**BEFORE THE NEW YORK STATE PUBLIC SERVICE COMMISSION**

In the matter of:

APPLICATION OF CENTRAL HUDSON GAS )
& ELECTRIC CORPORATION ) CASE NO.'s 08-E-XXXX
FOR AN INCREASE IN ELECTRIC AND GAS RATES ) and 08-G-XXXX

TESTIMONY

OF

ROGER A. MORIN, PhD

July 2008

**CENTRAL HUDSON GAS AND ELECTRIC CORPORATION**

**TESTIMONY OF DR. ROGER A MORIN**

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## INTRODUCTION

Q. Please state your name, address, and occupation.

A. My name is Dr. Roger A. Morin. My business address is Georgia State University, Robinson College of Business, University Plaza, Atlanta, Georgia, 30303. I am Emeritus Professor of Finance at the Robinson College of Business, Georgia State University and Professor of Finance for Regulated Industry at the Center for the Study of Regulated Industry at Georgia State University. I am also a principal in Utility Research International, an enterprise engaged in regulatory finance and economics consulting to business and government.

Q. Please describe your educational background.

A. I hold a Bachelor of Engineering degree and an MBA in Finance from McGill University, Montreal, Canada. I received my Ph.D. in Finance and Econometrics at the Wharton School of Finance, University of Pennsylvania.

Q. Please summarize your academic and business career.

A. I have taught at the Wharton School of Finance, University of Pennsylvania, Amos Tuck School of Business at Dartmouth College, Drexel University, University of Montreal, McGill University, and Georgia State University. I was a faculty member of Advanced Management Research International, and I am currently a faculty member of The Management Exchange Inc. and Exnet, where I continue to conduct frequent national executive-level education seminars throughout the United States and Canada. In the last thirty years, I have conducted numerous national seminars on “Utility Finance,” "Utility Cost of Capital," "Alternative Regulatory Frameworks," and on "Utility Capital Allocation," which I have developed on behalf of The Management Exchange Inc.

in conjunction with Public Utilities Reports, Inc.

I have authored or co-authored several books, monographs, and articles in academic scientific journals on the subject of finance. They have appeared in a variety of journals, including The Journal of Finance, The Journal of Business Administration, International Management Review, and Public Utility Fortnightly. I published a widely-used treatise on regulatory finance, Utilities' Cost of Capital, Public Utilities Reports, Inc., Arlington, Va. 1984. My second book on regulatory matters, Regulatory Finance, is a voluminous treatise on the application of finance to regulated utilities and was released by the same publisher in late 1994. A revised and expanded edition, The New Regulatory Finance, was published in 2006. I have engaged in extensive consulting activities on behalf of numerous corporations, legal firms, and regulatory bodies in matters of financial management and corporate litigation. Exhibit RAM-1 describes my professional credentials in more detail.

Q. Have you previously testified on cost of capital before regulatory bodies?

A. Yes, I have been a cost of capital witness before nearly fifty (50) regulatory bodies in North America, including the New York State Public Service Commission ("NYPSC"), the Federal Energy Regulatory Commission and the Federal Communications Commission. I have testified before regulatory bodies in the following states:

| | | | |
|---|---|---|---|
| Alabama | Hawaii | Montana | Ontario |
| Alaska | Illinois | Nevada | Oregon |
| Alberta | Indiana | New Brunswick | Pennsylvania |
| Arizona | Iowa | New Hampshire | Quebec |
| Arkansas | Kentucky | New Jersey | South Carolina |
| British Columbia | Louisiana | New York | South Dakota |
| California | Maine | Newfoundland | Tennessee |
| Colorado | Manitoba | North Carolina | Texas |
| Delaware | Michigan | North Dakota | Utah |
| District of Columbia | Minnesota | Nova Scotia | Vermont |
| Florida | Mississippi | Ohio | Washington |
| Georgia | Missouri | Oklahoma | West Virginia |

The details of my participation in regulatory proceedings are provided in Exhibit RAM-1.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to present an independent appraisal of the fair and reasonable rate of return on the common equity capital ("ROE") invested in Central Hudson Gas & Electric Corporation's ("CHG&E" or the "Company") energy delivery operations in the State of New York. Based upon this appraisal, I have formed my professional judgment as to a return on such capital that would: (1) be fair to customers, (2) allow the Company to attract equity capital on reasonable terms, (3) maintain the Company's financial integrity, and (4) be comparable to returns offered on comparable risk investments. I will testify in this proceeding as to the basis for that opinion.

This testimony and accompanying schedules were prepared by me or under my direct supervision and control. The source documents for my testimony are Company records, public documents, and my personal knowledge and experience.

Q. Please briefly identify the schedules and appendices accompanying your testimony.

A. I have attached to my testimony Exhibit RAM-1 through Exhibit RAM-8 and Appendices A and B. These Exhibits and Appendices relate directly to points in my testimony, and are described in further detail in connection with the discussion of those points in my testimony.

Q. Please summarize your findings and recommendation.

A. I recommend the adoption of a ROE in the range of 10.2% to 11.4% on CHG&E's electric and gas delivery operations. My recommendation is derived from studies that I performed using the Capital Asset Pricing Model ("CAPM"), Risk Premium, and Discounted Cash Flow ("DCF") methodologies. I performed two CAPM analyses, one using the plain vanilla CAPM and another using an empirical approximation of the CAPM ("ECAPM"). I performed two risk premium analyses: (1) a historical risk premium analysis on the electric utility industry, and (2) a study of the risk premiums allowed in the electric utility industry. I also performed DCF analyses on two surrogates for the Company's electricity delivery business. They are: a group of investment-grade electricity delivery utilities and a group consisting of the companies that make up Moody's Electric Utility Index.

My recommended rate of return reflects the application of my professional judgment to the indicated returns from my CAPM, Risk Premium, and DCF analyses.

Q. Dr. Morin, please describe how your testimony is organized.

A. The remainder of my testimony is divided into three (3) sections:

I. Regulatory Framework and Rate of Return;

II. Cost of Equity Estimates; and

III. Summary and Cost of Equity Recommendation.

The first section discusses the rudiments of rate of return regulation and the basic notions underlying rate of return. The second section contains the application of CAPM, Risk Premium, and DCF tests. The third section summarizes the results from the various approaches used in determining a fair return.

## I. REGULATORY FRAMEWORK AND RATE OF RETURN

Q. What economic and financial concepts have guided your assessment of CHG&E's cost of common equity?

A. Two fundamental economic principles underlie the appraisal of the Company's cost of equity, one relating to the supply side of capital markets, the other to the demand side. According to the first principle, a rational investor maximizes the performance of his or her portfolio only if he or she expects the returns earned on investments of comparable risk to be the same. If not, the rational investor will switch out of those investments yielding lower returns at a given risk level in favor of those investment activities offering higher returns for the same degree of risk. This principle implies that a company will be unable to attract the capital funds it needs to meet its service demands and to maintain financial integrity unless it can offer returns to capital suppliers that are comparable to those achieved on competing investments of similar risk. On the demand side, the second principle asserts that a company will continue to invest in real physical assets if the return on these investments exceeds or equals the company's marginal

cost of capital. This concept suggests that a regulatory commission should set rates at a level sufficient to create at least equality between the return on physical asset investments and the company's cost of capital.

Q. How does CHG&E's cost of capital relate to that of its parent company, CH Energy Group, Inc. ("CH Energy Group")?

A. I am treating CHG&E's electric delivery operations as a separate stand-alone entity, distinct from its holding company, CH Energy Group, because it is the cost of capital for CHG&E's electric and gas utility business that we are attempting to measure and not the cost of capital for CH Energy Group's consolidated activities. Financial theory establishes that the true cost of capital depends on the use to which the capital is put, in this case CHG&E's electric and gas delivery operations in the State of New York. The specific source of funding an investment and the cost of funds to the investor are irrelevant considerations.

For example, if an individual investor borrows money at the bank at an after-tax cost of 8% and invests the funds in a speculative oil extraction venture, the required return on the investment is not the 8% cost but, rather, the return foregone in speculative projects of similar risk, say 20%. Similarly, the required return on CHG&E is the return foregone in comparable risk electric delivery operations, and is unrelated to the parent's cost of capital. The cost of capital is governed by the risk to which the capital is exposed and not by the source of funds. The identity of the shareholders has no bearing on the cost of equity, be it either individual investors or a parent holding company.

Just as individual investors require different returns from different assets in managing their personal affairs, corporations behave in the same manner. A

parent company normally invests money in many operating companies of varying sizes and varying risks. These operating subsidiaries pay different rates for the use of investor capital, such as for long-term debt capital, because investors recognize the differences in capital structure, risk, and prospects between subsidiaries. Thus, the cost of investing funds in an operating utility company such as CHG&E is the return foregone on investments of similar risk and is unrelated to the investor's identity.

Q. Under traditional cost of service regulation, please explain how a regulated company's rates should be set.

A. Under the traditional regulatory process, a regulated company's rates should be set so that the company recovers its costs, including taxes and depreciation, plus a fair and reasonable return on its invested capital. The allowed rate of return must necessarily reflect the cost of the funds obtained, that is, investors' return requirements. In determining a company's rate of return, the starting point is investors' return requirements in financial markets. A rate of return can then be set at a level sufficient to enable the company to earn a return commensurate with the cost of those funds.

Funds can be obtained in two general forms, debt capital and equity capital. The cost of debt funds can be easily ascertained from an examination of the contractual interest payments. The cost of common equity funds, that is, investors' required rate of return, is more difficult to estimate. It is the purpose of the next section of my testimony to estimate CHG&E's cost of common equity capital.

Q. Dr. Morin, what must be considered in estimating a fair ROE?

A. The legal requirement is that the allowable ROE should be commensurate with returns on investments in other firms having corresponding risks. The allowed return should be sufficient to assure confidence in the financial integrity of the firm, in order to maintain creditworthiness, and ability to attract capital on reasonable terms. The attraction of capital standard focuses on investors' return requirements that are generally determined using market value methods, such as the Risk Premium, CAPM, or DCF methods. These market value tests define fair return as the return that investors anticipate when they purchase equity shares of comparable risk in the financial marketplace. This return is a market rate of return, defined in terms of anticipated dividends and capital gains as determined by expected changes in stock prices, and reflects the opportunity cost of capital. The economic basis for market value tests is that new capital will be attracted to a firm only if the return expected by the suppliers of funds is commensurate with that available from alternative investments of comparable risk.

Q. What fundamental principles underlie the determination of a fair and reasonable ROE?

A. The heart of utility regulation is the setting of just and reasonable rates by way of a fair and reasonable return. There are two landmark United States Supreme Court cases that define the legal principles underlying the regulation of a public utility's rate of return and provide the foundations for the notion of a fair return:

1. Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. 679 (1923).

