	2.85	Cap'l Spending per sh	2.90
8.26	8.52	8.61	8.92	9.25	10.06	10.46	10.94	11.52	11.60	11.95	12.23	12.67	13.05	13.50	16.89	17.55	17.80	Book Value per sh D	20.40
6.79	6.80	7.26	7.28	7.65	7.94	7.97	8.04	8.17	8.27	8.38	8.46	8.57	8.68	8.76	10.97	11.10	11.25	Common Shs Outst'g C	12.00
12.9	15.5	18.2	18.2	21.5	24.3	23.5	22.9	28.6	29.0	23.0	22.2	18.4	20.7	23.0	19.4	18.5		Avg Ann'l P/E Ratio	20.0
.74	.81	1.04	1.18	1.10	1.33	1.34	1.21	1.52	1.57	1.22	1.34	1.23	1.32	1.44	1.24	1.03		Relative P/E Ratio	1.35
6.0%	4.9%	4.2%	4.0%	3.3%	3.0%	3.0%	3.1%	3.4%	3.6%	3.6%	3.6%	4.1%	3.9%	3.6%	3.2%	3.2%		Avg Ann'l Div'd Yield	3.4%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $180.9 mill. **Due in 5 Yrs** $14.8 mill.
LT Debt $175.5 mill. **LT Interest** $7.6 mill.
(Total interest coverage: 8.8x)
(49% of Cap'l)

Leases, Uncapitalized: Annual rentals $.2 mill.
Pension Assets $45.4 mill.
Oblig. $66.5 mill.

Pfd Stock $0.8 mill. **Pfd Divd** NMF

Common Stock 11,018,161 shs.
as of 10/31/13
MARKET CAP: $375 million (Small Cap)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
47.1	48.5	47.5	46.9	59.0	61.3	59.4	66.4	69.4	83.8	95.0	100	Revenues ($mill)	135
9.2	9.4	7.2	6.7	8.8	9.4	10.2	9.8	9.9	13.6	18.0	19.5	Net Profit ($mill)	22.0
17.9%	22.9%	- -	23.5%	32.4%	27.2%	19.5%	35.2%	41.3%	32.0%	32.0%	33.0%	Income Tax Rate	35.0%
- -	- -	- -	- -	- -	1.7%	- -	- -	1.8%	1.7%	2.0%	2.0%	AFUDC % to Net Profit	3.0%
43.5%	42.8%	44.9%	44.4%	47.8%	46.9%	50.6%	49.5%	53.2%	49.0%	49.5%	49.5%	Long-Term Debt Ratio	48.5%
55.9%	56.7%	54.6%	55.1%	51.8%	52.7%	49.1%	50.2%	46.5%	50.8%	50.5%	50.5%	Common Equity Ratio	51.5%
148.9	155.1	172.3	174.1	193.2	196.5	221.3	225.6	254.2	364.6	370	395	Total Capital ($mill)	475
238.9	246.1	247.7	268.1	284.3	302.3	325.2	344.2	362.4	447.9	465	490	Net Plant ($mill)	550
7.5%	7.0%	5.0%	4.9%	5.5%	5.9%	5.5%	5.4%	4.9%	4.8%	6.0%	6.0%	Return on Total Cap'l	5.5%
10.9%	10.6%	7.5%	6.9%	8.7%	9.0%	9.3%	8.6%	8.3%	7.3%	9.5%	9.5%	Return on Shr. Equity	9.0%
11.0%	10.6%	7.6%	7.0%	8.7%	9.1%	9.4%	8.7%	8.3%	7.3%	9.5%	9.5%	Return on Com Equity	9.0%
3.2%	3.1%	.3%	NMF	1.6%	1.9%	2.3%	1.6%	1.4%	2.7%	4.0%	3.5%	Retained to Com Eq	3.0%
71%	71%	95%	105%	82%	79%	76%	81%	83%	62%	59%	58%	All Div'ds to Net Prof	61%

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	1.0	13.2	1.6
Accounts Receivable	14.9	11.5	14.3
Other	3.0	11.7	31.3
Current Assets	18.9	36.4	47.2
Accts Payable	7.2	10.0	7.4
Debt Due	- -	3.0	5.4
Other	23.2	2.9	6.5
Current Liab.	30.4	15.9	19.3
Fix. Chg. Cov.	419%	455%	460%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	3.5%	6.0%	6.5%
"Cash Flow"	2.5%	6.0%	4.5%
Earnings	1.5%	6.5%	6.5%
Dividends	1.5%	2.0%	3.0%
Book Value	5.5%	6.5%	6.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	13.8	15.9	21.0	15.7	66.4
2011	16.0	17.4	20.6	15.4	69.4
2012	18.5	21.3	24.5	19.5	83.8
2013	21.5	22.5	29.6	21.4	95.0
2014	22.0	24.0	30.0	24.0	100

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.12	.27	.54	.20	1.13
2011	.26	.37	.39	.11	1.13
2012	.22	.47	.67	.16	1.53
2013	.24	.39	.86	.16	1.65
2014	.30	.47	.73	.25	1.75

Cal-endar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.228	.228	.233	.233	.922
2011	.233	.233	.238	.238	.942
2012	.238	.238	.2425	.2425	.962
2013	.2425	.2425	.2475	.2475	.98
2014					

BUSINESS: Connecticut Water Service, Inc. is a non-operating holding company, whose income is derived from earnings of its wholly-owned subsidiary companies (regulated water utilities). Its largest subsidiary, Connecticut Water, accounted for about 85% of the holding company's net income in 2012, and provides water services to 400,000 people in 55 towns throughout Connecticut and Maine. Acquired The Maine Water Co., 1/12; Biddeford and Saco Water, 12/12. Inc.: CT. Has about 260 employees. Chairman/President/CEO: Eric W. Thornburg. Officers and directors own 2.2% of the common stock; BlackRock, Inc. 6.7%; The Vanguard Group, 5.3% (4/13 proxy). Address: 93 West Main Street, Clinton, CT 06413. Telephone: (860) 669-8636. Internet: www.ctwater.com.

Connecticut Water Service is consolidating its operations in Maine. In 2012, the company acquired The Maine Water Co. and Biddeford and Saco Water. Merging the two entities will reduce overhead, specifically resources spent on regulatory matters. Moreover, now that it has established a presence in the state, future tuck in acquisitions there seem likely.

The utility is also expanding on its home turf. Agreements have been reached to expand pipelines to supply water to the town of Mansfield as well as the main campus of the University of Connecticut, which is the equivalent of a small city. Additional mergers are probable here too.

Less onerous regulation augurs well for Connecticut Water. One of the key factors in analyzing a utility is how fair is the regulatory climate where it operates. Historically, Connecticut's Public Regulatory Authority (PURA) hasn't had a good reputation. Indeed, *Value Line* ranks the conditions in the state as Below Average. In the recent past, however, PURA appears to be striking a better balance between the interests of the public and the utilities it oversees. For example, last year the company was permitted to keep the benefits from an IRS refund in exchange for lowering rates and agreeing not to seek rate relief before 2015.

We are raising our earnings estimates for the utility. Despite fourth quarter's results probably being flat, we think that Connecticut Water's share net rose 8% to $1.65 in 2013, versus 2012's strong showing. For 2014, combining the utility's growing rate base with the advantages allowed by PURA, earnings per share could rise 6% to $1.75.

Dividend growth is still below average for a water utility. Over the past decade, the company has not had a good dividend-paying record compared to its peers. This is a trend that should continue for the foreseeable future due to the projected sharp rise in Connecticut Water's capital spending program.

These share are ranked to outperform the market in the year ahead. But due to the stock's recent strength, much of its appeal over the next three-to five-year period has been diminished.

James A. Flood *January 17, 2014*

(A) Diluted earnings. Next earnings report due mid-February. Quarterly earnings do no add in '12 due to rounding.
(B) Dividends historically paid in mid-March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for split.
(D) Includes intangibles. In '12: $31.7 million/$2.89 a share.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	45
Earnings Predictability	85

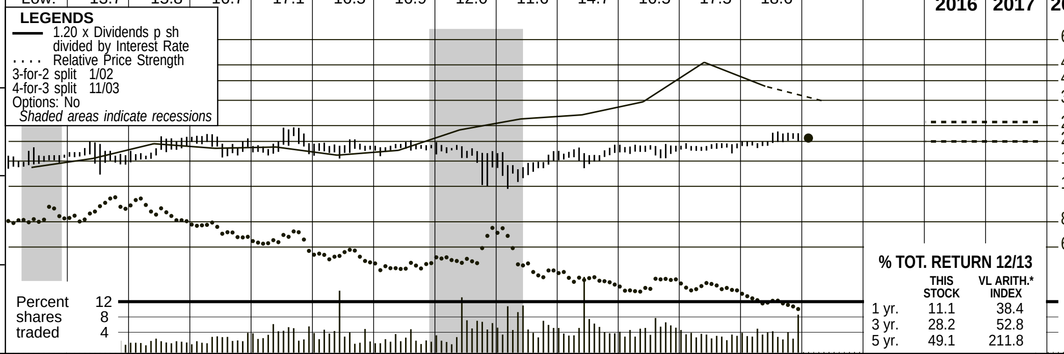
MIDDLESEX WATER NDQ-MSEX

RECENT PRICE 20.80 | P/E RATIO 21.4 (Trailing: 20.6 Median: 22.0) | RELATIVE P/E RATIO 1.15 | DIV'D YLD 3.7% | VALUE LINE

TIMELINESS 3 Lowered 11/15/13
SAFETY 2 New 10/21/11
TECHNICAL 3 Lowered 1/17/14
BETA .75 (1.00 = Market)

High:	20.0	21.2	21.8	23.5	20.5	20.2	19.8	17.9	19.3	19.4	19.6	22.5
Low:	13.7	15.8	16.7	17.1	16.5	16.9	12.0	11.6	14.7	16.5	17.5	18.6

Target Price Range
2016 | 2017 | 2018



2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	25	(+20%)	8%
Low	20	(-5%)	3%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	1	0	1	0	0
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	0	0	0	1	2	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	38	37	42
to Sell	30	35	29
Hld's(000)	6579	6489	6608

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	11.1	38.4
3 yr.	28.2	52.8
5 yr.	49.1	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
4.72	4.39	5.35	5.39	5.87	5.98	6.12	6.25	6.44	6.16	6.50	6.79	6.75	6.60	6.50	6.98	*7.20*	*7.70*	Revenues per sh	*9.10*
1.02	1.02	1.19	.99	1.18	1.20	1.15	1.28	1.33	1.33	1.49	1.53	1.40	1.55	1.46	1.56	*1.75*	*1.85*	"Cash Flow" per sh	*2.30*
.67	.71	.76	.51	.66	.73	.61	.73	.71	.82	.87	.89	.72	.96	.84	.90	*1.00*	*1.05*	Earnings per sh A	*1.15*
.57	.58	.60	.61	.62	.63	.65	.66	.67	.68	.69	.70	.71	.72	.73	.74	.75	*.76*	Div'd Decl'd per sh B■	*.80*
1.20	2.68	2.33	1.32	1.25	1.59	1.87	2.54	2.18	2.31	1.66	2.12	1.49	1.90	1.50	1.36	*1.50*	*1.65*	Cap'l Spending per sh	*2.00*
6.00	6.80	6.95	6.98	7.11	7.39	7.60	8.02	8.26	9.52	10.05	10.03	10.33	11.13	11.27	11.48	*11.70*	*12.10*	Book Value per sh D	*12.90*
8.54	9.82	10.00	10.11	10.17	10.36	10.48	11.36	11.58	13.17	13.25	13.40	13.52	15.57	15.70	15.82	*16.00*	*16.25*	Common Shs Outst'g C	*17.00*
13.4	15.2	17.6	28.7	24.6	23.5	30.0	26.4	27.4	22.7	21.6	19.8	21.0	17.8	21.7	20.8	*20.3*		Avg Ann'l P/E Ratio	*20.0*
.77	.79	1.00	1.87	1.26	1.28	1.71	1.39	1.46	1.23	1.15	1.19	1.40	1.13	1.36	1.33	*1.13*		Relative P/E Ratio	*1.35*
6.3%	5.4%	4.4%	4.2%	3.8%	3.7%	3.5%	3.4%	3.5%	3.7%	3.7%	4.0%	4.7%	4.2%	4.0%	4.0%	3.7%		Avg Ann'l Div'd Yield	*3.6%*