2. Federal Power Commission v. Hope Natural Gas Company, 320 U.S. 591 (1944).

The Bluefield case set the standard against which just and reasonable rates

of return are measured:

*A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties ... The return should be reasonable, sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise money necessary for the proper discharge of its public duties. (Emphasis added)*

The Hope case expanded on the guidelines to be used to assess the reasonableness of the allowed return. The Court reemphasized its statements in the Bluefield case and recognized that revenues must cover "capital costs." The Court stated:

*From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock ... By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and attract capital. (Emphasis added)*

The United States Supreme Court reiterated the criteria set forth in Hope in Federal Power Commission v. Memphis Light, Gas & Water Division, 411 U.S. 458 (1973), in Permian Basin Rate Cases, 390 U.S. 747 (1968), and most recently in Duquesne Light Co. vs. Barasch, 488 U.S. 299 (1989). In the Permian cases, the Supreme Court stressed that a regulatory agency's rate of return order should:

*...reasonably be expected to maintain financial integrity, attract necessary capital, and fairly compensate investors for the risks they have assumed...*

Therefore, the "end result" of the Commission's decision should be to allow CHG&E the opportunity to earn a return on equity that is: (1) commensurate with

returns on investments in other firms having corresponding risks, (2) sufficient to assure confidence in the Company's financial integrity, and (3) sufficient to maintain the Company's creditworthiness and ability to attract capital on reasonable terms.

Q. How is the fair rate of return determined?

A. The aggregate return required by investors is called the "cost of capital." The cost of capital is the opportunity cost, expressed in percentage terms, of the total pool of capital employed by the utility. It is the composite weighted cost of the various classes of capital (i.e., bonds, preferred stock, common stock) used by the utility, with the weights reflecting the proportions of the total capital that each class of capital represents. The fair return in dollars is obtained by multiplying the rate of return set by the regulator by the utility's "rate base." The rate base is essentially the net book value of the utility's plant and other assets used to provide utility service in a particular jurisdiction.

While utilities like CHG&E enjoy varying degrees of monopoly in the sale of public utility services, they must compete with everyone else in the free, open market for the input factors of production, whether they be labor, materials, machines, or capital. The prices of these inputs are set in the competitive marketplace by supply and demand, and it is these input prices that are incorporated in the cost of service computation. This item is just as true for capital as for any other factor of production. Since utilities and other investor-owned businesses must go to the open capital markets and sell their securities in competition with every other issuer, there is obviously a market price to pay for the capital they require, for example, the interest on debt capital, or the expected

market return on common and/or preferred equity.

Q. How does the concept of a fair return relate to the concept of opportunity cost?

A. The concept of a fair return is intimately related to the economic concept of "opportunity cost." When investors supply funds to a utility by buying its stocks or bonds, they are not only postponing consumption, giving up the alternative of spending their dollars in some other way, they also are exposing their funds to risk and forgoing returns from investing their money in alternative comparable-risk investments. The compensation that they require is the price of capital. If there are differences in the risk of the investments, competition among firms for a limited supply of capital will bring different prices. These differences in risk are translated by the capital markets into price differences in much the same way that differences in the characteristics of commodities are reflected in different prices.

The important point is that market prices of debt capital and equity capital are set by supply and demand, and both are influenced by the relationship between the risk and return expected for the respective securities and the risks expected from the overall menu of available securities.

Q. How does the Company obtain its capital and how is its overall cost of capital determined?

A. The funds employed by the Company are obtained in two general forms, debt capital and equity capital. The latter consists of preferred equity capital and common equity capital. The cost of debt funds and preferred stock funds can be ascertained easily from an examination of the contractual terms for the interest payments and preferred dividends. The cost of common equity funds, that is, equity investors' required rate of return, is more difficult to estimate because the

dividend payments received from common stock are not contractual or guaranteed in nature. They are uneven and risky, unlike interest payments. Once a cost of common equity estimate has been developed, it can then easily be combined with the embedded cost of debt and preferred stock, based on the utility's capital structure, in order to arrive at the overall cost of capital.

Q. What is the market required rate of return on equity capital?

A. The market required rate of return on common equity, or cost of equity, is the return demanded by the equity investor. Investors establish the price for equity capital through their buying and selling decisions. Investors set return requirements according to their perception of the risks inherent in the investment, recognizing the opportunity cost of forgone investments, and the returns available from other investments of comparable risk.

## II. COST OF EQUITY ESTIMATES

Q. Dr. Morin, how did you estimate the fair ROE for CHG&E?

A. I employed three methodologies: (1) the CAPM, (2) the Risk Premium, and (3) the DCF. All three items are market-based methodologies and are designed to estimate the return required by investors on the common equity capital committed to CHG&E.

Q. Why did you use more than one approach for estimating the cost of equity?

A. No one individual method provides the necessary level of precision for determining a fair return, but each method provides useful evidence to facilitate the exercise of an informed judgment. Reliance on any single method or preset formula is inappropriate when dealing with investor expectations because of possible measurement difficulties and vagaries in individual companies' market

data. Examples of such vagaries include dividend suspension, insufficient or unrepresentative historical data due to a recent merger, impending merger or acquisition, and a new corporate identity due to restructuring activities. The advantage of using several different approaches is that the results of each one can be used to check the others.

As a general proposition, it is extremely dangerous to rely on only one generic methodology to estimate equity costs. The difficulty is compounded when only one variant of that methodology is employed. It is compounded even further when that one methodology is applied to a single company. Hence, several methodologies applied to several comparable risk companies should be employed to estimate the cost of common equity.

Q. Dr. Morin, are you aware that some regulatory commissions and some analysts have placed principal reliance on DCF-based analyses to determine the cost of equity for public utilities?

A. Yes, I am.

Q. Do you agree with this approach?

A. While I agree that it is certainly appropriate to use the DCF methodology to estimate the cost of equity, and I myself do rely on such evidence, there is no proof that the DCF produces a more accurate estimate of the cost of equity than other methodologies. As I have stated, there are three broad generic methodologies available to measure the cost of equity: DCF, Risk Premium, and CAPM. All three of these methodologies are accepted and used by the financial community and firmly supported in the financial literature.

When measuring the cost of common equity, which essentially deals with

the measurement of investor expectations, no one single methodology provides a foolproof panacea. Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate the theory and apply the methodology. The failure of the traditional infinite growth DCF model to account for changes in relative market valuation, and the practical difficulties of specifying the expected growth component, are vivid examples of the potential shortcomings of the DCF model. It follows that more than one methodology should be employed in arriving at a judgment on the cost of equity and that all of these methodologies should be applied to multiple groups of comparable risk companies.

There is no single model that conclusively determines or estimates the expected return for an individual firm. Each methodology has its own way of examining investor behavior, its own premises, and its own set of simplifications of reality. Investors do not necessarily subscribe to any one method, nor does the market price of a share reflect the application of any one single method by the price-setting investor. Absent any hard evidence as to which method outperforms the other, all relevant evidence should be used, without discounting the value of any results, in order to minimize judgmental error, measurement error, and conceptual infirmities. I submit that a regulatory body should rely on the results of a variety of methods applied to a variety of comparable groups. There is no guarantee that a single DCF result is necessarily the ideal predictor of the market price of a share and of the market cost of equity reflected in that price, just as there is no guarantee that a single CAPM or Risk Premium result constitutes the

perfect explanation of a stock's price or the cost of equity.

Q. Does the financial literature support the use of more than a single method?

A. Yes. Authoritative financial literature strongly supports the use of multiple methods. For example, Professor Eugene F. Brigham, a widely respected scholar and finance academician, discusses the various methods used in estimating the cost of common equity capital, and states (see E. F. Brigham and M. C. Ehrhardt, Financial Management Theory and Practice, p. 311 (11th ed., Thomson South-Western, 2005):

*Three methods typically are used: (1) the Capital Asset Pricing Model (CAPM), (2) the discounted cash flow (DCF) model, and (3) the bond-yield-plus-risk-premium approach. These methods are not mutually exclusive - no method dominates the others, and all are subject to error when used in practice. Therefore, when faced with the task of estimating a company' cost of equity, we generally use all three methods....*

Another prominent finance scholar, Professor Stewart Myers, points out (see S. C. Myers, "On the Use of Modern Portfolio Theory in Public Utility Rate Cases: Comment," Financial Management, p. 67, Autumn 1978):

*Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically and exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data.*

Q. Does the broad use of the DCF methodology in past regulatory proceedings indicate that it is superior to other methods?

A. No, it does not. Uncritical acceptance of the standard DCF equation vests the model with a degree of reliability that is simply not justified. One of the leading experts on regulation, Dr. Charles F. Phillips discusses the dangers of relying solely on the DCF model:

*[U]se of the DCF model for regulatory purposes involves both theoretical and practical difficulties. The theoretical issues include the assumption of a constant retention ratio (i.e. a fixed payout ratio) and the assumption that dividends will continue to grow at a rate 'g' in perpetuity. Neither of these assumptions has any validity, particularly in recent years. Further, the investors' capitalization rate and the cost of equity capital to a utility for application to book value (i.e. an original cost rate base) are identical only when market price is equal to book value. Indeed, DCF advocates assume that if the market price of a utility's common stock exceeds its book value, the allowable rate of return on common equity is too high and should be lowered; and vice versa. Many question the assumption that market price should equal book value, believing that the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies.*

*...[T]here remains the circularity problem: Since regulation establishes a level of authorized earnings which, in turn, implicitly influences dividends per share, estimation of the growth rate from such data is an inherently circular process. For all of these reasons, the DCF model suggests a degree of precision which is in fact not present and leaves wide room for controversy about the level of k [cost of equity].*[5]

Sole reliance on any one model, whether it is DCF, CAPM, or Risk Premium, simply ignores the capital market evidence and investors' use of the other theoretical frameworks. The DCF model is only one of many tools to be employed in conjunction with other methods to estimate the cost of equity. It is not a superior methodology that should supplant other financial theory and market evidence. The same is true of the CAPM.

Q. Does the manner in which the regulator applies the DCF model understate the cost of equity?

A. Applying the market rate of return to the book value of equity understates the required return on book equity under current capital market conditions. Application of the DCF model produces estimates of common equity cost that are

[5] C. F. Phillips, The Regulation of Public Utilities Theory and Practice (Public Utilities Reports, Inc.,

consistent with investors' expected return only when stock price and book value are reasonably similar, that is, when the Market-to-Book (M/B) ratio is close to unity. As shown below, application of the standard DCF model does not account for the investor's expected return when the M/B ratio of a given stock deviates from unity. This item is particularly relevant in the current capital market environment where stocks in general and utility stocks in particular are trading at M/B ratios well above unity and have been for two decades. The converse is also true, that is, the DCF model overstates the investor's return when the stock's M/B ratio is less than unity. The reason for the distortion is that the DCF market return is applied to a book value rate base by the regulator, that is, a utility's earnings are limited to earnings on a book value rate base.

Q. What are the results of this distortion?

A. The return given to equity investors is lower than what they actually require when M/B ratios exceed unity. This is neither equitable for the existing stockholders nor efficient from the point of view of attracting capital to cover the significant capital expenditures that need to be undertaken.

Q. Can you illustrate the effect of the M/B ratio on the applicability of the DCF model by means of a simple example?

A. Yes. The simple numerical illustration shown in the table below demonstrates the result of applying a market value cost rate to book value rate base under three different M/B scenarios. The three columns correspond to three M/B situations: the stock trades below, equal to, and above book value, respectively. The last situation (third column of numbers) is noteworthy and representative of the

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1988) pp. 376-77 [Footnotes omitted]

current capital market environment. The DCF cost rate of 10%, made up of a 5% dividend yield and a 5% growth rate, is applied to the book value rate base of $50 to produce $5.00 of earnings. Of the $5.00 of earnings, the full $5.00 are required for dividends to produce a dividend yield of 5% on a stock price of $100.00, and no dollars are available for growth. The investor's return is therefore only 5% versus his required return of 10%. A DCF cost rate of 10%, which implies $10.00 of earnings, translates to only $5.00 of earnings on book value, a 5% return.