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
64.1	71.0	74.6	81.1	86.1	91.0	91.2	102.7	102.1	110.4	*115*	*125*	Revenues ($mill)	*155*
6.6	8.4	8.5	10.0	11.8	12.2	10.0	14.3	13.4	14.4	*16.0*	*17.0*	Net Profit ($mill)	*20.0*
32.8%	31.1%	27.6%	33.4%	32.6%	33.2%	34.1%	32.1%	32.7%	33.9%	*34.0%*	*34.0%*	Income Tax Rate	*34.0%*
--	--	--	--	--	--	--	6.8%	6.1%	3.4%	*4.5%*	*4.5%*	AFUDC % to Net Profit	*5.0%*
53.8%	53.8%	55.3%	49.5%	49.0%	45.6%	46.6%	43.1%	42.3%	41.5%	*41.5%*	*42.0%*	Long-Term Debt Ratio	*43.0%*
44.0%	42.5%	41.3%	47.5%	49.6%	51.8%	52.1%	55.8%	56.6%	57.4%	*57.5%*	*57.0%*	Common Equity Ratio	*57.0%*
181.1	214.5	231.7	264.0	268.8	259.4	267.9	310.5	312.5	316.5	*325*	*345*	Total Capital ($mill)	*400*
230.9	262.9	288.0	317.1	333.9	366.3	376.5	405.9	422.2	435.2	*445*	*450*	Net Plant ($mill)	*510*
5.0%	5.1%	5.0%	5.1%	5.6%	5.8%	5.0%	5.7%	5.2%	5.4%	*6.0%*	*7.0%*	Return on Total Cap'l	*5.5%*
7.9%	8.5%	8.2%	7.5%	8.6%	8.6%	7.0%	8.1%	7.5%	7.8%	*8.5%*	*8.5%*	Return on Shr. Equity	*9.0%*
8.0%	9.0%	8.6%	7.8%	8.7%	8.9%	7.0%	8.2%	7.5%	7.8%	*8.5%*	*8.5%*	Return on Com Equity	*9.0%*
NMF	.9%	.6%	1.3%	1.8%	2.0%	.1%	2.1%	1.0%	1.4%	*2.0%*	*2.5%*	Retained to Com Eq	*3.0%*
106%	90%	94%	84%	79%	78%	98%	75%	87%	83%	*76%*	*73%*	All Div'ds to Net Prof	*70%*

CAPITAL STRUCTURE as of 9/30/13
Total Debt $166.4 mill. **Due in 5 Yrs** $60.0 mill.
LT Debt $130.6 mill. **LT Interest** $7.0 mill.
(LT interest coverage: 4.1x)
(41% of Cap'l)

Pension Assets-12/12 $37.9 mill.
Oblig. $62.8 mill.
Pfd Stock $2.9 mill. **Pfd Div'd:** $.1 mill.

Common Stock 15,919,974 shs.
as of 10/31/13

MARKET CAP: $325 million (Small Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	3.1	3.0	3.0
Other	19.8	21.6	24.3
Current Assets	22.9	24.6	27.3
Accts Payable	5.7	3.8	4.4
Debt Due	4.6	11.1	35.8
Other	36.4	41.1	12.1
Current Liab.	46.7	56.0	52.3
Fix. Chg. Cov.	380%	410%	*415%*

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	1.5%	1.0%	*5.5%*
"Cash Flow"	3.0%	2.0%	*7.0%*
Earnings	3.5%	2.5%	*4.0%*
Dividends	1.5%	1.5%	*1.5%*
Book Value	4.5%	4.0%	*2.0%*

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	21.6	26.5	29.6	25.0	102.7
2011	24.0	26.1	28.7	23.3	102.1
2012	23.5	27.4	32.3	27.1	110.4
2013	27.0	29.1	31.3	*27.6*	*115*
2014	*30.0*	*30.0*	*35.0*	*30.0*	*125*

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.11	.31	.37	.17	.96
2011	.17	.23	.32	.12	.84
2012	.11	.23	.38	.17	.90
2013	.20	.28	.36	*.16*	*1.00*
2014	*.17*	*.28*	*.40*	*.20*	*1.05*

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.180	.180	.180	.183	.72
2011	.183	.183	.183	.185	.73
2012	.185	.185	.185	.1875	.74
2013	.1875	.1875	.1875	.19	.753
2014					

BUSINESS: Middlesex Water Company engages in the ownership and operation of regulated water utility systems in New Jersey, Delaware, and Pennsylvania. It also operates water and wastewater systems under contract on behalf of municipal and private clients in NJ and DE. Its Middlesex System provides water services to 60,000 retail customers, primarily in Middlesex County, New Jersey. in 2012, the Middlesex System accounted for 65% of total revenues. At 12/31/12, the company had 279 employees. Incorporated: NJ. President, CEO, and Chairman: Dennis W. Doll. Officers/directors own 3.1% of the common stock; BlackRock, 6.3%; The Vanguard Group, 5.7% (4/13 proxy). Address: 1500 Ronson Road, Iselin, NJ 08830. Tel.: 732-634-1500. Internet: www.middlesexwater.com.

Middlesex Water's recent dividend hike was subpar for a water utility. The company increased its payout by only 1.3%, versus the industry average of over 5%. Moreover, this represents the lowest growth rate of the nine water utilities that *Value Line* covers. It was also the 11th straight year in which the annual increase was only $0.01 a share.

Long-term dividend growth prospects are also below average. Over the next three- to five-year period, we expect the yearly raises to remain in the 1%-2% range. Much of this is a result of the company's high dividend payout ratio, which provides little room for future increases. This is also the reason why Middlesex sports a current dividend yield that is a full percentage point higher than the typical water utility. (Investors are willing to pay a premium and accept a lower yield in return for the potential of larger dividends in the future.)

Middlesex has been hit with some bad luck in the commercial and industrial markets. Last year, a large Hess refinery was shuttered. In addition, a major contract to supply water to a large borough in New Jersey lapsed. Together both accounted for almost $5 million in revenues.

Meanwhile, requests for higher rates have recently been filed. Two of Middlesex's subsidiaries petitioned regulators in Delaware and New Jersey seeking to recover costs used to repair and upgrade its water systems. If approved, rates would increase 14.4% and 15.9%, respectively. Very favorable rulings would probably make our earnings estimates conservative through 2016-2018.

The capital spending program has been increased. The company plans on spending $75 million over the next three years to upgrade and expand its infrastructure. Most of the funds will be invested in the residential sector, which is more predictable and carries higher margins than the commercial and industrial segments of the business.

We would advise investors to steer clear of this stock for the time being. Until the company's earnings can somehow gain sufficient traction to support a loftier dividend, there are more worthwhile selections in the water utility group.

James A. Flood *January 17, 2014*

(A) Diluted earnings. May not sum due to rounding. Next earnings report due mid-Feb.
(B) Dividends historically paid in mid-Feb., May, Aug., and November.■ Div'd reinvestment plan available.
(C) In millions, adjusted for splits.
(D) Intangible assets in 2012: $9.2 million, $0.58 a share.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	40
Earnings Predictability	80

SJW CORP. NYSE-SJW

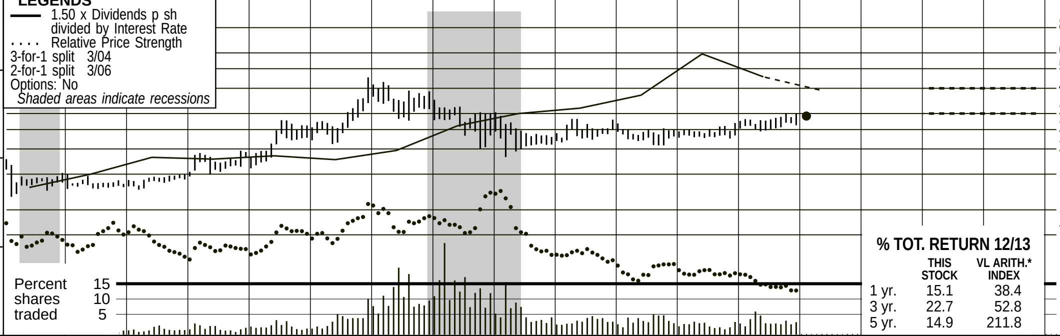
RECENT PRICE 29.15 | P/E RATIO 23.1 (Trailing: 24.5 Median: 23.0) | RELATIVE P/E RATIO 1.24 | DIV'D YLD 2.6% | VALUE LINE

TIMELINESS 3 Lowered 11/8/13
SAFETY 3 New 4/22/11
TECHNICAL 2 Raised 1/3/14
BETA .85 (1.00 = Market)

High:	15.1	15.0	19.6	27.8	45.3	43.0	35.1	30.4	28.2	26.8	26.9	30.1
Low:	12.7	12.6	14.6	16.1	21.2	27.7	20.0	18.2	21.6	20.9	22.6	24.5

Target Price Range 2016 | 2017 | 2018

LEGENDS
— 1.50 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-1 split 3/04
2-for-1 split 3/06
Options: No
Shaded areas indicate recessions



2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	40	(+35%)	11%
Low	30	(+5%)	4%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	0	0	0	0	0	0	0
Options	0	0	0	0	0	0	1	0	0
to Sell	0	0	0	0	0	0	1	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	46	47	43
to Sell	20	28	29
Hld's(000)	10000	10629	10697

Percent shares traded 15 10 5

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	15.1	38.4
3 yr.	22.7	52.8
5 yr.	14.9	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
5.79	5.58	6.40	6.74	7.45	7.97	8.20	9.14	9.86	10.35	11.25	12.12	11.68	11.62	12.85	14.01	14.05	14.75	Revenues per sh	16.30
1.27	1.26	1.43	1.23	1.49	1.55	1.75	1.89	2.21	2.38	2.30	2.44	2.21	2.38	2.80	2.97	3.25	3.50	"Cash Flow" per sh	3.65
.80	.76	.87	.58	.77	.78	.91	.87	1.12	1.19	1.04	1.08	.81	.84	1.11	1.18	1.20	1.40	Earnings per sh A	1.60
.38	.39	.40	.41	.43	.46	.49	.51	.53	.57	.61	.65	.66	.68	.69	.71	.73	.75	Div'd Decl'd per sh B■	.90
1.27	1.81	1.77	1.89	2.63	2.06	3.41	2.31	2.83	3.87	6.62	3.79	3.17	5.65	3.75	5.67	5.25	5.20	Cap'l Spending per sh	4.85
7.02	7.53	7.88	7.90	8.17	8.40	9.11	10.11	10.72	12.48	12.90	13.99	13.66	13.75	14.20	14.71	15.40	16.40	Book Value per sh	19.15
19.02	19.01	18.27	18.27	18.27	18.27	18.27	18.27	18.27	18.28	18.36	18.18	18.50	18.55	18.59	18.67	20.25	21.00	Common Shs Outst'g C	23.00
11.2	13.1	15.5	33.1	18.5	17.3	15.4	19.6	19.7	23.5	33.4	26.2	28.7	29.1	21.2	20.4	22.7		Avg Ann'l P/E Ratio	22.0
.65	.68	.88	2.15	.95	.94	.88	1.04	1.05	1.27	1.77	1.58	1.91	1.85	1.33	1.30	1.27		Relative P/E Ratio	1.45
4.3%	3.9%	3.0%	2.1%	3.0%	3.4%	3.5%	3.0%	2.4%	2.0%	1.7%	2.3%	2.8%	2.8%	2.9%	3.0%	2.7%		Avg Ann'l Div'd Yield	2.6%

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
149.7	166.9	180.1	189.2	206.6	220.3	216.1	215.6	239.0	261.5	275	310	Revenues ($mill)	375
16.7	16.0	20.7	22.2	19.3	20.2	15.2	15.8	20.9	22.3	26.0	29.0	Net Profit ($mill)	37.0
36.2%	42.1%	41.6%	40.8%	39.4%	39.5%	40.4%	38.8%	41.1%	41.1%	41.0%	40.0%	Income Tax Rate	40.0%
1.6%	2.1%	1.6%	2.1%	2.7%	2.3%	2.0%	- -	2.0%	2.0%	3.0%	4.0%	AFUDC % to Net Profit	5.0%
45.6%	43.7%	42.6%	41.8%	47.7%	46.0%	49.4%	53.7%	56.6%	55.0%	54.5%	54.0%	Long-Term Debt Ratio	51.0%
54.4%	56.3%	57.4%	58.2%	52.3%	54.0%	50.6%	46.3%	43.4%	45.0%	45.5%	46.0%	Common Equity Ratio	49.0%
306.0	328.3	341.2	391.8	453.2	470.9	499.6	550.7	607.9	610.2	685	745	Total Capital ($mill)	900
428.5	456.8	484.8	541.7	645.5	684.2	718.5	785.5	756.2	831.6	890	950	Net Plant ($mill)	1150
6.9%	6.5%	7.6%	7.0%	5.7%	5.8%	4.4%	4.3%	4.9%	5.0%	5.0%	5.0%	Return on Total Cap'l	6.0%
10.0%	8.7%	10.6%	9.7%	8.2%	8.0%	6.0%	6.2%	7.9%	8.1%	8.5%	8.5%	Return on Shr. Equity	8.5%
10.0%	8.7%	10.6%	9.7%	8.2%	8.0%	6.0%	6.2%	7.9%	8.1%	8.5%	8.5%	Return on Com Equity	8.5%
4.7%	3.6%	5.6%	5.2%	3.5%	3.3%	1.2%	1.2%	3.1%	3.3%	3.5%	4.0%	Retained to Com Eq	3.5%
53%	58%	47%	46%	57%	59%	80%	80%	61%	59%	56%	54%	All Div'ds to Net Prof	56%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $335.1 mill. **Due in 5 Yrs** $21.2 mill.
LT Debt $335.1 mill. **LT Interest** $18.6 mill.
(Total interest coverage: 4.6x) (51% of Cap'l)

Leases, Uncapitalized: Annual rentals $4.7 mill.

Pension Assets $75.5 mill. **Oblig.** $141.0 mill.

Pfd Stock None.

Common Stock 20,162,133 shs. as of 10/25/13
MARKET CAP: $600 million (Small Cap)

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	26.7	2.5	3.2
Other	42.2	40.4	46.1
Current Assets	68.9	42.9	49.3
Accts Payable	7.4	8.5	11.8
Debt Due	.8	20.7	7.6
Other	20.1	19.9	30.3
Current Liab.	28.3	49.1	49.7
Fix. Chg. Cov.	276%	247%	231%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	5.5%	4.0%	4.0%
"Cash Flow"	6.5%	3.5%	5.0%
Earnings	4.0%	-1.5%	7.5%
Dividends	5.0%	4.0%	4.5%
Book Value	5.5%	3.5%	5.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	40.4	54.1	70.3	50.8	215.6
2011	43.7	59.0	73.9	62.4	239.0
2012	51.1	65.6	82.4	62.4	261.5
2013	50.1	74.2	85.2	65.5	275
2014	60.0	75.0	100	75.0	310

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.055	.24	.44	.11	.84
2011	.03	.29	.44	.35	1.11
2012	.06	.28	.53	.31	1.18
2013	.07	.37	.44	.32	1.20
2014	.10	.40	.55	.35	1.40

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.17	.17	.17	.17	.68
2011	.173	.173	.173	.173	.69
2012	.1775	.1775	.1775	.1775	.71
2013	.1825	.1825	.1825	.1825	.73
2014					

BUSINESS: SJW Corporation engages in the production, purchase, storage, purification, distribution, and retail sale of water. It provides water service to approximately 227,000 connections that serve a population of approximately one million people in the San Jose area and 8,700 connections that serve approximately 36,000 residents in a service area in the region between San Antonio and Austin, Texas. The company offers nonregulated water-related services, including water system operations, cash remittances, and maintenance contract services. SJW also owns and operates commercial real estate investments. Has about 375 employees. Chrm.: Charles J. Toeniskoetter. Inc.: CA. Address: 110 W. Taylor Street, San Jose, CA 95110. Tel.: (408) 279-7800. Int: www.sjwater.com.

We have lowered our 2013 earnings estimate for SJW. Higher costs for both extracting ground water and for purchasing water on the open market resulted in an unexpected 17% decline in last year's third-quarter earnings per share. As a result, we think the company's annual share net only reached $1.20, $0.10 less than our previous estimate.

Earnings for the next several years will depend upon state regulators. In 2012, SJW filed a rate case with the California Public Utility Commission (CPUC) seeking to have rates increased 21.5% in 2013, 4.9% in 2014, and 12.6% in 2016, respectfully. Raising customers' bills by such significant amounts is not easy for any public body. However, SJW's pipelines are antiquated and badly in need of modernization.

We are guardedly optimistic regarding SJW's chances of receiving a favorable ruling. With the exception of the allowed return on equity, the CPUC's recent decisions have been reasonable. Utilities that have made sound arguments for the need for higher tariffs have been treated fairly. Still, predicting regulators' actions is not an exact science.

SJW's short-term dividend growth prospects are unexciting. The company is expected to raise its dividend later this month or in early February. We are anticipating only a quarterly increase of $0.005 a share (or $0.02 a share on an annual basis). This increase is only 2.7%, versus the industry average of over 5%. As future rate relief is implemented, there is the possibility that our projections could prove conservative.

SJW's operates in healthy service areas. The company's main utility operations are in San Jose, the home of Silicon Valley. While other parts of California may suffer, due to the high cost of doing business, this is a geographic location that should continue to experience solid growth. Moreover, the company's Texas subsidiary is located in the thriving Austin-to-San Antonio corridor.

We think that there are other stocks in the water utility group that hold greater appeal than SJW. On a risk adjusted basis, the equity's prospects are in line with the industry averages.

James A. Flood *January 17, 2014*

(A) Diluted earnings. Excludes nonrecurring losses : '03, $1.97; '04, $3.78; '05, $1.09; '06, $16.36; '08, $1.22; '10, 46¢. Next earnings report due early February. Quarterly egs. may not add due to rounding.
(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for stock splits.

Company's Financial Strength	B+
Stock's Price Stability	80
Price Growth Persistence	45
Earnings Predictability	80

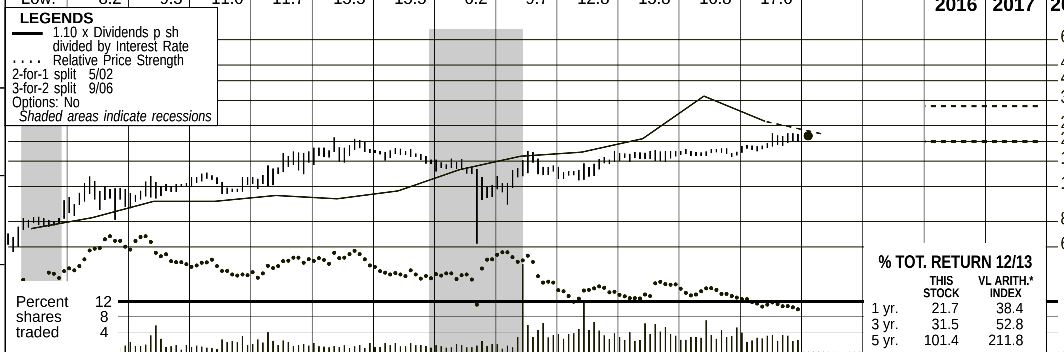
YORK WATER NDQ-YORW

RECENT PRICE **21.37** | P/E RATIO **26.7** (Trailing: 29.7 Median: 25.0) | RELATIVE P/E RATIO **1.44** | DIV'D YLD **2.7%** | VALUE LINE

TIMELINESS 5 Lowered 11/22/13
SAFETY 2 New 7/19/13
TECHNICAL 2 Raised 1/3/14
BETA .70 (1.00 = Market)

High:	13.4	13.5	14.0	17.9	21.0	18.5	16.5	18.0	18.0	18.1	18.5	22.0
Low:	8.2	9.3	11.0	11.7	15.3	15.5	6.2	9.7	12.8	15.8	16.8	17.6

Target Price Range 2016 | 2017 | 2018



2016-18 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	30	(+40%)	12%
Low	20	(-5%)	2%

Insider Decisions

	F	M	A	M	J	J	A	S	O
to Buy	0	0	4	0	1	5	0	2	5
Options	0	0	0	0	0	0	0	0	0
to Sell	0	0	1	0	0	0	0	0	0

Institutional Decisions

	1Q2013	2Q2013	3Q2013
to Buy	33	32	30
to Sell	21	26	23
Hld's(000)	3375	3346	3451

% TOT. RETURN 12/13

	THIS STOCK	VL ARITH.* INDEX
1 yr.	21.7	38.4
3 yr.	31.5	52.8
5 yr.	101.4	211.8

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	© VALUE LINE PUB. LLC	16-18
- -	- -	- -	- -	2.05	2.05	2.17	2.18	2.58	2.56	2.79	2.89	2.95	3.07	3.18	3.21	3.40	3.65	Revenues per sh	4.15
- -	- -	- -	- -	.59	.57	.65	.65	.79	.77	.86	.88	.95	1.07	1.09	1.12	1.25	1.35	"Cash Flow" per sh	1.65
- -	- -	- -	- -	.43	.40	.47	.49	.56	.58	.57	.57	.64	.71	.71	.72	.75	.90	Earnings per sh A	1.05
- -	- -	- -	- -	.34	.35	.37	.39	.42	.45	.48	.49	.51	.52	.53	.54	.55	.57	Div'd Decl'd per sh B	.70
- -	- -	- -	- -	.75	.66	1.07	2.50	1.69	1.85	1.69	2.17	1.18	.83	.74	.94	.90	.85	Cap'l Spending per sh	1.05
- -	- -	- -	- -	3.79	3.90	4.06	4.65	4.85	5.84	5.97	6.14	6.92	7.19	7.45	7.73	7.85	8.70	Book Value per sh	9.60
- -	- -	- -	- -	9.46	9.55	9.63	10.33	10.40	11.20	11.27	11.37	12.56	12.69	12.79	12.92	13.00	12.60	Common Shs Outst'g C	12.00
- -	- -	- -	- -	17.8	26.9	24.5	25.7	26.3	31.2	30.3	24.6	21.9	20.7	23.9	24.4	26.3		Avg Ann'l P/E Ratio	23.0
- -	- -	- -	- -	.91	1.47	1.40	1.36	1.40	1.68	1.61	1.48	1.46	1.32	1.50	1.55	1.47		Relative P/E Ratio	1.55
- -	- -	- -	- -	4.4%	3.3%	3.2%	3.1%	2.9%	2.5%	2.8%	3.5%	3.6%	3.5%	3.1%	3.1%	2.8%		Avg Ann'l Div'd Yield	2.8%

CAPITAL STRUCTURE as of 9/30/13
Total Debt $84.9 mill. **Due in 5 Yrs** $19.5 mill.
LT Debt $84.9 mill. **LT Interest** $5.2 mill.
(Total interest coverage: 2.9x)
(45% of Cap'l)

Pension Assets 12/12 $22.7 mill.
Oblig. $34.7 mill.