The situation is reversed in the first column when the stock trades below book value. The $5.00 of earnings is more than enough to satisfy the investor's dividend requirements of $1.25, leaving $3.75 for growth, for a total return of 20%. This item occurs when the DCF cost rate is applied to a book value rate base well above the market price.

Therefore, the DCF cost rate significantly understates the investor's required return when stock prices are well above book, as is the case presently.

EFFECT OF MARKET-TO-BOOK RATIO ON MARKET RETURN

| | Situation | 1 | 2 | 3 |
|---|---|---|---|---|
| 1 | Initial purchase price | $25 | $50 | $100 |
| 2 | Initial book value | $50 | $50 | $50 |
| 3 | Initial M/B | 0.50 | 1.00 | 2.00 |
| 4 | DCF Return 10% = 5% + 5% | 10% | 10% | 10% |
| 5 | Dollar Return | $5.00 | $5.00 | $5.00 |
| 6 | Dollar Dividends 5% Yield | $1.25 | $2.50 | $5.00 |
| 7 | Dollar Growth 5% Growth | $3.75 | $2.50 | $0.00 |
| 8 | Market Return | 20% | 10% | 5% |

Q. Does the annual version of the DCF model understate the cost of equity?

A. Yes, it does. Another reason why the DCF methodology understates the cost of equity is that the annual DCF model usually employed in regulatory settings assumes that dividend payments are made annually at the end of the year, while most utilities in fact pay dividends on a quarterly basis. Failure to recognize the quarterly nature of dividend payments understates the cost of equity capital by about 30 basis points. By analogy, a bank rate on deposit that does not take into consideration the timing of the interest payments understates the true yield of your investment if you receive the interest payments more than once a year. Since the stock price employed in the DCF model already reflects the quarterly stream of dividends to be received, consistency therefore requires explicit recognition of the quarterly nature of dividend payments. One only has to think of what would happen to a company's stock price if the company was to suddenly announce that it is, from now on, paying dividends once a year at the end of the year instead of four times a year each quarter. Clearly, the stock price would decline by an amount reflecting the lost time value of money.

Q. Do regulators rely primarily on the DCF model?

A. A majority of regulatory commissions, including the NYPSC, do not, as a matter of practice, rely solely on the DCF model results in setting the allowed rate of return on common equity. According to the survey results posted in the Utility Regulatory Policy in the United States and Canada – 1994-1995 Compilation which was conducted by the National Association of Regulatory Utility Commissioners ("NARUC"), regulators employ a variety of methods and rely on

all the evidence submitted.

Q. Do regulators share your reservations on the reliability of the DCF model?

A. Yes, I believe they do. While a majority of regulatory commissions do not, as a matter of practice, rely solely on the DCF model results in setting the allowed ROE, some regulatory commissions have explicitly recognized the need to avoid exclusive reliance upon the DCF model and have acknowledged the need to adjust the DCF result when M/B ratios exceed one[2]. In a recent case involving Pacific Bell Telephone Company, the California Commission (Application No. 01-02-024, Joint Application of ATT Communications, Opinion Establishing Revised Unbundled Network Element Rates at VI.N, October 2004) declined to place any reliance on the DCF method, finding that it was "too dependent on one forecasted input."

My sentiments on the DCF model were echoed in a decision by the Indiana Utility Regulatory Commission (IURC). The IURC recognized its concerns with the DCF model and that the model understates the cost of equity. In Cause No. 39871 Final Order, the IURC states on page 24:

*....the DCF model, heavily relied upon by the Public, understates the cost of common equity. The Commission has recognized this fact before. In Indiana Mich. Power Co. (IURC 8/24/90), Cause No. 38728, 116 PUR4th 1, 17-18, we found*:

*The unadjusted DCF result is almost always well below what any informed financial analyst would regard as defensible, and therefore requires an upward adjustment based largely on the expert witness's judgment.*

[2] See the Indiana Utility Regulatory Commission decision in Indiana Mich. Power Co. (IURC 8/24/90), Cause No. 38728, 116 PUR4th 1, 17-18. See also the Iowa Utilities Board decision in U.S. West Communications, Inc. Docket No. RPR-93-9, 152 PUR4th 446, 459 (Iowa 1994). See also the Hawaii Public Utilities Commission decision in Hawaiian Electric Company, Inc., 134 PUR4th 418,

The Commission also expressed its concern with a witness relying solely on one methodology:

*.....the Commission has had concerns in our past orders with a witness relying solely on one methodology in reaching an opinion on a proper return on equity figure. (page 25)*

Even more convincing evidence that regulators have in fact not relied on the DCF model exclusively is the fact that M/B ratios have exceeded unity for over two decades. Had regulators relied exclusively on the DCF model, utility stocks would have traded at or near book value. Regulators have "corrected" for this M/B problem by considering other methods for estimating capital cost.

Q. Is the usage of the DCF model prevalent in corporate practices?

A. No, not really. The CAPM continues to be widely used by analysts, investors, and corporations. Bruner, Eades, Harris, and Higgins (1998) in a comprehensive survey[3] of current practices for estimating the cost of capital found that 81% of companies used the CAPM to estimate the cost of equity, 4% used a modified CAPM, and 15% were uncertain. In another comprehensive survey conducted by Graham and Harvey (2001), the managers surveyed reported using more than one methodology to estimate the cost of equity, and 73% used the CAPM.[4] Since its introduction by Professor William F. Sharpe in 1964, the CAPM has gained immense popularity as the practitioner's method of choice when estimating cost

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479 (1992). More recently, see the Pennsylvania Public Utility Commission decision in Pennsylvania-American Water Co., Docket R-00016339.

[3] Bruner, R. F., Eades, K. M., Harris, R. S., and Higgins, R. C., "Best Practices in Estimating the Cost of Capital: Survey and Synthesis," *Financial Practice and Education,* Vol. 8, Number 1, Spring/Summer 1998, page 18.

[4] Graham, J. R. and Harvey, C. R., "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, Vol. 61, 2001, pp. 187-243.

of capital under conditions of risk.[5] The intuitive simplicity of its basic concept (that investors must get compensated for the risk they assume), and the relatively easy application of the CAPM are the main reasons behind its popularity.

Q. Do the assumptions underlying the DCF model require that the model be treated with caution?

A. Yes, particularly in today's rapidly changing electric utility industry. Even ignoring the fundamental thesis that several methods and/or variants of such methods should be used in measuring equity costs, the DCF methodology, as those familiar with the industry and the accepted norms for estimating the cost of equity are aware, is problematic for use in estimating cost of equity at this time.

Several fundamental structural changes have transformed the energy utility industry since the standard DCF model and its assumptions were developed. For example, deregulation, accounting rule changes, changes in customer attitudes regarding utility services, the evolution of alternative energy sources, highly volatile fuel prices, and mergers-acquisitions have all influenced stock prices in ways that have deviated substantially from the assumptions of the DCF model, which was first formulated in the mid-1970s. These changes suggest that (1) some of the fundamental assumptions underlying the standard DCF model, particularly that of constant growth and constant relative market valuation, for example price/earnings (P/E) ratios and M/B ratios, are problematic at this point in time for utility stocks, and (2) therefore, alternate methodologies to estimate the cost of common equity should be accorded at least as much weight as

[5] See practitioner surveys by Graham & Harvey (2001) and Bruner, et. al. (1988)

the DCF method.

Q. Is the constant relative market valuation assumption inherent in the DCF model always reasonable?

A. No, not always. Caution must be exercised when implementing the standard DCF model in a mechanistic fashion, for it may fail to recognize changes in relative market valuations over time. The traditional DCF model is not equipped to deal with surges in P/E ratios and M/B multiples. The standard DCF model assumes a constant market valuation multiple, that is, a constant P/E ratio and a M/B ratio. Stated another way, the model assumes that investors expect the ratio of market price to dividends (or earnings) in any given year to be the same as the current ratio of market price to dividend (or earnings). This item is a necessary result of the infinite growth assumption. This assumption is unrealistic under current conditions.

Q. What is your recommendation given such market conditions?

A. In short, caution and judgment are required in interpreting the results of the standard DCF model because of (1) the effect of changes in risk and growth on electric utilities, (2) the fragile applicability of the DCF model to electric utilities stocks in the current capital market environment, and (3) the practical difficulties associated with the growth component of the standard DCF model. Hence, there is a clear need to go beyond the standard DCF results and take into account the results produced by alternate methodologies in arriving at a common equity recommendation.

Q. What weight would you give the DCF model in determining a utility company's cost of common equity capital?

A. As stated earlier, there is no single model that conclusively determines or estimates the expected return for an individual firm. Absent any hard evidence as to which method outperforms the other, all relevant evidence should be used, without discounting the value of any results, in order to minimize judgmental error, measurement error, and conceptual infirmities. I submit that a regulatory body should rely on the results of a variety of methods applied to a variety of comparable groups. I would therefore ascribe equal weight to the various methodologies. I do note that the DCF model has more questionable underlying assumptions than do other models at this time.

Q. Dr. Morin, can you please comment on the NYPSC Staff's persistent claim that the particular approach used is by Staff is consistent with the Generic Financing Case[6] and therefore must be used to calculate a utility's ROE in New York base rate cases.

A. Yes. First, more than two decades have passed since the Generic Financing Case. Reliance on analytical methods developed some twenty years ago, without reviewing their validity under current industry circumstances and current capital market conditions, is problematic. Second, it is my understanding that the Commission has never applied the three methods approach developed by Staff and the other parties in that proceeding whereby a utility's ROE would be calculated by assigning equal weight to the DCF, CAPM, and Comparable

[6] Case 91-M-0509, Proceeding on Motion of the Commission to Consider Financial Regulatory Policies for New York State Utilities.

Earnings methodologies. Alternative methodologies, including the Arbitrage Pricing and Fama-French models, that were supposed to be investigated were ignored. Furthermore, the Commission has never issued a formal Order in the Generic Financing case, formally adopting an ROE methodology.

Q. Do the assumptions underlying the CAPM require that the model be treated with caution?

A. Yes, as was the case with the DCF model, the assumptions underlying any model in the social sciences, including the CAPM, are stringent. Moreover, the empirical validity of the CAPM has been the subject of intense research in recent years. Although the CAPM provides useful evidence, it must be complemented by other methodologies as well.

Q. As a theoretical matter, why should the CAPM be used as a tool to estimate utility capital costs in regulatory proceedings?

A. As a tool in the regulatory arena, the CAPM is a rigorous conceptual framework, and is logical insofar as it is not subject to circularity problems, since its inputs are objective, market-based quantities, largely immune to regulatory decisions. The data requirements of the model are not prohibitive. The CAPM is one of several tools in the arsenal of techniques to determine the cost of equity capital. Caution, appropriate training in finance and econometrics, and judgment are required for its successful execution, as is the case with the DCF and Risk Premium methodologies.

## RISK PREMIUM ANALYSES

Q. Dr. Morin, please provide an overview of your risk premium analyses.

A. In order to quantify the risk premium for CHG&E, I have performed four risk premium studies. The first two studies deal with aggregate stock market risk

premium evidence using two versions of the CAPM methodology and the other two studies deal directly with the electric utility industry.