Pfd Stock None

Common Stock 12,942,843 shs.
as of 11/6/13

MARKET CAP: $275 million (Small Cap)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		16-18
20.9	22.5	26.8	28.7	31.4	32.8	37.0	39.0	40.6	41.4	43.0	46.0	Revenues ($mill)	50.0
4.4	4.8	5.8	6.1	6.4	6.4	7.5	8.9	9.1	9.3	10.0	11.5	Net Profit ($mill)	12.5
34.8%	36.7%	36.7%	34.4%	36.5%	36.1%	37.9%	38.5%	35.3%	37.6%	36.0%	36.0%	Income Tax Rate	36.0%
- -	- -	- -	7.2%	3.6%	10.1%	- -	1.2%	1.1%	1.1%	1.0%	1.0%	AFUDC % to Net Profit	1.0%
43.4%	42.5%	44.1%	48.3%	46.5%	54.5%	45.7%	48.3%	47.1%	46.0%	45.0%	44.5%	Long-Term Debt Ratio	42.5%
56.6%	57.5%	55.9%	51.7%	53.5%	45.5%	54.3%	51.7%	52.9%	54.0%	55.0%	54.5%	Common Equity Ratio	57.5%
69.0	83.6	90.3	126.5	125.7	153.4	160.1	176.4	180.2	184.8	190	185	Total Capital ($mill)	200
116.5	140.0	155.3	174.4	191.6	211.4	222.0	228.4	233.0	240.3	245	250	Net Plant ($mill)	260
8.5%	7.6%	8.4%	6.2%	6.7%	5.7%	6.2%	6.5%	6.4%	6.4%	6.5%	7.5%	Return on Total Cap'l	7.5%
11.4%	10.0%	11.6%	9.3%	9.5%	9.2%	8.6%	9.8%	9.5%	9.3%	9.5%	11.5%	Return on Shr. Equity	11.0%
11.4%	10.0%	11.6%	9.3%	9.5%	9.2%	8.6%	9.8%	9.5%	9.3%	9.5%	11.5%	Return on Com Equity	11.0%
2.6%	2.1%	3.0%	2.2%	1.7%	1.4%	1.9%	2.7%	2.5%	2.4%	3.0%	3.0%	Retained to Com Eq	3.5%
77%	79%	74%	77%	82%	85%	78%	72%	73%	74%	71%	63%	All Div'ds to Net Prof	67%

CURRENT POSITION ($MILL.)	2011	2012	9/30/13
Cash Assets	4.0	4.0	6.8
Accounts Receivable	6.0	6.4	3.9
Other	1.4	1.2	3.6
Current Assets	11.4	11.6	14.3
Accts Payable	1.1	1.1	1.9
Debt Due	.1	.1	- -
Other	4.1	4.3	5.0
Current Liab.	5.3	5.5	6.9
Fix. Chg. Cov.	160%	156%	154%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '10-'12 to '16-'18
Revenues	4.5%	3.5%	4.5%
"Cash Flow"	6.5%	6.5%	7.0%
Earnings	5.5%	4.5%	6.5%
Dividends	1.5%	3.0%	5.0%
Book Value	7.0%	6.0%	4.5%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	9.0	9.7	10.5	9.8	39.0
2011	9.6	10.5	10.5	10.0	40.6
2012	9.6	10.4	11.0	10.4	41.4
2013	10.1	10.7	10.9	11.3	43.0
2014	10.5	11.5	12.2	11.8	46.0

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2010	.15	.18	.21	.17	.71
2011	.17	.19	.19	.16	.71
2012	.15	.17	.22	.18	.72
2013	.17	.18	.19	.21	.75
2014	.19	.22	.22	.22	.85

Cal-endar	QUARTERLY DIVIDENDS PAID B Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2010	.128	.128	.128	.128	.512
2011	.131	.131	.131	.131	.524
2012	.134	.134	.134	.134	.535
2013	.138	.138	.138	.138	.552
2014	.1431				

BUSINESS: The York Water Company is the oldest investor-owned regulated water utility in the United States. It has operated continuously since 1816. As of December 31, 2012, the company's average daily availability was 35.0 million gallons and its service territory had an estimated population of 189,000. Has more than 63,000 customers. Residential customers accounted for 63% of 2012 revenues; commercial and industrial (29%); other (8%). It also provides sewer billing services. Incorporated: PA. York had 103 full-time employees at 12/31/12. President/CEO: Jeffrey R. Hines. Officers/directors own 1.2% of the common stock (3/13 proxy). Address: 130 East Market Street York, Pennsylvania 17401. Telephone: (717) 845-3601. Internet: www.yorkwater.com.

The York Water Company probably experienced little growth in the year just ended. We think that the company's share net barely moved higher in 2013, reaching $0.75, at best. This represents the fourth-consecutive year in which the bottom line has showed little improvement. Moreover, the dividend only increased slightly over the same time period.

Higher rates could possibly provide a nice lift to profits in 2014, however. York is still awaiting the ruling on a rate case filed last year in Pennsylvania. The petition was for a 17% hike in tariffs to enable it to recover the nearly $50 million that it spent over the past several years upgrading the system's deteriorating infrastructure.

A share-repurchase program would also help. The company hasn't really bought back any of the 1.2 million shares authorized by its board more than a year ago. While this might not sound like much, the amount represents more than 9% of the company's outstanding shares.

The balance sheet should remain in good shape. York's finances have strengthened over the last several years. And, even assuming a reduction in the equity base resulting from the share repurchases, we think that the equity-to-total capital ratio will remain at a healthy 55% next year, and gradually rise to 57% by 2016-2018. Having solid finances will also provide York with greater flexibility. As the industry continues to consolidate, perhaps a small acquisition or two could be made to help foster earnings growth.

We have raised the company's long-term dividend growth prospects. York raised its dividend by 3.5% last quarter, nearly double the average of the past several years. Though this rate is still below the industry average, it might signal a more positive long-term trend.

York shares are now ranked 5 (Lowest) for year-ahead relative performance. While our outlook for the company has improved since our October report, it now appears that all of the company's positive metrics are fully reflected in the recent stock price. Indeed, the current price earnings ratio of nearly 27 is high, both for a water utility and the general market.

James A. Flood *January 17, 2014*

(A) Diluted earnings. Next earnings report due early February.
(B) Dividends historically paid in mid-January, April, July, and October.
(C) In millions, adjusted for splits.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	70
Earnings Predictability	100

United Water Rhode Island, Inc.
Summary of Risk Premium Models for the
Proxy Group of Nine Water Companies

		Proxy Group of Nine Water Companies
Predictive Risk Premium Model ™ (PRPM™) (1)		11.89 %
Risk Premium Using an Adjusted Market Approach (2)		9.67 %
	Average	11.33 %

Notes:
(1) From page 13 of this Schedule.
(2) From page 14 of this Schedule.

United Water Rhode Island, Inc.
Derivation of Common Equity Cost Rate
Using the Predictive Risk Premium Model ™ (PRPM ™)
Proxy Group of Nine Water Companies

	American States Water Co.	American Water Works Co., Inc.	Aqua America, Inc.	Artesian Resources Corp.	California Water Service Group	Connecticut Water Service, Inc.	Middlesex Water Company	SJW Corporation	York Water Company
GARCH Coefficient (1)	1.541826259	4.572332998	2.198333083	2.159831171	1.83967266	1.808647271	1.950055786	1.364467426	1.995065254
Average Variance (1)	0.39%	0.25%	0.48%	0.30%	0.31%	0.28%	0.27%	0.42%	0.46%
PRPM™ Derived Risk Premium (1)	7.45%	14.41%	13.30%	8.11%	7.12%	6.35%	6.49%	7.09%	11.57%
Risk-Free Rate (2)	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%
Indicated Cost of Common Equity	11.89%	18.85%	17.74%	12.55%	11.56%	10.79%	10.93%	11.53%	16.01%
								Average	13.54%
								Median	11.89%

Notes:
(1) Based upon data from CRSP(R) Data © 2012, Center For Research in Security Prices (CRSP(R)), The University of Chicago Booth School of Business.
(2) From note 3 on page 23 of this Schedule.

United Water Rhode Island, Inc.
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

Line No.		Proxy Group of Nine Water Companies
1.	Prospective Yield on Aaa Rated Corporate Bonds (1)	5.19 %
2.	Adjustment to Reflect Yield Spread Between Aaa Rated Corporate Bonds and A Rated Public Utility Bonds	0.16 (2)
3.	Adjusted Prospective Yield on A Rated Public Utility Bonds	5.35 %
4.	Adjustment to Reflect Bond Rating Difference of Proxy Group	-0.04 (3)
5.	Adjusted Prospective Bond Yield	5.32 %
6.	Equity Risk Premium (5)	4.35
7.	Risk Premium Derived Common Equity Cost Rate	9.67 %

Notes:

(1) Six quarter average consensus forecast ending with Q1 of 2015 averaged with the 2015-2019 and 2020-2024 consensus forecast of Moody's Aaa Rated Corporate bonds from Blue Chip Financial

(2) The average yield spread of A rated public utility bonds over Aaa rated corporate bonds of 0.16% from page 16 of this Schedule.

(3) Adjustment to reflect the A1/A2 Moody's bond rating of the proxy group of nine water companies as shown on page 16 of this Schedule. The 4 basis point adjustment is derived by taking 1/6 of the spread between Aa2 and A2 Public Utility Bonds (1/6 * 0.21% = 0.04%).

(4) From page 17 of this Schedule.

United Water Rhode Island, Inc.
Comparison of Bond Ratings, Business Risk and Financial Risk Profiles for the
Proxy Group of Nine Water Companies

	Moody's Bond Rating February 2014		Standard & Poor's Bond Rating February 2014	
Proxy Group of Nine Water Companies	Bond Rating	Numerical Weighting (1)	Bond Rating	Numerical Weighting (1)
American States Water Co. (2)	A2	6.0	A+	5.0
American Water Works Co., Inc. (3)	A1	5.0	A	6.0
Aqua America, Inc. (4)	NR	- -	AA-	4.0
Artesian Resources Corp.	NR	- -	NR	- -
California Water Service Group (5)	NR	- -	AA-	4.0
Connecticut Water Service, Inc. (6)	NR	- -	A/A-	6.5
Middlesex Water Company	NR	- -	A	6.0
SJW Corporation (7)	NR	- -	A	6.0
York Water Company	NR	- -	A-	7.0
Average	A1/A2	5.5	A+/A	5.5

Notes:
(1) From Schedule PMA-7, page 5 of Ms. Ahern's Direct Exhibit.
(2) Ratings are those of Golden State Water Company.
(3) Ratings are those of Pennsylvania American Water.
(4) Ratings are those of Aqua Pennsylvania, Inc.
(5) Ratings are those of California Water Service Co.
(6) Ratings are those of Connecticut Water Company.
(7) Ratings are those of San Jose Water Co.

Source Information:
Moody's Investors Service
Standard & Poor's Global Utilities Rating Service

Moody's
Comparison of Interest Rate Trends
for the Three Months Ending January 2014 (1)

	Corporate Bonds	Public Utility Bonds			Spread - Corporate v. Public Utility Bonds			Spread - Public Utility Bonds	
Months	Aaa Rated	Aa Rated	A Rated	Baa Rated	Aa (Pub. Util.) over Aaa (Corp.)	A (Pub. Util.) over Aaa (Corp.)	Baa (Pub. Util.) over Aaa (Corp.)	A over Aa	Baa over A
January-14	4.49 %	4.44 %	4.63 %	5.09 %					
December-13	4.62	4.59	4.81	5.25					
November-13	4.63	4.56	4.77	5.24					
Average of Last 3 Months	4.58 %	4.53 %	4.74 %	5.19 %	(0.05) %	0.16 %	0.61 %	0.21 %	0.45 %

Notes: (1) All yields are distributed yields.

Source of Information: Mergent Bond Record, February 2014, Vol. 81, No. 2.

United Water Rhode Island, Inc.
Judgment of Equity Risk Premium for
the Proxy Group of Nine Water Companies

Line No.		Proxy Group of Nine Water Companies
1.	Calculated equity risk premium based on the total market using the beta approach (1)	4.00 %
2.	Mean equity risk premium based on a study using the holding period returns of public utilities with A rated bonds (2)	4.70
3.	Average equity risk premium	4.35 %

Notes: (1) From page 18 of this Schedule.
(2) From page 21 of this Schedule.

United Water Rhode Island, Inc.
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for
the Proxy Group of Nine Water Companies

Line No.		Proxy Group of Nine Water Companies
	Based on SBBI Valuation Yearbook Data:	
1.	Ibbotson Equity Risk Premium (1)	5.60 %
2.	Ibbotson Equity Risk Premium based on PRPM™ (2)	9.33
	Based on Value Line Summary and Index:	
3.	Equity Risk Premium Based on Value Line Summary and Index (3)	3.55
4.	Conclusion of Equity Risk Premium (4)	6.16 %
5.	Adjusted Value Line Beta (5)	0.65
6	Beta Adjusted Equity Risk Premium	4.00 %

Notes: (1) Based on the arithmetic mean historical monthly returns on large company common stocks from Ibbotson® SBBI® 2012 Valuation Yearbook - Market Results for Stocks, Bonds, Bills, and Inflation minus the arithmetic mean monthly yield of Moody's Aaa and Aa corporate bonds from 1926 - 2012. (11.83% - 6.23% = 5.60%).

(2) The Predictive Risk Premium Model (PRPM™) is discussed in Ms. Ahern's accompanying direct testimony. The Ibbotson equity risk premium based on the PRPM™ is derived by applying the PRPM™ to the monthly risk premiums between Ibbotson large company common stock monthly returns minus the average Aaa and Aa corporate monthly bond yields, from January 1928 through December 2013.

(3) The equity risk premium based on the Value Line Summary and Index is derived from taking the projected 3-5 year total annual market return of 8.74% (described fully in note 1 of page 23 of this Schedule) and subtracting the average consensus forecast of Aaa corporate bonds of 5.19% (Shown on page 14 of this Schedule). (8.74% - 5.19% = 3.55%).

(4) Average of Lines 1, 2, & 3.

(5) Median beta derived from page 22 of this Schedule.

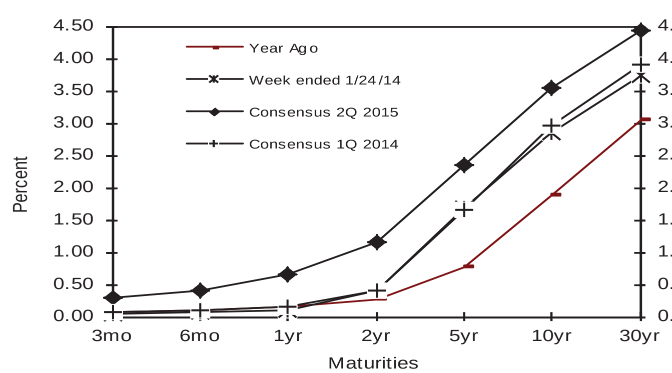
Sources of Information:
Ibbotson® SBBI® 2013 Valuation Yearbook - Market Results for Stocks, Bonds, Bills, and Inflation, Morningstar, Inc., 2013 Chicago, IL.
Industrial Manual and Mergent Bond Record Monthly Update.
Value Line Summary and Index
Blue Chip Financial Forecasts, February 1, 2014

Consensus Forecasts Of U.S. Interest Rates And Key Assumptions[1]

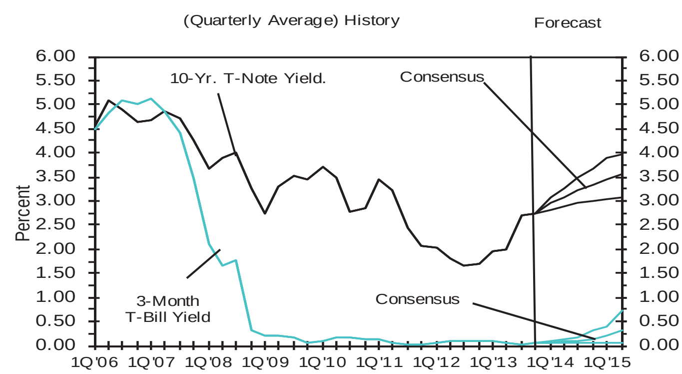
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			Latest Q	1Q	2Q	3Q	4Q	1Q	2Q
Interest Rates	Jan. 24	Jan. 17	Jan. 10	Jan. 3	Dec.	Nov.	Oct.	4Q 2013	2014	2014	2014	2014	2015	2015
Federal Funds Rate	0.07	0.07	0.08	0.08	0.09	0.08	0.09	0.09	**0.1**	**0.1**	**0.2**	**0.2**	**0.2**	**0.3**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.4**
LIBOR, 3-mo.	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	**0.3**	**0.3**	**0.3**	**0.4**	**0.4**	**0.5**
Commercial Paper, 1-mo.	0.05	0.05	0.05	0.05	0.06	0.05	0.07	0.06	**0.1**	**0.1**	**0.1**	**0.2**	**0.2**	**0.4**
Treasury bill, 3-mo.	0.04	0.04	0.05	0.07	0.07	0.07	0.05	0.06	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.3**
Treasury bill, 6-mo.	0.07	0.06	0.07	0.10	0.10	0.10	0.08	0.09	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**	**0.4**
Treasury bill, 1 yr.	0.11	0.11	0.13	0.13	0.13	0.12	0.12	0.12	**0.2**	**0.2**	**0.3**	**0.4**	**0.5**	**0.7**
Treasury note, 2 yr.	0.41	040	0.41	0.39	0.34	0.30	0.34	0.33	**0.4**	**0.5**	**0.6**	**0.8**	**1.0**	**1.2**
Treasury note, 5 yr.	1.67	1.65	1.71	1.73	1.58	1.37	1.37	1.44	**1.7**	**1.8**	**1.9**	**2.1**	**2.2**	**2.4**
Treasury note, 10 yr.	2.86	2.86	2.96	3.01	2.90	2.72	2.62	2.75	**3.0**	**3.1**	**3.2**	**3.3**	**3.4**	**3.5**
Treasury note, 30 yr.	3.75	3.78	3.87	3.93	3.89	3.80	3.68	3.79	**3.9**	**4.0**	**4.1**	**4.3**	**4.3**	**4.4**
Corporate Aaa bond	4.47	4.48	4.53	4.55	4.62	4.63	4.53	4.59	**4.6**	**4.8**	**4.9**	**5.0**	**5.1**	**5.2**
Corporate Baa bond	5.17	5.19	5.28	5.35	5.38	5.38	5.31	5.36	**5.4**	**5.6**	**5.7**	**5.8**	**5.9**	**6.0**
State & Local bonds	4.50	4.55	4.68	4.75	4.73	4.60	4.56	4.63	**4.6**	**4.7**	**4.8**	**4.8**	**4.9**	**5.0**
Home mortgage rate	4.39	4.41	4.51	4.53	4.46	4.26	4.19	4.30	**4.6**	**4.7**	**4.8**	**5.0**	**5.1**	**5.2**
	History								Consensus Forecasts-Quarterly					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	*4Q**	1Q	2Q	3Q	4Q	1Q	2Q
Key Assumptions	2012	2012	2012	2012	2013	2013	2013	*2013*	2014	2014	2014	2014	2015	2015
Major Currency Index	72.9	73.9	74.0	73.2	74.7	76.4	76.7	76.0	**76.8**	**77.2**	**77.6**	**77.6**	**77.7**	**77.7**
Real GDP	3.7	1.2	2.8	0.1	1.1	2.5	4.1	*3.1*	**2.5**	**2.8**	**2.9**	**3.0**	**3.0**	**3.0**
GDP Price Index	2.0	1.8	2.3	1.1	1.3	0.6	2.0	*1.4*	**1.7**	**1.7**	**1.9**	**1.9**	**2.0**	**2.0**
Consumer Price Index	2.3	1.0	2.1	2.2	1.4	0.0	2.6	0.9	**1.8**	**1.8**	**2.1**	**2.0**	**2.1**	**2.0**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data for interest rates except LIBOR is from Federal Reserve Release (FRSR) H.15. LIBOR quotes available from *The Wall Street Journal*. Interest rate definitions are same as those in FRSR H.15. Treasury yields are reported on a constant maturity basis. Historical data for Fed's Major Currency Index is from FRSR H.10 and G.5. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). **Figures for 4Q 2013 Real GDP and GDP Chained Price Index are consensus forecasts based on a special question asked of the panelists' this month.*

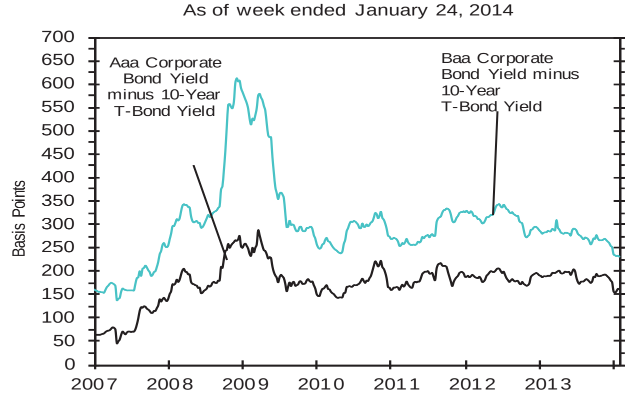
U.S. Treasury Yield Curve
Week ended January 24, 2014 and Year Ago vs.
1Q 2014 and 2Q 2015 Consensus Forecasts



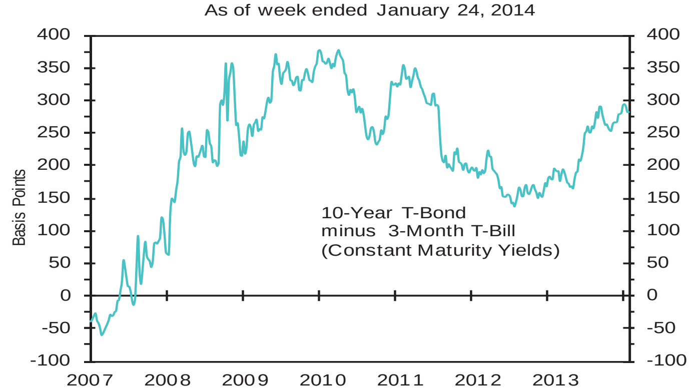
U.S. 3-Mo. T-Bills & 10-Yr. T-Note Yield



Corporate Bond Spreads
As of week ended January 24, 2014



U.S. Treasury Yield Curve
As of week ended January 24, 2014



Long-Range Estimates:

The table below contains results of our semi-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are estimates for the years 2015 through 2019 and averages for the five-year periods 2015-2019 and 2020-2024. Apply these projections cautiously. Few economic, demographic and political forces can be evaluated accurately over such long time spans.