## A. CAPM ESTIMATES

Q. Please describe your application of the CAPM risk premium approach.

A. My first two risk premium estimates are based on the CAPM and on an empirical approximation to the CAPM (ECAPM). The CAPM is a fundamental paradigm of finance. Simply put, the fundamental idea underlying the CAPM is that risk-averse investors demand higher returns for assuming additional risk, and higher-risk securities are priced to yield higher expected returns than lower-risk securities. The CAPM quantifies the additional return, or risk premium, required for bearing incremental risk. It provides a formal risk-return relationship anchored on the basic idea that only market risk matters, as measured by beta. According to the CAPM, securities are priced such that their:

EXPECTED RETURN = RISK-FREE RATE + RISK PREMIUM

Denoting the risk-free rate by $R_F$ and the return on the market as a whole by $R_M$, the CAPM is:

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

This is the seminal CAPM expression, which states that the return required by investors is made up of a risk-free component, $R_F$, plus a risk premium determined by $\beta(R_M - R_F)$. To derive the CAPM risk premium estimate, three quantities are required: the risk-free rate ($R_F$), beta ($\beta$), and the market risk premium, ($R_M - R_F$). For the risk-free rate, I used 4.6% based on the current level of long-term Treasury interest rates. For beta, I used 0.82 and for the market risk

premium ("MRP"), I used 7.4%. These inputs to the CAPM are explained below.

Q. What risk-free rate did you use in your CAPM and risk premium analyses?

A. To implement the CAPM and Risk Premium methods, an estimate of the risk-free return is required as a benchmark. As a proxy for the risk-free rate, I have relied on the current level of 30-year Treasury bond yields.

The appropriate proxy for the risk-free rate in the CAPM is the return on the longest term Treasury bond possible. This is because common stocks are very long-term instruments more akin to very long-term bonds rather than to short-term or intermediate-term Treasury notes. In a risk premium model, the ideal estimate for the risk-free rate has a term to maturity equal to the security being analyzed. Since common stock is a very long-term investment because the cash flows to investors in the form of dividends last indefinitely, the yield on the longest-term possible government bonds, that is the yield on 30-year Treasury bonds, is the best measure of the risk-free rate for use in the CAPM. The expected common stock return is based on very long-term cash flows, regardless of an individual's holding time period. Moreover, utility asset investments generally have very long-term useful lives and should correspondingly be matched with very long-term maturity financing instruments.

While long-term Treasury bonds are potentially subject to interest rate risk, this is only true if the bonds are sold prior to maturity. A substantial fraction of bond market participants, usually institutional investors with long-term liabilities (pension funds, insurance companies), in fact hold bonds until they mature, and therefore are not subject to interest rate risk. Moreover, institutional bondholders neutralize the impact of interest rate changes by matching the

maturity of a bond portfolio with the investment planning period, or by engaging in hedging transactions in the financial futures markets. The merits and mechanics of such immunization strategies are well documented by both academicians and practitioners.

Another reason for using the longest maturity Treasury bond possible is that common equity has an infinite life span, and the inflation expectations embodied in its market-required rate of return will therefore be equal to the inflation rate anticipated to prevail over the very long-term. The same expectation should be embodied in the risk-free rate used in applying the CAPM model. It stands to reason that the yields on 30-year Treasury bonds will more closely incorporate within their yield the inflation expectations that influence the prices of common stocks than do short-term or intermediate-term U.S. Treasury notes.

Among U.S. Treasury securities, 30-year Treasury bonds have the longest term to maturity and the yield on such securities should be used as proxies for the risk-free rate in applying the CAPM, provided there are no anomalous conditions existing in the 30-year Treasury market. In the absence of such conditions, I have relied on the yield on 30-year Treasury bonds in implementing the CAPM and risk premium methods.

Q. Dr. Morin, why did you reject short-term interest rates as proxies for the risk-free rate in implementing the CAPM?

A. Short-term rates are volatile, fluctuate widely, and are subject to more random disturbances than are long-term rates. Short-term rates are largely administered rates. For example, Treasury bills are used by the Federal Reserve as a policy

vehicle to stimulate the economy and to control the money supply, and are used by foreign governments, companies, and individuals as a temporary safe-house for money.

As a practical matter, it makes no sense to match the return on common stock to the yield on 90-day Treasury Bills. This is because short-term rates, such as the yield on 90-day Treasury Bills, fluctuate widely, leading to volatile and unreliable equity return estimates. Moreover, yields on 90-day Treasury Bills typically do not match the equity investor's planning horizon. Equity investors generally have an investment horizon far in excess of 90 days.

As a conceptual matter, short-term Treasury bill yields reflect the impact of factors different from those influencing the yields on long-term securities such as common stock. For example, the premium for expected inflation embedded into 90-day Treasury Bills is likely to be far different than the inflationary premium embedded into long-term securities yields. On grounds of stability and consistency, the yields on long-term Treasury bonds match more closely with common stock returns.

Q. What is the current level of U.S. Treasury 30-year bonds?

A. The yield on U.S. Treasury 30-year bonds prevailing in May 2008, as reported in Value Line and the Federal Reserve Bank Web site, was 4.6%. Accordingly, I use 4.6% as my estimate of the risk-free rate component of the CAPM.

Q. How did you select the beta for your CAPM analysis?

A. A major thrust of modern financial theory as embodied in the CAPM is that perfectly diversified investors can eliminate the company-specific component of risk, and that only market risk remains. The latter is technically known as "beta",

or "systematic risk". The beta coefficient measures the change in a security's return relative to that of the market. The beta coefficient states the extent and direction of movement in the rate of return on a stock relative to the movement in the rate of return on the market as a whole. The beta coefficient indicates the change in the rate of return on a stock associated with a one percentage point change in the rate of return on the market, and, thus, measures the degree to which a particular stock shares the risk of the market as a whole. Modern financial theory has established that beta incorporates several economic characteristics of a corporation which are reflected in investors' return requirements.

Technically, the beta of a stock is a measure of the covariance of the returns of a stock with the returns of the market as a whole. Accordingly, it measures dispersion in a stock's return that cannot be reduced through diversification. For a large diversified portfolio, dispersion in the market rate of return on the entire portfolio is the weighted sum of the beta coefficients of its constituent stocks.

CHG&E is not publicly-traded and, therefore, proxies must be used for CHG&E. As a first proxy for the Company's beta, I have examined the betas of a sample of widely-traded investment-grade dividend-paying electric utilities designated as distribution utilities by S&P covered by Value Line and with at least 50% of their revenues from electric utility operations. This group is examined in more detail later in my testimony, in connection with the DCF estimates of the cost of common equity. As displayed on page 1 of Exhibit RAM-2, the average beta for the group is currently 0.83.

I also examined the average beta of the companies that make up Moody's

Electric Utility Index as a second proxy for the Company. As shown on page 2 of Exhibit RAM-2, the average beta of the Moody's group is 0.82. If those companies with less than 50% of their revenues from electric utility operations are removed from the group, the average beta of the remaining companies is 0.81, as shown on page 3 of Exhibit RAM-2. Based on these results, I shall use 0.82 as a beta estimate for CHG&E's electric and gas delivery operations.

Q. Did you consider analyzing a group of natural gas distributors as a proxy for CHG&E's energy distribution business?

A. Yes, I did but chose not to analyze a separate group of natural gas distribution utilities for two reasons. First, CH's energy distribution business consists primarily of electricity distribution which makes up nearly 80% of its operating income. Second, the sample of pure-play natural gas distribution utilities has dwindled considerably in recent years. Several former natural gas distributors are no longer publicly traded as a result of merger and acquisitions (e.g. Cascade, Keyspan), and several others now possess significant unregulated energy trading operations (e.g. New Jersey Resources, AGL Resources, Atmos Energy). Therefore, I have relied on two samples of electric utilities, as proxies for CHG&E.

Q. What MRP estimate did you use in your CAPM analysis?

A. For the MRP, I used 7.4%. This estimate was based on the results of both forward-looking and historical studies of long-term risk premiums. First, the Ibbotson Associates (now Morningstar) study, Stocks, Bonds, Bills, and Inflation, 2008 Yearbook, compiling historical returns from 1926 to 2007, shows that a broad market sample of common stocks outperformed long-term U. S. Treasury

bonds by 6.5%. The historical MRP over the income component of long-term Treasury bonds rather than over the total return is 7.1%. The Morningstar study recommends the use of the latter as a more reliable estimate of the historical MRP, and I concur with this viewpoint. The historical MRP should be computed using the income component of bond returns because the intent, even using historical data, is to identify an expected MRP. The more accurate way to estimate the MRP from historic data is to use the income return, not total returns on government bonds, as explained at pages 75-77 of Morningstar's Stocks, Bonds, Bills, and Inflation: Valuation Edition, 2007 Yearbook. This is because the income component of total bond return (i.e., the coupon rate) is a far better estimate of expected market return than the total return (i.e., the coupon rate + capital gain), as realized capital gains/losses are largely unanticipated by bond investors. The long-horizon (1926-2007) MRP (based on income returns, as required) is specifically calculated to be 7.1% rather than 6.5%.

Second, a DCF analysis applied to the aggregate equity market using the S&P 500 Index and Value Line growth forecasts indicates a prospective MRP of 7.8%. Therefore, I shall employ the average of the two estimates, 7.4%, as a reasonable estimate of the MRP.

**Historical Market Risk Premium**

Q. On what maturity bond does the Morningstar historical risk premium data rely upon?

A. Because 30-year bonds were not always traded or even available throughout the entire 1926-2007 period covered in the Morningstar Study of historical returns,

the latter study relied on bond return data based on 20-year Treasury bonds. To the extent that the normal yield curve is virtually flat above maturities of 20 years over most of the period covered in the Ibbotson study, the difference in yield is not material. In fact, the difference in yield between 30-year and 20-year bonds is actually negative. The average difference in yield over the 1977-2007 period is approximately 13 basis points, that is, the yield on 20-year bonds is slightly higher than the yield on 30-year bonds.

Q. Why did you use long time periods in arriving at your historical MRP estimate?

A. Because realized returns can be substantially different from prospective returns anticipated by investors when measured over short time periods, it is important to employ returns realized over long time periods rather than returns realized over more recent time periods when estimating the MRP with historical returns. Therefore, a risk premium study should consider the longest possible period for which data are available. Short-run periods during which investors earned a lower risk premium than they expected are offset by short-run periods during which investors earned a higher risk premium than they expected. Only over long time periods will investor return expectations and realizations converge.

I have therefore ignored realized risk premiums measured over short time periods, since they are heavily dependent on short-term market movements. Instead, I relied on results over periods of enough length to smooth out short-term aberrations, and to encompass several business and interest rate cycles. The use of the entire study period in estimating the appropriate MRP minimizes subjective judgment and encompasses many diverse regimes of inflation, interest rate cycles, and economic cycles.

To the extent that the estimated historical equity risk premium follows what is known in statistics as a "random walk," the best estimate of the future risk premium is the historical mean. Since I found no evidence that the MRP in common stocks has changed over time, that is, no significant serial correlation in the Ibbotson study, it is reasonable to assume that these quantities will remain stable in the future.

**Prospective Market Risk Premium**

Q. Please describe your prospective approach in deriving the MRP in the CAPM analysis.

A. For my prospective estimate of the MRP, I applied a DCF analysis to the aggregate equity market using Value Line's VLIA software. The dividend yield on the stocks that make up the S&P 500 Index is currently 1.78% (VLIA 05/2008 edition), and the average projected long-term growth rate in dividends is 10.21%. Adding the dividend yield to the growth component produces an expected return on the aggregate equity market of 11.99%. Following the tenets of the DCF model, the spot dividend yield must be converted into an expected dividend yield by multiplying it by one plus the growth rate. This brings the expected return on the aggregate equity market to 12.17%. Recognition of the quarterly timing of dividend payments rather than the annual timing of dividends assumed in the annual DCF model brings the MRP estimate to approximately 12.37%. Subtracting the risk-free rate of 4.6% from the latter, the implied risk premium is 7.77% over long-term U.S. Treasury bonds.

Q. Did you check your MRP estimate of 7.4% from any other source?

A. Yes, I did. As a check on my final MRP estimate of 7.4%, I examined a 2003 comprehensive article published in Financial Management (see Harris, R. S., Marston, F. C., Mishra, D. R., and O'Brien, T. J., "*Ex Ante* Cost of Equity Estimates of S&P 500 Firms: The Choice Between Global and Domestic CAPM," Financial Management, Autumn 2003, pp. 51-66).

These authors provide estimates of the prospective expected market returns for S&P 500 companies over the period 1983-1998. They measure the expected market rate of return of each dividend-paying stock in the S&P 500 for each month from January 1983 to August 1998 by using the constant growth DCF model. The prevailing risk-free rate for each year was then subtracted from the expected rate of return for the overall market to arrive at the market risk premium for that year. The table below, drawn from Table 2 of the aforementioned study, displays the average prospective MRP estimate (Column 2) for each year from 1983 to 1998. The average MRP estimate for the overall period is 7.2%, which is reasonably close to my own estimate of 7.4%.

DCF Market

| Year | Risk Premium |
|---|---|
| 1983 | 6.6% |
| 1984 | 5.3% |
| 1985 | 5.7% |
| 1986 | 7.4% |
| 1987 | 6.1% |
| 1988 | 6.4% |
| 1989 | 6.6% |
| 1990 | 7.1% |
| 1991 | 7.5% |
| 1992 | 7.8% |
| 1993 | 8.2% |
| 1994 | 7.3% |
| 1995 | 7.7% |
| 1996 | 7.8% |
| 1997 | 8.2% |
| 1998 | 9.2% |
| **MEAN** | **7.2%** |

Q. What is your estimate of CHG&E's cost of equity using the CAPM approach?

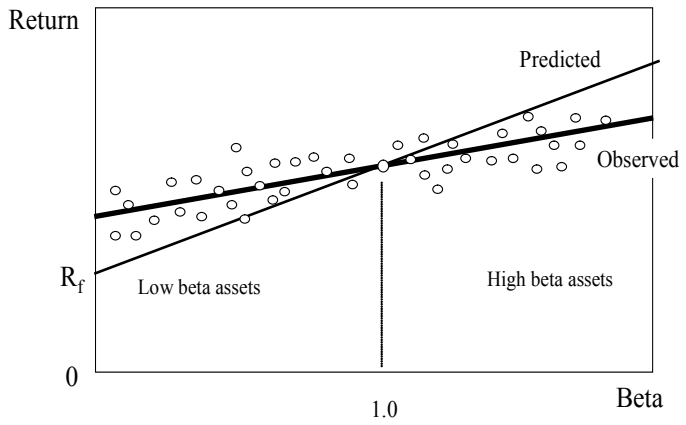
A. Inserting those input values in the CAPM equation, namely a risk-free rate of 4.6%, a beta of 0.82, and a MRP of 7.4%, the CAPM estimate of the cost of common equity for CHG&E is: 4.6% + 0.82 x 7.4% = 10.7%. This estimate becomes 11.0% with flotation costs. The need for a flotation cost allowance is discussed later in my testimony.

Q. What is your estimate of CHG&E's cost of equity using the ECAPM?

A. There have been countless empirical tests of the CAPM in the finance literature in order to determine to what extent security returns and betas are related in the manner predicted by the CAPM. This literature is summarized in Chapter 13 of my 1994 book, Regulatory Finance, and Chapter 6 of my most recent book, The New Regulatory Finance, both published by Public Utilities Report Inc. The results of the tests support the idea that beta is related to security returns, that the risk-return tradeoff is positive, and that the relationship is linear. The contradictory finding is that the risk-return tradeoff is not as steeply sloped as the

predicted CAPM. That is, empirical research has long shown that low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted. A CAPM-based estimate of cost of capital underestimates the return required from low-beta securities and overstates the return required from high-beta securities, based on the empirical evidence. This is one of the most well-known results in finance, and it is displayed graphically below.

CAPM: Predicted vs Observed Returns




A number of variations on the original CAPM theory have been proposed to explain this finding. The ECAPM makes use of these empirical findings. The ECAPM estimates the cost of capital with the equation:

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

where $\acute{\alpha}$ is the "alpha" of the risk-return line, a constant, MRP is the market risk premium ($R_M - R_F$), and the other symbols are defined as usual. Inserting the long-term risk-free rate as a proxy for the risk-free rate, an alpha in the

range of 1% - 2%, and reasonable values of beta and the MRP in the above equation produces results that are indistinguishable from the following more tractable ECAPM expression:

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

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 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. This is also because the use of adjusted betas rather than the use of raw betas also incorporates some of the desired effect of using the ECAPM. Thus, it is reasonable to apply a conservative alpha adjustment.

Q. Is the use of the ECAPM consistent with the use of adjusted betas?

A. Yes, it is. Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line. 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 observed 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 the previous graph, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary. Moreover, the use of adjusted betas compensates for interest rate sensitivity of utility stocks not captured by unadjusted betas, as explained in Appendix A.

Appendix A contains a full discussion of the ECAPM, including its theoretical and empirical underpinnings. In short, the following equation provides a viable approximation to the observed relationship between risk and return, and provides the following cost of equity capital estimate:

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

Inserting 4.6% for the risk-free rate $R_F$, a MRP of 7.4% for $(R_M - R_F)$ and a beta of 0.82 in the above equation, the ROE is 11.0% without flotation costs and 11.3% with flotation costs.

Q. Dr. Morin, please summarize your CAPM estimates.

A. The table below summarizes the common equity estimates obtained from my CAPM studies. The average CAPM result is a rounded 11.2%.

| CAPM | % ROE |
|---|---|
| CAPM plain | 11.0% |

| | |
|---|---|
| Empirical CAPM | 11.3% |
| AVERAGE | 11.2% |

## B. HISTORICAL RISK PREMIUM

Q. Please describe your historical risk premium analysis of the electric utility industry.

A. As a proxy for the risk premium applicable to the Company, I estimated the historical risk premium for the electric utility industry with an annual time series analysis applied to the industry as a whole, using *Moody's Electric Utility Index* as an industry proxy. The analysis is depicted on Exhibit RAM-3. The risk premium was estimated by computing the actual realized return on equity capital for Moody's Index for each year, using the actual stock prices and dividends of the index, and then subtracting the long-term government bond return for that year.

As shown on Exhibit RAM-3, the average risk premium over the period was 5.7% over historical long-term Treasury bond returns and 5.8% over long-term Treasury bond yields. Given that the risk-free rate is 4.6%, and using the historical estimate of 5.7%, the implied cost of equity for the average electric utility from this particular method is 4.6% + 5.7% = 10.3% without flotation costs and 10.6% with flotation costs.

Q. Dr. Morin, are risk premium studies widely used?

A. Yes, they are. Risk Premium analyses are widely used by analysts, investors, and expert witnesses. Most college-level corporate finance and/or investment management texts including Investments by Bodie, Kane, and Marcus, McGraw-

Hill Irwin, 2002, which is a recommended textbook for CFA (Chartered Financial Analyst) certification and examination, contain detailed conceptual and empirical discussion of the risk premium approach. The latter is typically recommended as one of the three leading methods of estimating the cost of capital. Professor Brigham's best-selling corporate finance textbook (Financial Management: Theory and Practice, 11th ed., South-Western, 2005), recommends the use of risk premium studies, among others. Techniques of risk premium analysis are widespread in investment community reports. Professional certified financial analysts are certainly well versed in the use of this method.

Q. Are you concerned about the realism of the assumptions that underlie the historical risk premium method?

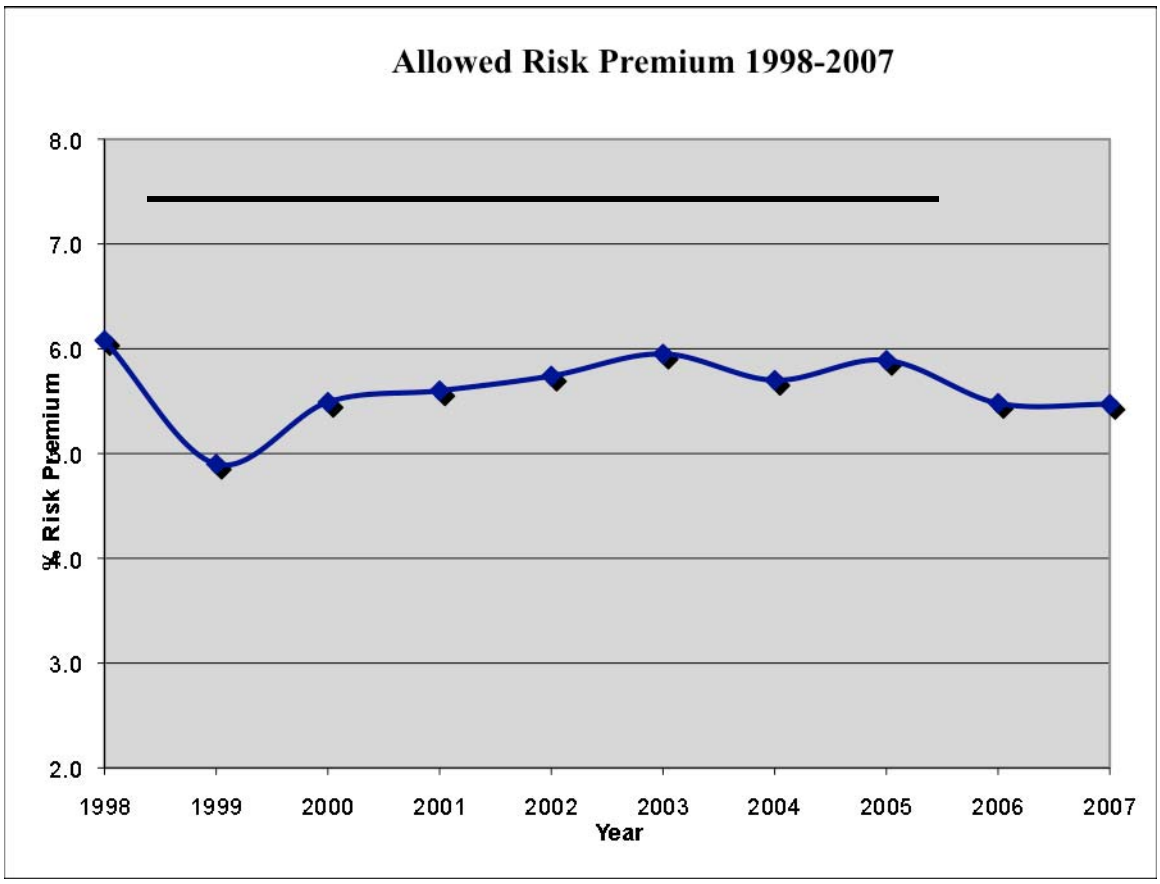
A. No, I am not, for they are no more restrictive than the assumptions that underlie the DCF model or the CAPM. While it is true that the method looks backward in time and assumes that the risk premium is constant over time, these assumptions are not necessarily restrictive. By employing returns realized over long time periods rather than returns realized over more recent time periods, investor return expectations and realizations converge. Realized returns can be substantially different from prospective returns anticipated by investors, especially when measured over short time periods. By ensuring that the risk premium study encompasses the longest possible period for which data are available, short-run periods during which investors earned a lower risk premium than they expected are offset by short-run periods during which investors earned a higher risk premium than they expected. Only over long time periods will investor return expectations and realizations converge, or else, investors would never invest any

money.