		-----------Average For The Year------------					Five-Year Averages	
Interest Rates		**2015**	**2016**	**2017**	**2018**	**2019**	**2015-2019**	**2020-2024**
1. Federal Funds Rate	**CONSENSUS**	**0.4**	**1.7**	**2.9**	**3.6**	**3.9**	**2.5**	**3.7**
	Top 10 Average	0.8	2.6	3.9	4.2	4.5	3.2	4.4
	Bottom 10 Average	0.2	0.8	1.6	2.6	3.1	1.6	2.9
2. Prime Rate	**CONSENSUS**	**3.5**	**4.8**	**6.0**	**6.6**	**6.9**	**5.6**	**6.7**
	Top 10 Average	3.9	5.6	6.9	7.2	7.6	6.2	7.4
	Bottom 10 Average	3.3	4.1	5.0	5.7	6.1	4.8	5.8
3. LIBOR, 3-Mo.	**CONSENSUS**	**0.9**	**2.2**	**3.3**	**4.0**	**4.2**	**2.9**	**4.0**
	Top 10 Average	1.6	3.3	4.6	5.0	5.2	3.9	5.0
	Bottom 10 Average	0.4	1.1	2.0	2.8	3.3	1.9	3.0
4. Commercial Paper, 1-Mo.	**CONSENSUS**	**0.6**	**2.0**	**3.1**	**3.7**	**3.9**	**2.6**	**3.7**
	Top 10 Average	1.0	2.7	3.9	4.3	4.5	3.3	4.3
	Bottom 10 Average	0.3	1.3	2.3	2.9	3.1	2.0	3.0
5. Treasury Bill Yield, 3-Mo.	**CONSENSUS**	**0.5**	**1.7**	**2.9**	**3.5**	**3.7**	**2.5**	**3.6**
	Top 10 Average	1.0	2.7	3.9	4.3	4.5	3.3	4.3
	Bottom 10 Average	0.2	0.8	1.7	2.4	3.0	1.6	2.7
6. Treasury Bill Yield, 6-Mo.	**CONSENSUS**	**0.7**	**2.0**	**3.1**	**3.7**	**3.9**	**2.7**	**3.8**
	Top 10 Average	1.2	2.9	4.1	4.5	4.6	3.5	4.5
	Bottom 10 Average	0.3	1.1	1.9	2.7	3.1	1.8	2.8
7. Treasury Bill Yield, 1-Yr.	**CONSENSUS**	**0.9**	**2.2**	**3.2**	**3.8**	**4.0**	**2.8**	**3.9**
	Top 10 Average	1.5	3.2	4.3	4.7	4.8	3.7	4.6
	Bottom 10 Average	0.4	1.2	2.0	2.8	3.1	1.9	2.9
8. Treasury Note Yield, 2-Yr.	**CONSENSUS**	**1.4**	**2.6**	**3.6**	**4.0**	**4.3**	**3.2**	**4.2**
	Top 10 Average	2.0	3.5	4.5	4.9	5.0	4.0	4.9
	Bottom 10 Average	0.8	1.7	2.4	3.1	3.5	2.3	3.3
10. Treasury Note Yield, 5-Yr.	**CONSENSUS**	**2.3**	**3.3**	**4.1**	**4.4**	**4.6**	**3.7**	**4.4**
	Top 10 Average	2.9	4.0	4.8	5.1	5.3	4.4	5.1
	Bottom 10 Average	1.7	2.6	3.2	3.5	3.7	2.9	3.6
11. Treasury Note Yield, 10-Yr.	**CONSENSUS**	**3.4**	**4.1**	**4.6**	**4.8**	**5.0**	**4.4**	**4.9**
	Top 10 Average	3.9	4.8	5.3	5.6	5.8	5.1	5.6
	Bottom 10 Average	2.8	3.5	3.8	4.0	4.1	3.7	4.0
12. Treasury Bond Yield, 30-Yr.	**CONSENSUS**	**4.3**	**4.7**	**5.2**	**5.5**	**5.6**	**5.0**	**5.5**
	Top 10 Average	4.8	5.5	6.0	6.3	6.5	5.8	6.2
	Bottom 10 Average	3.7	4.0	4.4	4.6	4.7	4.3	4.6
13. Corporate Aaa Bond Yield	**CONSENSUS**	**4.9**	**5.4**	**5.9**	**6.2**	**6.3**	**5.7**	**6.2**
	Top 10 Average	5.6	6.2	6.7	7.0	7.2	6.5	7.0
	Bottom 10 Average	4.2	4.5	4.9	5.2	5.3	4.8	5.3
13. Corporate Baa Bond Yield	**CONSENSUS**	**5.9**	**6.3**	**6.8**	**7.1**	**7.2**	**6.7**	**7.0**
	Top 10 Average	6.5	7.1	7.5	7.9	8.1	7.4	7.9
	Bottom 10 Average	5.1	5.4	5.7	6.1	6.1	5.7	6.0
14. State & Local Bonds Yield	**CONSENSUS**	**4.8**	**5.2**	**5.6**	**5.7**	**5.7**	**5.4**	**5.5**
	Top 10 Average	5.2	5.9	6.3	6.5	6.6	6.1	6.3
	Bottom 10 Average	4.3	4.5	4.8	4.9	4.9	4.7	4.7
15. Home Mortgage Rate	**CONSENSUS**	**5.1**	**5.6**	**6.1**	**6.4**	**6.5**	**5.9**	**6.4**
	Top 10 Average	5.6	6.3	6.9	7.1	7.3	6.6	7.1
	Bottom 10 Average	4.4	5.0	5.3	5.5	5.6	5.2	5.6
A. FRB - Major Currency Index	**CONSENSUS**	**77.8**	**78.4**	**78.8**	**79.1**	**79.2**	**78.7**	**79.7**
	Top 10 Average	81.0	82.3	83.4	84.2	84.4	83.1	84.8
	Bottom 10 Average	74.6	74.3	74.0	73.7	74.0	74.1	74.7

		----------Year-Over-Year, % Change----------					Five-Year Averages	
		2015	**2016**	**2017**	**2018**	**2019**	**2015-2019**	**2020-2024**
B. Real GDP	**CONSENSUS**	**3.0**	**2.9**	**2.7**	**2.6**	**2.5**	**2.7**	**2.4**
	Top 10 Average	3.5	3.3	3.1	2.9	2.9	3.1	2.7
	Bottom 10 Average	2.5	2.5	2.3	2.1	2.2	2.3	2.1
C. GDP Chained Price Index	**CONSENSUS**	**2.0**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.5	2.5	2.6	2.5	2.5	2.5	2.5
	Bottom 10 Average	1.5	1.7	1.7	1.7	1.7	1.7	1.7
D. Consumer Price Index	**CONSENSUS**	**2.2**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**	**2.3**
	Top 10 Average	2.6	2.8	2.8	2.8	2.8	2.8	2.8
	Bottom 10 Average	1.7	1.9	1.9	1.9	2.0	1.9	1.9

United Water Rhode Island, Inc.
Derivation of Mean Equity Risk Premium Based on a Study
Using Holding Period Returns of Public Utilities

		Over A Rated Moody's Public Utility Bonds - AUS Consultants Study (1)
1.	Arithmetic Mean Holding Period Returns on the Standard & Poor's Utility Index 1926-2012 (2):	10.69 %
2.	Arithmetic Mean Yield on Moody's A Rated Public Utility Yields 1926-2012	(6.53)
3.	Historical Equity Risk Premium	4.16 %
4.	Forecasted Equity Risk Premium Based on PRPM™ (3)	5.24
5.	Average of Historical and PRPM™ Equity Risk Premium	4.70 %

Notes: (1) Based on S&P Public Utility Index monthly total returns and Moody's Public Utility Bond average monthly yields from 1926-2012, (AUS Consultants, 2013).

(2) Holding period returns are calculated based upon income received (dividends and interest) plus the relative change in the market value of a security over a one-year holding period.

(3) The Predictive Risk Premium Model (PRPM™) is applied to the risk premium of the monthly total returns of the S&P Utility Index and the monthly yields on Moody's A rated public utility bonds from 1928 - 2012.

United Water Rhode Island, Inc.
Indicated Common Equity Cost Rate Through Use
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)

	1	2	3	4	5	6
Proxy Group of Nine Water Companies	Value Line Adjusted Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate (3)	ECAPM Cost Rate (4)	Indicated Common Equity Cost Rate (5)
American States Water Co.	0.65	7.09 %	4.44 %	9.05 %	9.67 %	
American Water Works Co., Inc.	0.65	7.09	4.44	9.05	9.67	
Aqua America, Inc.	0.60	7.09	4.44	8.69	9.40	
Artesian Resources Corp.	0.55	7.09	4.44	8.34	9.14	
California Water Service Group	0.60	7.09	4.44	8.69	9.40	
Connecticut Water Service, Inc.	0.75	7.09	4.44	9.76	10.20	
Middlesex Water Company	0.75	7.09	4.44	9.76	10.20	
SJW Corporation	0.85	7.09	4.44	10.47	10.73	
York Water Company	0.70	7.09	4.44	9.40	9.93	
Average	0.68			9.25 %	9.82 %	9.54 %
Median	0.65			9.05 %	9.67 %	9.36 %

See page 23 for notes.

United Water Rhode Island, Inc.
Development of the Market-Required Rate of Return on Common Equity Using
the Capital Asset Pricing Model for
the Proxy Group of Nine Water Companies
Adjusted to Reflect a Forecasted Risk-Free Rate and Market Return

Notes:

(1) For reasons explained in Ms. Ahern's accompanying direct testimony, from the 13 weeks ending February 7, 2014, Value Line Summary & Index, a forecasted 3-5 year total annual market return of 8.74% can be derived by averaging the 13 weeks ending February 7, 2014 forecasted total 3-5 year total appreciation, converting it into an annual market appreciation and adding the Value Line average forecasted annual dividend yield.

The 3-5 year average total market appreciation of 30% produces a four-year average annual return of 6.78% ($(1.30^{0.25})$ - 1). When the average annual forecasted dividend yield of 1.96% is added, a total average market return of 8.74% (1.96% + 6.78%) is derived.

The 13 weeks ending February 7, 2014 forecasted total market return of 8.74% minus the risk-free rate of 4.44% (developed in Note 2) is 4.30% (8.74% - 4.44%).

The Predictive Risk Premium Model (PRPM™) market equity risk premium of 10.43% is derived by applying the PRPM™ to the monthly equity risk premium of large company common stocks over the income return on long-term U.S. Government Securities from January 1926 through December 2013.

The Morningstar, Inc. (Ibbotson Associates) calculated arithmetic mean monthly market equity risk premium of 6.55% for the period 1926-2012 results from a total market return of 11.83%% less the arithmetic mean income return on long-term U.S. Government Securities of 5.28% (11.83% - 5.28% = 6.55%).

These three expectational risk premiums are then averaged, resulting in a 7.09% market equity risk premium, which is then multiplied by the beta in column 1 of page 1 of this Schedule. ((4.30% + 10.43% + 6.55%)/3).

(2) For reasons explained in Ms. Ahern's direct testimony, the risk-free rate that Ms. Ahern relies upon for her CAPM analysis is the average forecast of 30-year Treasury Note yields per the consensus of nearly 50 economists reported in the Blue Chip Financial Forecasts dated December 1, 2013 and February 1, 2014 (see pages 19 & 20 of this Schedule).The estimates are detailed below:

	30-Year Treasury Note Yield
First Quarter 2014	3.90%
Second Quarter 2014	4.00%
Third Quarter 2014	4.10%
Fourth Quarter 2014	4.30%
First Quarter 2015	4.30%
Second Quarter 2015	4.40%
2015 – 2019	5.00%
2020 – 2024	5.50%
Average	4.44%

(3) The traditional Capital Asset Pricing Model (CAPM) is applied using the following formula:

$R_S = R_F + \beta (R_M - R_F)$

Where R_S = Return rate of common stock
R_F = Risk Free Rate
β = Value Line Adjusted Beta
R_M = Return on the market as a whole

(4) The empirical CAPM is applied using the following formula:

$R_S = R_F + .25 (R_M - R_F) + .75 \beta (R_M - R_F)$

Where R_S = Return rate of common stock
R_F = Risk-Free Rate
β = Value Line Adjusted Beta
R_M = Return on the market as a whole

Source of Information:
Value Line Summary & Index
Blue Chip Financial Forecasts, December 1, 2013 & February 1, 2014
Value Line Investment Survey, (Standard Edition)
2013 Ibbotson® SBBI® Valuation Yearbook, Morningstar, Inc., 2013, Chicago, IL

United Water Rhode Island, Inc.
Summary of Cost of Equity Models Applied to the
Proxy Group of Non-Price-Regulated Companies
Comparable in Total Risk to the
Proxy Group of Nine Water Companies

Principal Methods		Proxy Group of Twenty-Seven Non-Price-Regulated
Discounted Cash Flow Model (DCF) (1)		12.02 %
Risk Premium Model (RPM) (2)		10.32 %
Capital Asset Pricing Model (CAPM) (3)		9.67 %
	Average	10.67 %

Notes:
(1) From page 28 of this Schedule.
(2) From page 29 of this Schedule.
(3) From Page 32 of this Schedule.

United Water Rhode Island, Inc.
Basis of Selection of Comparable Risk
Domestic Non-Price Regulated Companies

Proxy Group of Nine Water Companies	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
American States Water Co.	0.70	0.48	3.3620	0.0650
American Water Works Co., Inc.	0.65	0.44	3.0655	0.0610
Aqua America, Inc.	0.60	0.36	2.5902	0.0501
Artesian Resources Corp.	0.55	0.30	2.6477	0.0512
California Water Service Group	0.65	0.40	2.7115	0.0524
Connecticut Water Service, Inc.	0.75	0.58	3.1061	0.0601
Middlesex Water Company	0.70	0.54	2.6637	0.0515
SJW Corporation	0.85	0.70	3.6057	0.0697
York Water Company	0.70	0.48	3.1325	0.0606
Average	0.68	0.48	2.9872	0.0580

Beta Range (+/- 2 std. Devs. of Beta)	0.36	0.60
2 std. Devs. of Beta	0.12	
Residual Std. Err. Range (+/- 2 std. Devs. of the Residual Std. Err.)	2.7246	3.2498
Std. dev. of the Res. Std. Err.	0.1313	
2 std. devs. of the Res. Std. Err.	0.2626	

United Water Rhode Island, Inc.
Proxy Group of Non-Price Regulated Companies Comparable in Total Risk to the Proxy Group of Nine Water Companies

Proxy Group of Twenty-Seven Non-Price-Regulated Companies	VL Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
Gallagher (Arthur J.)	0.75	0.57	2.9742	0.0575
Baxter Intl Inc.	0.70	0.49	2.9372	0.0568
Bristol-Myers Squibb	0.70	0.50	2.8839	0.0558
Brown & Brown	0.75	0.55	3.1464	0.0608
ConAgra Foods	0.65	0.42	2.7898	0.0540
Capitol Fed. Finl	0.60	0.39	3.0449	0.0589
Quest Diagnostics	0.75	0.59	2.7655	0.0535
Dun & Bradstreet	0.75	0.60	2.9024	0.0561
DaVita HealthCare	0.65	0.46	2.8841	0.0558
Haemonetics Corp.	0.65	0.41	2.7538	0.0533
Kroger Co.	0.60	0.36	2.8843	0.0558
Lancaster Colony	0.70	0.53	3.1660	0.0612
McKesson Corp.	0.75	0.58	3.2240	0.0623
Mercury General	0.70	0.48	3.0066	0.0581
Mead Johnson Nutrition	0.65	0.43	3.1630	0.0824
Annaly Capital Mgmt.	0.65	0.39	3.2022	0.0619
Northwest Bancshares	0.75	0.59	3.0864	0.0597
Owens & Minor	0.70	0.53	3.2368	0.0626
Peoples United Finl	0.65	0.46	2.8665	0.0554
Sherwin-Williams	0.70	0.48	2.9688	0.0574
Smucker (J.M.)	0.70	0.49	2.9429	0.0569
Silgan Holdings	0.75	0.56	2.8926	0.0559
Suburban Propane	0.70	0.54	3.0689	0.0593
Stericycle Inc.	0.70	0.49	2.9267	0.0566
Waste Connections	0.70	0.53	2.7663	0.0535
Weis Markets	0.65	0.42	2.9050	0.0562
Berkley (W.R.)	0.70	0.47	2.9475	0.0570
Average	0.69	0.49	2.9754	0.0583
Proxy Group of Nine Water Companies	0.68	0.48	2.9872	0.0580

Basis of Selection of the Group of Non-Price Regulated Companies
Comparable in Total Risk to the Proxy Group of Nine Water Companies

The criteria for selection of the proxy group of twenty-seven non-price regulated companies was that the non-price regulated companies be domestic and reported in Value Line Investment Survey (Standard Edition).

The proxy group of twenty-seven non-price regulated companies were then selected based upon the unadjusted beta range of 0.36 – 0.60 and standard error of the regression range of 2.7246 – 3.2498 of the water proxy group.

These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression. Plus or minus two standard deviations captures 95.50% of the distribution of unadjusted betas and standard errors of the regression.

The standard deviation of the water industry's standard error of the regression is 0.1313. The standard deviation of the standard error of the regression is calculated as follows:

$$\text{Standard Deviation of the Std. Err. of the Regr.} = \frac{\text{Standard Error of the Regression}}{\sqrt{2N}}$$

where: N = number of observations. Since Value Line betas are derived from weekly price change observations over a period of five years, N = 259

$$\text{Thus, } 0.1313 = \frac{2.9872}{\sqrt{518}} = \frac{2.9872}{22.7596}$$

Source of Information: Value Line, Inc., June 15, 2013
Value Line Investment Survey (Standard Edition)

United Water Rhode Island, Inc.
DCF Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to
the Proxy Group of Nine Water Companies

Proxy Group of Twenty-Seven Non-Price-Regulated Companies	Average Dividend Yield	Value Line Projected Five Year Growth in EPS	Reuters Mean Consensus Projected Five Year Growth Rate in EPS	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth Rate in EPS	Adjusted Dividend Yield	Indicated Common Equity Cost Rate
Gallagher (Arthur J.	2.99 %	12.50 %	12.00 %	10.70 %	12.36 %	11.89 %	3.17 %	15.06 %
Baxter Intl Inc.	2.88	8.50	7.40	8.50	7.44	7.96	3.00	10.96
Bristol-Myers Squibb	2.69	10.00	13.00	9.10	13.67	11.44	2.84	14.28
Brown & Brown	1.28	14.00	14.00	13.10	15.53	14.16	1.38	15.54
ConAgra Foods	3.06	11.00	8.80	8.70	8.70	9.30	3.21	12.51
Capitol Fed. Finl	2.51	6.00	5.00	3.50	5.00	4.88	2.57	7.45
Quest Diagnostics	2.12	7.00	9.80	10.60	9.84	9.31	2.22	11.53
Dun & Bradstreet	1.37	9.00	9.90	9.90	9.05	9.46	1.44	10.90
DaVita Inc.	-	14.00	12.00	12.30	12.22	12.63	-	NA
Haemonetics Corp.	-	11.00	13.00	12.30	13.00	12.33	-	NA
Kroger Co.	1.51	10.50	7.90	7.20	7.90	8.38	1.58	9.96
Lancaster Colony	1.87	6.00	7.00	NA	7.00	6.67	1.93	8.60
McKesson Corp.	0.59	10.50	19.00	14.00	19.93	15.86	0.63	16.49
Mercury General	5.15	8.00	2.10	2.10	2.10	3.58	5.24	8.82
Mead Johnson Nutrition	1.65	12.00	10.00	11.80	10.75	11.14	1.74	12.88
Annaly Capital Mgmt.	13.89	(2.50)	NA	3.50	(4.70)	3.50	14.13	17.63
Northwest Bancshares, Inc.	3.63	8.50	5.00	5.00	5.00	5.88	3.74	9.62
Owens & Minor	2.63	10.50	13.00	9.00	13.00	11.38	2.78	14.16
Peoples United Fin	4.44	19.00	12.00	6.50	12.07	12.39	4.71	17.10
Sherwin-Williams	1.08	16.50	14.00	14.60	14.10	14.80	1.16	15.96
Smucker (J.M.)	2.27	8.50	8.40	7.70	8.43	8.26	2.37	10.63
Silgan Holdings	1.20	10.50	9.70	10.30	9.73	10.06	1.26	11.32
Suburban Propane	7.81	6.00	23.00	3.00	23.00	13.75	8.35	22.10
Stericycle Inc.	-	12.00	15.00	16.00	15.67	14.67	-	NA
Waste Connections	0.94	12.00	13.00	19.50	13.85	14.59	1.01	15.60
Weis Markets	2.37	3.50	NA	NA	NA	3.50	2.41	5.91
Berkley (W.R.)	0.94	12.50	7.90	9.50	6.91	9.20	0.99	10.19
Average								12.72 %
Median								12.02 %

NA= Not Available
NMF= Not Meaningful Figure

(1) Ms. Ahern's application of the DCF model to the domestic, non-price regluated comparable risk companies is identical to the application of the DCF to her proxy group of water companies. She uses the 60 day average price and the spot indicated dividend as of February 4, 2014 for her dividend yield and then adjusts that yield for 1/2 the average projected growth rate in EPS, which is calculated by averaging the 5 year projected growth in EPS provided by Value Line, www.reuters.com, www.zacks.com, and www.yahoo.com (excluding any negative growth rates) and then adding that growth rate to the adjusted dividend yield.

Source of Information: Value Line Investment Survey:
www.reuters.com Downloaded on 02/05/2014
www.zacks.com Downloaded on 02/05/2014
www.yahoo.com Downloaded on 02/05/2014

United Water Rhode Island, Inc.
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

Line No.		Proxy Group of Twenty-Seven Non-Price-Regulated Companies
1.	Prospective Yield on Baa Rated Corporate Bonds (1)	6.01 %
2.	Equity Risk Premium (2)	4.31
3.	Risk Premium Derived Common Equity Cost Rate	10.32 %

Notes: (1) Average forecast based upon estimates of Baa rated corporate bonds per the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts dated December 1, 2013 and February 1, 2014 (see pages 19 and 20 of this Schedule). The estimates are detailed below.

First Quarter 2014	5.40 %
Second Quarter 2014	5.60
Third Quarter 2014	5.70
Fourth Quarter 2014	5.80
First Quarter 2015	5.90
Second Quarter 2015	6.00
2015-2019	6.70
2020-2024	7.00
Average	6.01 %

(2) From page 31 of this Schedule.

United Water Rhode Island, Inc.
Comparison of Bond Ratings for the
Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Nine Water Companies

	Moody's Bond Rating February 2014		Standard & Poor's Bond Rating February 2014	
Proxy Group of Twenty-Seven Non-Price-Regulated Companies	Bond Rating	Numerical Weighting (1)	Bond Rating	Numerical Weighting (1)
Gallagher (Arthur J.)	NA	--	NA	--
Baxter Intl Inc.	A3	10.0	A	6.0
Bristol-Myers Squibb	A2	6.0	A+	5.0
Brown & Brown	NA	--	NA	--
ConAgra Foods	Baa2	9.0	BB+	11.0
Capitol Fed. Finl	NA	16.0	NA	--
Quest Diagnostics	Baa2	9.0	BBB+	8.0
Dun & Bradstreet	NA	--	NA	--
DaVita HealthCare	Ba3	13.0	B	15.0
Haemonetics Corp.	NA	--	NA	--
Kroger Co.	Baa2	9.0	BBB	9.0
Lancaster Colony	NA	--	NA	--
McKesson Corp.	Baa2	9.0	A-	7.0
Mercury General	NA	--	NA	--
Mead Johnson Nutrition	NA	--	BBB-	10.0
Annaly Capital Mgmt.	NA	--	NA	--
Northwest Bancshares	NA	--	NA	--
Owens & Minor	Ba1	11.0	BBB	9.0
Peoples United Finl	A3	7.0	BBB+	8.0
Sherwin-Williams	A3	7.0	A	6.0
Smucker (J.M.)	A3	7.0	NA	--
Silgan Holdings	Ba1	11.0	BB-	13.0
Suburban Propane	Ba2	12.0	BB-	13.0
Stericycle Inc.	NA	--	NA	--
Waste Connections	NA	--	NA	--
Weis Markets	NA	--	NA	--
Berkley (W.R.)	Baa2	9.0	BBB+	8.0
Average	Baa2	9.7	BBB	9.1

Notes:
(1) From Schedule PMA-7, page 5 of Ms. Ahern's Direct Testimony.