## C. ALLOWED RISK PREMIUMS

Q. Please describe your analysis of allowed risk premiums in the electric utility industry.

A. To estimate the Company's cost of common equity, I also examined the historical risk premiums implied in the ROEs allowed by regulatory commissions for electric utilities over the last decade relative to the contemporaneous level of the long-term Treasury bond yield. This variation of the risk premium approach is reasonable because allowed risk premiums are presumably based on the results of market-based methodologies (DCF, Risk Premium, CAPM, *etc.*) presented to regulators in rate hearings and on the actions of objective unbiased investors in a competitive marketplace. Historical allowed ROE data are readily available over long periods on a quarterly basis from SNL [formerly Regulatory Research Associates ("RRA")] and easily verifiable from RRA publications and past commission decision archives. The average ROE spread over long-term Treasury yields was 5.6% for the 1999-2008 time period, as shown in the graph below. I note that this estimate is nearly identical to the one obtained from the historical risk premium study of the electric utility industry.




Given the current long-term Treasury bond yield of 4.6% and a risk premium of 5.6%, the implied allowed ROE for the average risk electric utility is 10.2%. No flotation cost adjustment is required here since the return figures are allowed book returns on common equity capital.

Q. Why did you rely on the last decade to conduct your allowed risk premium analysis?

A. Because allowed returns already reflect investor expectations, that is, are forward-looking in nature, the need for relying on long historical periods is minimized. The last decade is a reasonable period of analysis in the case of allowed returns in view of the stability of the inflation rate experienced over the last decade.

Q. Do investors take into account allowed returns in formulating their return

expectations?

A. Yes, they do. Investors do take into account returns granted by various regulators in formulating their risk and return expectations, as evidenced by the availability of commercial publications disseminating such data, including Value Line and RRA. Allowed returns, while certainly not a precise indication of a particular company's cost of equity capital, are an important determinant of investor growth perceptions and investor expected returns.

Q. Please summarize your risk premium estimates.

A. The table below summarizes the ROE estimates obtained from the three risk premium studies. The average risk premium result is 10.3%.

| **Risk Premium Method** | **ROE** |
|---|---|
| Historical Risk Premium Electric | 10.6% |
| Allowed Risk Premium | 10.2% |

## D. DCF ESTIMATES

Q. Please describe the DCF approach to estimating the cost of equity capital.

A. According to DCF theory, the value of any security to an investor is the expected discounted value of the future stream of dividends or other benefits. One widely used method to measure these anticipated benefits in the case of a non-static company is to examine the current dividend plus the increases in future dividend payments expected by investors. This valuation process can be represented by the following formula, which is the standard DCF model:

$$K_e = D_1/P_o + g$$

where: $K_e$ = investors' expected return on equity

$D_1$ = expected dividend at the end of the coming year

$P_o$ = current stock price

g = expected growth rate of dividends, earnings, stock price, book value

The standard DCF formula states that under certain assumptions, which are described in the next paragraph, the equity investor's expected return, $K_e$, can be viewed as the sum of an expected dividend yield, $D_1/P$, plus the expected growth rate of future dividends, earnings, and book value, g. The returns anticipated at a given stock price are not directly observable and must be estimated from statistical information. The idea of the market value approach is to infer '$K_e$' from the observed stock price, the observed dividend, and an estimate of investors' expectations of future growth.

The assumptions underlying this valuation formulation are well known, and are discussed in detail in Chapter 4 of my reference book, Regulatory Finance, and Chapter 8 of my latest textbook, New Regulatory Finance. The standard DCF model requires the following main assumptions: a constant average growth trend for both dividends and earnings, a stable dividend payout policy, a discount rate in excess of the expected growth rate, and a constant price-earnings multiple, which implies that growth in price is synonymous with growth in earnings and dividends. The standard DCF model also assumes that dividends are paid at the end of each year when, in fact, dividend payments are normally made on a quarterly basis.

Q. How did you estimate CHG&E's cost of equity with the DCF model?

A. I applied the DCF model to two proxies for CHG&E's energy delivery operations: a group consisting of investment-grade dividend-paying electric distribution utilities and a group consisting of those electric utilities that make up Moody's

Electric Utility Index. In addition, both groups were restricted to those companies with at least 50% of their revenues from regulated operations

In order to apply the DCF model, two components are required: the expected dividend yield ($D_1/P_o$) and the expected long-term growth (g). The expected dividend $D_1$ in the annual DCF model can be obtained by multiplying the current indicated annual dividend rate by the growth factor (1 + g).

From a conceptual viewpoint, the stock price to employ in calculating the dividend yield is the current price of the security at the time of estimating the cost of equity. The reason is that current stock price provides a better indication of expected future prices than any other price in an efficient market. An efficient market implies that prices adjust rapidly to the arrival of new information. Therefore, the current price reflects the fundamental economic value of a security. A considerable body of empirical evidence indicates that capital markets are efficient with respect to a broad set of information. This evidence implies that observed current prices represent the fundamental value of a security, and that a cost of capital estimate should be based on current prices.

In implementing the DCF model, I have used the current dividend yields reported in the latest edition of Value Line's VLIA software. Basing dividend yields on average results from a large group of companies reduces the concern that idiosyncrasies of individual company stock prices will result in an unrepresentative dividend yield.

Q. How did you estimate the growth component of the DCF model?

A. The principal difficulty in calculating the required return by the DCF approach is in ascertaining the growth rate that investors currently expect. Since no explicit

estimate of expected growth is observable, proxies must be employed.

As proxies for expected growth, I examined growth estimates developed by professional analysts employed by large investment brokerage institutions. Projected long-term growth rates actually used by institutional investors to determine the desirability of investing in different securities influence investors' growth anticipations. These forecasts are made by large reputable organizations, and the data are readily available to investors and are representative of the consensus view of investors. Because of the dominance of institutional investors in investment management and security selection, and their influence on individual investment decisions, analysts' growth forecasts influence investor growth expectations and provide a sound basis for estimating the cost of equity with the DCF model. Growth rate forecasts of analysts are available from published investment newsletters and from systematic compilations of analysts' forecasts, such as those tabulated by Zacks Investment Research Inc. ("Zacks"). I used analysts' long-term growth forecasts contained in Zacks as proxies for investors' growth expectations in applying the DCF model. I also used Value Line's growth forecast as an additional proxy.

Q. Why did you reject the use of historical growth rates in applying the DCF model to utilities?

A. I have rejected historical growth rates as proxies for expected growth in the DCF calculation because historical growth patterns are already incorporated in analysts' growth forecasts that should be used in the DCF model, and are therefore somewhat redundant.

Q. Did you consider any other method of estimating expected growth in the DCF

model?

A. Yes, I did. I considered using the so-called “sustainable growth” method, also referred to as the “retention growth” method. According to this method, future growth is estimated by multiplying the fraction of earnings expected to be retained by the company, 'b', by the expected return on book equity, 'ROE'. That is,

$$g = b \times ROE$$

where: g = expected growth rate in earnings/dividends

b = expected retention ratio

ROE = expected return on book equity

However, I do not generally subscribe to the growth results produced by this particular method for several reasons. First, the sustainable method of predicting growth is only accurate under the assumptions that the ROE is constant over time and that no new common stock is issued by the company, or if so, it is sold at book value. Second, and more importantly, the sustainable growth method contains a logic trap: the method requires an estimate of ROE to be implemented. But if the ROE input required by the model differs from the recommended return on equity, a fundamental contradiction in logic follows. Third, the empirical finance literature demonstrates that the sustainable growth method of determining growth is not as significantly correlated to measures of value, such as stock prices and price/earnings ratios, as analysts' growth forecasts[7]. I therefore placed no reliance on this method.

[7] *See* Vander Weide & Carleton, "*Investor Growth Expectations: Analysts vs. History*," Jrnl. of Portfolio Mgt., Spring 1988. Timme & Eiseman, "*On the Use of Consensus Forecasts of Growth in the Constant Growth Model: The Case of Electric Utilities*," Financial Mgt, Winter 1989.

Q. Did you consider dividend growth in applying the DCF model?

A. No, not at this time. This reason is that it is widely expected that utilities will continue to lower their dividend payout ratio over the next several years. In other words, earnings are expected to grow faster than dividends in the future.

Whenever the dividend payout ratio is expected to change, the intermediate growth rate in dividends cannot equal the long-term growth rate, because dividend/earnings growth must adjust to the changing payout ratio. The assumptions of constant perpetual growth and constant payout ratio are clearly not met. Thus, the implementation of the standard DCF model is of questionable relevance in this circumstance.

Dividend growth rates are unlikely to provide a meaningful guide to investors' growth expectations for utilities in general. This result is because utilities' dividend policies have become increasing conservative as business risks in the industry have intensified steadily. Dividend growth has remained largely stagnant in past years as utilities are increasingly conserving financial resources in order to hedge against rising business risks. As a result, investors' attention has shifted from dividends to earnings. Therefore, earnings growth provides a more meaningful guide to investors' long-term growth expectations. Indeed, it is growth in earnings that will support future dividends and share prices.

Q. Is there any empirical evidence documenting the importance of earnings in evaluating investors' expectations in the investment community?

A. Yes, there is an abundance of evidence attesting to the importance of earnings in assessing investors' expectations. First, the sheer volume of earnings forecasts available from the investment community relative to the scarcity of dividend

forecasts attests to their importance. To illustrate, Value Line, Zacks Investment, First Call Thompson, Yahoo Finance, and Multex provide comprehensive compilations of investors' earnings forecasts, to name some. The fact that these investment information providers focus on growth in earnings rather than growth in dividends indicates that the investment community regards earnings growth as a superior indicator of future long-term growth. Second, Value Line's principal investment rating assigned to individual stocks, Timeliness Rank, is based primarily on earnings, which account for 65% of the ranking.

Q. Please describe your first proxy group for the Company's electric distribution business?

A. As a first proxy for the Company's energy distribution business, I examined a group of investment-grade publicly-traded utilities designated as electricity distribution utilities by S&P in its analysis of utility business risks. The original group is shown on Pages 1 - 2 of Exhibit RAM-4, and includes electricity distribution and natural gas distribution companies engaged in predominantly monopolistic distribution activities. Foreign companies and companies below investment-grade, that is, companies with a bond rating below BBB-, were eliminated as well as those companies without Value Line coverage. Page 3 of Exhibit RAM-4 narrows the group down to only include electricity distribution operating utilities. The final sample of 12 companies is made up of the parent company of these investment-grade operating electricity distribution companies with at least 50% of their revenues from regulated operations, as shown on Page 4 of Exhibit RAM-4. The initial group was utilized earlier in connection with beta estimates. The same group was retained for the DCF analysis.