Source of Information:
Standard & Poor's Bond Guide January 2014
www.moodys.com; downloaded 2/5/2014

United Water Rhode Island, Inc.
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for
the Proxy Group of Non-Price-Regulated Companies
Proxy Group of Nine Water Companies

Line No.		Proxy Group of Twenty-Seven Non-Price-Regulated Companies
	Based on SBBI Valuation Yearbook Data:	
1.	Ibbotson Equity Risk Premium (1)	5.60 %
2.	Ibbotson Equity Risk Premium based on PRPM™ (2)	9.33
	Based on Value Line Summary and Index:	
3.	Equity Risk Premium Based on Value Line Summary and Index (3)	3.55
4.	Conclusion of Equity Risk Premium (4)	6.16 %
5.	Adjusted Value Line Beta (5)	0.70
6.	Forecasted Equity Risk Premium	4.31 %

Notes: (1) Based on the arithmetic mean historical monthly returns on large company common stocks from Ibbotson® SBBI® 2013 Valuation Yearbook - Market Results for Stocks, Bonds, Bills, and Inflation minus the arithmetic mean monthly yield of Moody's Aaa and Aa corporate bonds from 1926 - 2012. (11.83% - 6.23% = 5.60%).

(2) The Predictive Risk Premium Model (PRPM™) is discussed in Ms. Ahern's accompanying direct testimony. The Ibbotson equity risk premium based on the PRPM™ is derived by applying the PRPM™ to the monthly risk premiums between Ibbotson large company common stock monthly returns minus the average Aaa and Aa corporate monthly bond yields, from January 1928 through December 2013.

(3) From page 18 of this schedule.
(4) Average of Lines 1, 2, & 3.Average of Lines 1, 2, & 3.
(5) Median beta derived from page 32 of this Schedule.

Sources of Information:
Ibbotson® SBBI® 2013 Valuation Yearbook - Market Results for Stocks, Bonds, Bills, and Inflation, Morningstar, Inc., 2013 Chicago, IL.

Value Line Summary and Index
Blue Chip Financial Forecasts, December 1,2013 and February 1, 2014

United Water Rhode Island, Inc.
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Nine Water Companies

Proxy Group of Twenty-Seven Non-Price-Regulated Companies	Value Line Adjusted Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate (3)	ECAPM Cost Rate (4)	Indicated Common Equity Cost Rate (5)
Gallagher (Arthur J.)	0.75	7.09 %	4.44 %	9.76 %	10.20 %	
Baxter Intl Inc.	0.70	7.09	4.44	9.40	9.93	
Bristol-Myers Squibb	0.70	7.09	4.44	9.40	9.93	
Brown & Brown	0.75	7.09	4.44	9.76	10.20	
ConAgra Foods	0.65	7.09	4.44	9.05	9.67	
Capitol Fed. Finl	0.60	7.09	4.44	8.69	9.40	
Quest Diagnostics	0.75	7.09	4.44	9.76	10.20	
Dun & Bradstreet	0.75	7.09	4.44	9.76	10.20	
DaVita HealthCare	0.65	0.00	4.44	4.44	4.44	
Haemonetics Corp.	0.65	0.00	4.44	4.44	4.44	
Kroger Co.	0.60	0.00	4.44	4.44	4.44	
Lancaster Colony	0.70	0.00	4.44	4.44	4.44	
McKesson Corp.	0.75	0.00	4.44	4.44	4.44	
Mercury General	0.70	7.09	4.44	9.40	9.93	
Mead Johnson Nutrition	0.65	7.09	4.44	9.05	9.67	
Annaly Capital Mgmt.	0.65	7.09	4.44	9.05	9.67	
Northwest Bancshares	0.75	7.09	4.44	9.76	10.20	
Owens & Minor	0.70	7.09	4.44	9.40	9.93	
Peoples United Finl	0.65	7.09	4.44	9.05	9.67	
Sherwin-Williams	0.70	7.09	4.44	9.40	9.93	
Smucker (J.M.)	0.70	7.09	4.44	9.40	9.93	
Silgan Holdings	0.75	7.09	4.44	9.76	10.20	
Suburban Propane	0.70	7.09	4.44	9.40	9.93	
Stericycle Inc.	0.70	7.09	4.44	9.40	9.93	
Waste Connections	0.70	7.09	4.44	9.40	9.93	
Weis Markets	0.65	7.09	4.44	9.05	9.67	
Berkley (W.R.)	0.70	7.09	4.44	9.40	9.93	
Average	0.69			8.47 %	8.91 %	8.69 %
Median	0.70			9.40 %	9.93 %	9.67 %

Notes:
(1) From page 23, note 1 of this Schedule.
(2) From page 23, note 2 of this Schedule.
(3) Derived from the model shown on page 23, note 3 of this Schedule.
(4) Derived from the model shown on page 23, note 4 of this Schedule.
(5) Average of CAPM and ECAPM cost rates.

United Water Rhode Island, Inc.
Derivation of Investment Risk Adjustment Based upon
Ibbotson Associates' Size Premia for the Decile Portfolios of the NYSE/AMEX/NASDAQ

Line No.		1 Market Capitalization on February 4, 2014 (1) (millions)	1 (times larger)	2 Applicable Decile of the NYSE/AMEX/ NASDAQ (2)	3 Applicable Size Premium (3)	4 Spread from Applicable Size Premium for (4)
1.	United Water Rhode Island, Inc.					
	a. Based Upon the Proxy Group of Nine Water Companies	$ 12.184		10	6.03%	
	b. Based Upon Mr. Kahal's Water Proxy Group	$ 12.627		10	6.03%	
2.	Proxy Group of Nine Water Companies	$ 1,680.289	137.9 x	6	1.72%	4.31%
3.	Mr. Kahal's Proxy Group	$ 1,868.672	148.0 x	5 - 6	1.70%	4.33%

	(A) Decile	(B) Number of Companies (millions)	(C) Recent Total Market Capitalization (millions)	(D) Recent Average Market Capitalization (millions)	(E) Size Premium (Return in Excess of CAPM) (2)
Largest	1	173	$ 10,255,341.469	$ 59,279.430	-0.37%
	2	193	2,219,118.548	$ 11,498.024	0.76%
	3	187	1,072,861.025	$ 5,737.225	0.92%
	4	202	695,897.336	$ 3,445.036	1.14%
	5	205	473,139.390	$ 2,307.997	1.70%
	6	234	377,485.205	$ 1,613.185	1.72%
	7	317	329,504.738	$ 1,039.447	1.73%
	8	329	214,084.258	$ 650.712	2.46%
	9	466	166,708.095	$ 357.743	2.70%
Smallest	10	1068	107,517.520	$ 100.672	6.03%

*From Ibbotson 2013 Yearbook

Notes:
(1) From Page 34 of this Schedule.
(2) Gleaned from Column (D) on the bottom of this page. The appropriate decile (Column (A)) corresponds to the market capitalization of the proxy group, which is found in Column 1.
(3) Corresponding risk premium to the decile is provided on Column (E) on the bottom of this page.
(4) Line No. 1a Column 3 – Line No. 2 Column 3 and Line No. 1b, Column 3 – Line No. 3 of Column 3 etc.. For example, the 4.31% in Column 4, Line No. 2 is derived as follows 4.31% = 6.03% - 1.72%.

United Water Rhode Island, Inc.
Market Capitalization of United Water Rhode Island, Inc. and
the Proxy Group of Nine Water Companies

Company	Exchange	1 Common Stock Shares Outstanding at Fiscal Year End 2012 (millions)	2 Book Value per Share at Fiscal Year End 2012 (1)	3 Total Common Equity at Fiscal Year End 2012 (millions)	4 Closing Stock Market Price on February 04, 2014	5 Market-to-Book Ratio on February 04, 2014 (2)	6 Market Capitalization on February 04, 2014 (3) (millions)
United Water Rhode Island, Inc.		NA	NA	$ 5.915 (4)	NA		
Based Upon the Proxy Group of Nine Water Companies						206.0 % (5)	$ 12.184 (6)
Based Upon Mr. Kahal's Water Proxy Group						213.5 % (7)	$ 12.627 (8)
Proxy Group of Nine Water Companies							
American States Water Co.		38.474	$ 11.815	$ 454.579	$ 27.740	234.8 %	$ 1,067.281
American Water Works Co., Inc.		176.988	$ 25.115	$ 4,444.988	$ 41.760	166.3	$ 7,391.019
Aqua America, Inc.		175.209	$ 7.909	$ 1,385.704	$ 23.370	295.5	$ 4,094.636
Artesian Resources Corp.		7.838	$ 15.078	$ 118.180	$ 22.100	146.6	$ 173.222
California Water Service Group		41.908	$ 11.304	$ 473.712	$ 22.590	199.8	$ 946.707
Connecticut Water Service, Inc.		10.939	$ 17.014	$ 186.121	$ 32.620	191.7	$ 356.846
Middlesex Water Company		15.795	$ 11.499	$ 181.632	$ 19.670	171.1	$ 310.688
SJW Corporation		18.671	$ 14.708	$ 274.604	$ 28.160	191.5	$ 525.763
York Water Company		12.919	$ 7.727	$ 99.825	$ 19.850	256.9	$ 256.435
Average		55.416	$ 13.574	$ 846.594	$ 26.429	206.0 %	$ 1,680.289
Average of Mr. Kahal's Water Proxy Group		61.363	$ 13.386	$ 937.646	$ 26.970	213.450 %	$ 1,868.672

NA= Not Available

Notes:
(1) Column 3 / Column 1.
(2) Column 4 / Column 2.
(3) Column 5 * Column 3.
(4) Total capitalization of United Water Rhode Island multiplied by the recommended common equity ratio (11.065M x 53.45% = 5.915M).
(5) The market-to-book ratio of United Water Rhode Island, Inc. on February 04, 2014 is assumed to be equal to the market-to-book ratio of the Proxy Group of Nine Water Companies at February 04, 2014.
(6) United Water Rhode Island, Inc.'s common stock, if traded, would trade at a market-to-book ratio equal to the average market-to-book ratio at February 04, 2014 of the Proxy Group of Nine Water Companies, 206%, and United Water Rhode Island, Inc.'s market capitalization on February 04, 2014 would therefore have been $12.184 million.
(7) The market-to-book ratio of United Water Rhode Island, Inc. on February 04, 2014 is assumed to be equal to the market-to-book ratio of the Mr. Kahal's Water Proxy Group at February 04, 2014.
(8) United Water Rhode Island, Inc.'s common stock, if traded, would trade at a market-to-book ratio equal to the average market-to-book ratio at February 04, 2014 of the Mr. Kahal's Water Proxy Group, 213.5%, and United Water Rhode Island, Inc.'s market capitalization on February 04, 2014 would therefore have been $12.627 million.

Source of Information: 2012 Annual Forms 10K
yahoo.finance.com