Q. What DCF results did you obtain for the electricity distribution utilities group using the Value Line growth?

A. As shown on Column 2 of Exhibit RAM-5, the average long-term growth forecast obtained from Value Line is 7.6% for this group. Combining this growth rate with the average expected dividend yield of 4.3% shown in Column 3, produces an estimate of equity costs of 11.9% for the group, unadjusted for flotation costs. Adding an allowance for flotation costs to the results of Column 4 brings the cost of equity estimate to 12.2%, shown in Column 5. Removing Northeast Utilities from the group on account of its unsustainable growth rate, the average ROE is 11.4%.

Q. What DCF results did you obtain for the electricity distribution utilities group using the analyst's consensus growth forecast?

A. From the original sample of 12 companies shown on page 1 of Exhibit RAM-6, CH Energy and Energy East were eliminated as no analysts' growth forecasts was available from Zacks. For the remaining 10 companies, using the consensus analysts' earnings growth forecast published by Zacks of 8.8% instead of the Value Line forecast, the cost of equity for the group is 12.8%. Allowance for flotation costs brings the cost of equity estimate to 13.0%. This analysis is shown on page 2 of Exhibit RAM-6. Eliminating the PPL Corp. estimate of 19.6% and in order to palliate the influence of the three companies with high growth estimates (Exelon, Public Service Enterprise, and Pepco), the median estimate of 11.1% is a more reasonable estimate.

Q. What DCF results did you obtain for Moody's electric utilities group?

A. Page 1 of Exhibit RAM-7 displays the electric utilities that make up Moody's Electric Utility Index. No growth forecast was available for Duke Energy, and that company was therefore eliminated from the group. As shown on Column 2 of page 2 of Exhibit RAM-7, the average long-term growth forecast obtained from Value Line is 6.6% for this group. Coupling this growth rate with the average expected dividend yield of 4.4% shown in Column 3 produces an estimate of equity costs of 11.0% for the group. Allowance for flotation costs brings the cost of equity estimate to 11.3%. Eliminating the companies with less than 50% of their revenues from regulated electricity operations, the average DCF result for the remaining fifteen companies is 11.0%, as shown on page 3 of Exhibit RAM-7.

Using the consensus analysts' earnings growth forecast of 7.8% from Zacks instead of the Value Line growth forecast, the cost of equity for the Moody's group is 12.1%. Allowance for flotation costs brings the cost of equity estimate to 12.4%. This analysis is displayed on Pages 1 and 2 of Exhibit RAM-8. No growth projections were available for CH Energy and Energy East, and these two companies were therefore eliminated from the group. As shown on page 3 of Exhibit RAM-8, eliminating utility companies with less than 50% of their revenues from utility operations from the Moody's group, the average estimate for the group is 12.1%. As was the case earlier, eliminating the PPL Corp. estimate of 19.6% and in order to palliate the influence of the companies with high growth estimates, the median estimate of 10.9% is a more reasonable estimate.

Q. Please summarize your DCF estimates.

A. The table below summarizes the DCF estimates. The average DCF result is 11.1%.

| DCF STUDY | ROE |
|---|---|
| Electricity Distribution Utilities Value Line Growth | 11.4% |
| Electricity Distribution Utilities Zacks Growth | 11.1% |
| Moody's Electric Utilities Value Line Growth | 11.0% |
| Moody's Electric Utilities Zacks Growth | 10.9% |

Q. Dr. Morin, please now turn to the need for a flotation cost allowance.

A. All the market-based estimates reported above include an adjustment for flotation costs. The simple fact of the matter is that common equity capital is not free. Flotation costs associated with stock issues are exactly like the flotation costs associated with bonds and preferred stocks. Flotation costs are incurred; they are not expensed at the time of issue and, therefore, must be recovered via a rate of return adjustment. This treatment is done routinely for bond and preferred stock issues by most regulatory commissions. Clearly, the common equity capital accumulated by the Company is not cost-free. The flotation cost allowance to the cost of common equity capital is discussed and applied in most corporate finance textbooks; it is unreasonable to ignore the need for such an adjustment.

Flotation costs are very similar to the closing costs on a home mortgage. In the case of issues of new equity, flotation costs represent the discounts that must be provided to place the new securities. Flotation costs have a direct and an indirect component. The direct component is the compensation to the security underwriter for his marketing/consulting services, for the risks involved in distributing the issue, and for any operating expenses associated with the issue (printing, legal, prospectus, etc.). The indirect component represents the downward pressure on the stock price as a result of the increased supply of stock

from the new issue. The latter component is frequently referred to as "market pressure."

Investors must be compensated for flotation costs on an ongoing basis to the extent that such costs have not been expensed in the past, and therefore the adjustment must continue for the entire time that these initial funds are retained in the firm. Appendix B to my testimony discusses flotation costs in detail, and shows: (1) why it is necessary to apply an allowance of 5% to the dividend yield component of equity cost by dividing that yield by 0.95 (100% - 5%) to obtain the fair return on equity capital; (2) why the flotation adjustment is permanently required to avoid confiscation even if no further stock issues are contemplated; and (3) that flotation costs are only recovered if the rate of return is applied to total equity, including retained earnings, in all future years.

By analogy, in the case of a bond issue, flotation costs are not expensed but are amortized over the life of the bond, and the annual amortization charge is embedded in the cost of service. The flotation adjustment is also analogous to the process of depreciation, which allows the recovery of funds invested in utility plant. The recovery of bond flotation expense continues year after year, irrespective of whether the Company issues new debt capital in the future, until recovery is complete, in the same way that the recovery of past investments in plant and equipment through depreciation allowances continues in the future even if no new construction is contemplated. In the case of common stock that has no finite life, flotation costs are not amortized. Thus, the recovery of flotation cost requires an upward adjustment to the allowed return on equity.

A simple example will illustrate the concept. A stock is sold for $100, and

investors require a 10% return, that is, $10 of earnings. But if flotation costs are 5%, the Company nets $95 from the issue, and its common equity account is credited by $95. In order to generate the same $10 of earnings to the shareholders, from a reduced equity base, it is clear that a return in excess of 10% must be allowed on this reduced equity base, here 10.52%.

According to the empirical finance literature discussed in Appendix B, total flotation costs amount to 4% for the direct component and 1% for the market pressure component, for a total of 5% of gross proceeds. This in turn amounts to approximately 30 basis points, depending on the magnitude of the dividend yield component. To illustrate, dividing the average expected dividend yield of approximately 5.0% for utility stocks by 0.95 yields 5.3%, which is 30 basis points higher.

Sometimes, the argument is made that flotation costs are real and should be recognized in calculating the fair return on equity, but only at the time when the expenses are incurred. In other words, the flotation cost allowance should not continue indefinitely, but should be made in the year in which the sale of securities occurs, with no need for continuing compensation in future years. This argument is valid only if the Company has already been compensated for these costs. If not, the argument is without merit. My own recommendation is that investors be compensated for flotation costs on an on-going basis rather than through expensing and that the flotation cost adjustment continue for the entire time that these initial funds are retained in the firm.

There are several sources of equity capital available to a firm including: common equity issues, conversions of convertible preferred stock, dividend

reinvestment plan, employees' savings plan, warrants, and stock dividend programs. Each item carries its own set of administrative costs and flotation cost components, including discounts, commissions, corporate expenses, offering spread, and market pressure. The flotation cost allowance is a composite factor that reflects the historical mix of sources of equity. The allowance factor is a build-up of historical flotation cost adjustments associated and traceable to each component of equity at its source. It is impractical and prohibitively costly to start from the inception of a company and determine the source of all present equity. A practical solution is to identify general categories and assign one factor to each category. My recommended flotation cost allowance is a weighted average cost factor designed to capture the average cost of various equity vintages and types of equity capital raised by the Company.

Q. Is a flotation cost adjustment required for an operating subsidiary like CHG&E that does not trade publicly?

A. Yes, it is. It is sometimes alleged that a flotation cost allowance is inappropriate if the utility is a subsidiary whose equity capital is obtained from its parent, in this case, CH Energy Group. This objection is unfounded since the parent-subsidiary relationship does not eliminate the costs of a new issue, but merely transfers them to the parent. It would be unfair and discriminatory to subject parent shareholders to dilution while individual shareholders are absolved from such dilution. Fair treatment must consider that, if the utility-subsidiary had gone to the capital markets directly, flotation costs would have been incurred.

## III. SUMMARY OF COST OF EQUITY RECOMMENDATION

Q. Please summarize your results and recommendation.

A. To arrive at my final recommendation, I performed four risk premium analyses. For the first two risk premium studies, I applied the CAPM and an empirical approximation of the CAPM using current market data. The other two risk premium analyses were performed on historical and allowed risk premium data from electric utility industry aggregate data. I also performed DCF analyses on two surrogates for CHG&E: a group of investment-grade electricity distribution utilities and a group representative of the electric utility industry, namely, Moody's Electric Utility Index. The results from all the various tests are summarized in the table below.

| METHODOLOGY | ROE |
|---|---|
| CAPM | 11.0% |
| Empirical CAPM | 11.3% |
| Historical Risk Premium Elec Utility Industry | 10.6% |
| Allowed Risk Premium | 10.2% |
| DCF S&P Elec Distribution Utilities Value Line Growth | 11.4% |
| DCF S&P Elec Distribution Utilities Zacks Growth | 11.1% |
| DCF Moody's Elec Utilities Value Line Growth | 11.0% |
| DCF Moody's Elec Utilities Zacks Growth | 10.9% |

From these results, I conclude that CHG&E's cost of common equity capital lies in a range of 10.2% - 11.4%. In view of CHG&E's lower business risk on account of its status as a pure "wires" utility unencumbered with the riskier power production function, it would not be unreasonable to set rates in the lower half of that range. I do note, however, that the company's regulatory risk profile has risen relative to historical level, as discussed below.

Q. Dr. Morin, have there been any specific references to regulatory risk as an important element in assessing CHG&E's creditworthiness?

A. Yes. Standard & Poor's in its recent March 2008 report "***Consolidated Edison Inc. Downgraded to 'A-' From 'A" on Rate Decision***," commented on recent decisions by CHG&E's state regulator, the New York Public Service Commission. S&P stated the following:

> *The rating action reflects our expectations that the firm's financial measures will be commensurate with 'A-' after the recent New York Public Service Commission's $425 million rate order for CECONY becomes effective….The firm's ability to manage its regulatory relations effectively will likely be a key determinant at current rating levels.*

Moody's, in its Credit Opinion of March 21, 2008 also commented on the New York regulatory environment and made the following comments in its assessment of Consolidated Edison (CEI), Consolidated Edison of New York (CECONY) and Orange & Rockland (O&R):

> *Moody's affirmed the ratings of CEI, CECONY, and O&R but revised the rating outlook for all three companies to negative from stable. This action reflected our growing concern with regard to the ability of the three companies to achieve a materially stronger financial profile given the persistent weakness in key credit metrics for the companies relative to what we typically see for companies in the "A" rating category coupled with the decision by the NYPSC with respect to CECONY's latest rate case….The change to negative rating outlooks for the companies also takes into account our more guarded view than we have had in the past about the extent to which the New York regulatory environment will be supportive in future rate case decisions for CECONY and O&R. In particular, we note the 9.1% allowed return on equity (ROE) used by the NYPSC in late 2007 for O&R's rate investigation…. And the recent fully litigated decision in CECONY's electric rate case, which granted only about 35% of the $1.2 billion rate increase requested…**also based on a 9.1% allowed ROE (reportedly the lowest ROE granted to an electric utility in over 30 years).***

Q. Dr. Morin, what is your final conclusion regarding CHG&E's cost of common equity capital?

A. Based on the results of all my analyses, the application of my professional judgment, and the risk circumstances of CHG&E, it is my opinion that a just and reasonable return on the market value of the common equity capital of CHG&E's energy distribution operations in the state of New York lies in a range of 10.2% - is 11.4%.

Q. Dr. Morin, what capital structure assumption underlies your recommended return on CHG&E's common equity capital?

A. My recommended ROE for CHG&E is predicated on the adoption of a test year capital structure consisting of approximately 48% common equity capital.

Q. Is there a relationship between financial risk and the authorized ROE?

A. There certainly is. A low authorized ROE increases the likelihood the utility will have to rely increasingly on debt financing for its capital needs. This creates the specter of a spiraling cycle that further increases risks to both equity and debt investors; the resulting increase in financing costs is ultimately borne by the utility's customers through higher capital costs and rates of returns.

We have seen a vivid example of this phenomenon with the recent downgrade of the Consolidated Edison Company of New York 's bonds following the unreasonably low ROE allowed in CHG&E's last rate order, the lowest allowed ROE for a major electric utility in the country. The net result of which is that ratepayers will have to pay hundreds of millions of dollars more on the much needed debt and equity capital to be raised by this company over the next decades. To place the additional ratepayer burden in perspective, for every $100 million of 20-year debt capital to be raised by the Company, the additional interest burden from a 25 basis points increase in debt costs is $5 million per $100

million of new debt, or $50 million per $1 billion of new debt.

Q. Is CHG&E's financial risk impacted by the authorized ROE?

A. Yes, it is. A low ROE increases the likelihood that CHG&E will have to rely on debt financing for its capital needs. As the Company relies more on debt financing, its capital structure becomes more leveraged. Since debt payments are a fixed financial obligation to the utility, this decreases net income. If, instead, the Company attempts to maintain its capitalization ratios by issuing more stock, lower operating income and more shares outstanding mean less income per share available for dividend growth. In either case, equity investors face greater uncertainty about the future dividend potential of the firm. As a result, the Company's equity becomes a riskier investment. The risk of default on the Company's bonds also increases, making the utility's debt a riskier investment. This increases the cost to the utility from both debt and equity financing and] increases the possibility the Company will not have access to the capital markets for its outside financing needs, or if so, at prohibitive costs.

Q. Finally, Dr. Morin, if capital market conditions change significantly between the date of filing your prepared testimony and the date your oral testimony is presented, would this cause you to revise your estimated cost of equity?

A. Yes. Interest rates and security prices do change over time, and risk premiums change also, although much more sluggishly. If substantial changes were to occur between the filing date and the time my oral testimony is presented, I will update my testimony accordingly.

Q. Does this conclude your direct testimony?

A. Yes, it does.

# APPENDIX A
# CAPM, EMPIRICAL CAPM

The Capital Asset Pricing Model (CAPM) is a fundamental paradigm of finance. Simply put, the fundamental idea underlying the CAPM is that risk-averse investors demand higher returns for assuming additional risk, and higher-risk securities are priced to yield higher expected returns than lower-risk securities. The CAPM quantifies the additional return, or risk premium, required for bearing incremental risk. It provides a formal risk-return relationship anchored on the basic idea that only market risk matters, as measured by beta. According to the CAPM, securities are priced such that their:

$$\text{EXPECTED RETURN} = \text{RISK-FREE RATE} + \text{RISK PREMIUM}$$

Denoting the risk-free rate by $R_F$ and the return on the market as a whole by $R_M$, the CAPM is:

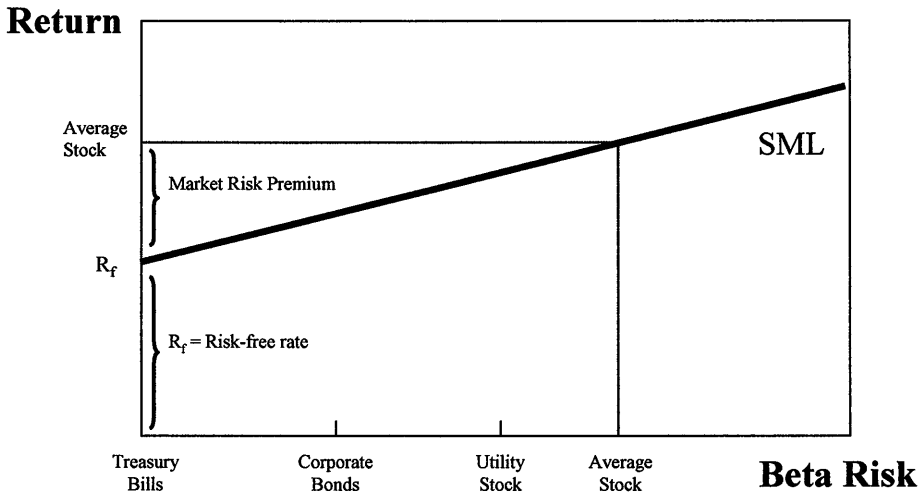
$$K = R_F + \beta(R_M - R_F) \qquad (1)$$

Equation 1 is the CAPM expression which asserts that an investor expects to earn a return, K, that could be gained on a risk-free investment, $R_F$, plus a risk premium for assuming risk, proportional to the security's market risk, also known as beta, $\beta$, and the market risk premium, $(R_M - R_F)$, where $R_M$ is the market return . The market risk premium $(R_M - R_F)$ can be abbreviated MRP so that the CAPM becomes:

$$K = R_F + \beta \times MRP \qquad (2)$$

The CAPM risk-return relationship is depicted in the figure below and is typically labeled as the Security Market Line (SML) by the investment community.

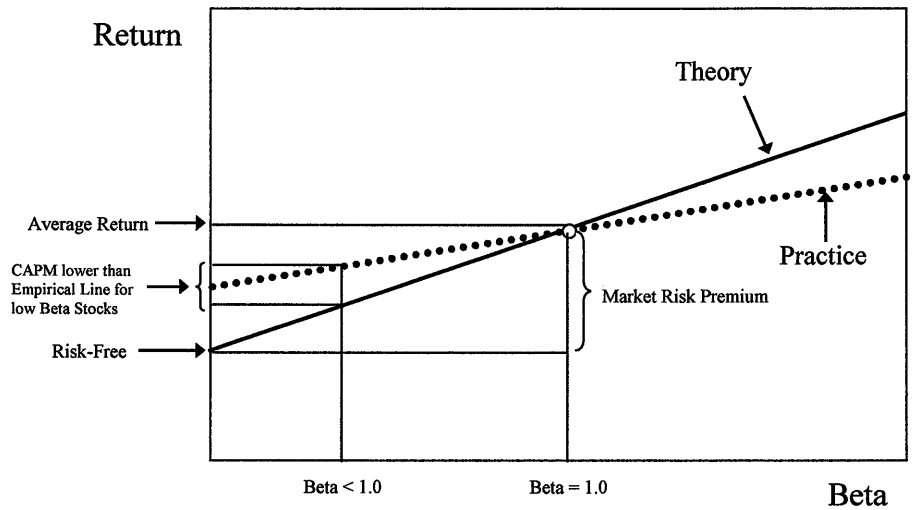
## CAPM and Risk - Return in Capital Markets




A myriad empirical tests of the CAPM have shown that the risk-return tradeoff is not as steeply sloped as that predicted by the CAPM, however. That is, low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted. In other words, the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher returns and high-beta stocks tend to have lower risk returns than predicted by the CAPM. The difference between the CAPM and the type of relationship observed in the empirical studies is depicted in the figure below. This is one of the most widely known empirical findings of the finance literature. This extensive literature is summarized in Chapter 13 of Dr. Morin's book [Regulatory Finance, Public Utilities Report Inc., Arlington, VA, 1994].

# Risk vs Return

Theory vs. Practice




A number of refinements and expanded versions of the original CAPM theory have been proposed to explain the empirical findings. These revised CAPMs typically produce a risk-return relationship that is flatter than the standard CAPM prediction. The following equation makes use of these empirical findings by flattening the slope of the risk-return relationship and increasing the intercept:

$$K = R_F + \alpha + \beta (MRP - \alpha) \quad (3)$$

where $\alpha$ is the "alpha" of the risk-return line, a constant determined empirically, and the other symbols are defined as before. Alternatively, Equation 3 can be written as follows:

$$K = R_F + a\,MRP + (1-a)\,\beta\,MRP \quad (4)$$

where a is a fraction to be determined empirically. Comparing Equations 3 and 4, it is easy to see that alpha equals 'a' times MRP, that is, $\alpha = a \times M R P$

**Theoretical Underpinnings**

The obvious question becomes what would produce a risk return relationship which is flatter than the CAPM prediction, or in other words, how do you explain the presence of "alpha" in the above equation. The exclusion of variables aside from beta would produce this result. Three such variables are noteworthy: dividend yield, skewness, and hedging potential.

The dividend yield effects stem from the differential taxation on corporate dividends and capital gains. The standard CAPM does not consider the regularity of dividends received by investors. Utilities generally maintain high dividend payout ratios relative to the market, and by ignoring dividend yield, the CAPM provides biased cost of capital estimates. To the extent that dividend income is taxed at a higher rate than capital gains, investors will require higher pre-tax returns in order to equalize the after-tax returns provided by high-yielding stocks (e.g. utility stocks) with those of low-yielding stocks. In other words, high-yielding stocks must offer investors higher pre-tax returns. Even if dividends and capital gains are undifferentiated for tax purposes, there is still a tax bias in favor of earnings retention (lower dividend payout), as capital gains taxes are paid only when gains are realized.

Empirical studies by Litzenberger and Ramaswamy (1979) and Litzenberger et al. (1980) find that security returns are positively related to dividend yield as well as to beta. These results are consistent with after-tax extensions of the CAPM developed by Breenan (1973) and Litzenberger and Ramaswamy (1979) and suggest that the relationship between return, beta, and dividend yield should be estimated and employed to calculate the cost of equity capital.

As far as skewness is concerned, investors are more concerned with losing money than with total variability of return. If risk is defined as the probability of loss, it appears more logical to measure risk as the probability of achieving a return which is below the expected return. The traditional CAPM provides downward-biased estimates of cost of capital to the extent that these skewness effects are significant. As shown by Kraus and Litzenberger (1976), expected return depends on both on a stock's systematic risk (beta) and the systematic skewness. Empirical studies by Kraus and Litzenberger (1976), Friend, Westerfield, and Granito (1978), and Morin (1981) found that, in addition to beta, skewness of returns has a significant negative relationship with security returns. This

result is consistent with the skewness version of the CAPM developed by Rubinstein (1973) and Kraus and Litzenberger (1976).

This is particularly relevant for public utilities whose future profitability is constrained by the regulatory process on the upside and relatively unconstrained on the downside in the face of socio-political realities of public utility regulation. The process of regulation, by restricting the upward potential for returns and responding sluggishly on the downward side, may impart some asymmetry to the distribution of returns, and is more likely to result in utilities earning less, rather than more, than their cost of capital. The traditional CAPM provides downward-biased estimates of cost of capital to the extent that these skewness effects are significant.

As far as hedging potential is concerned, investors are exposed to another kind of risk, namely, the risk of unfavorable shifts in the investment opportunity set. Merton (1973) shows that investors will hold portfolios consisting of three funds: the risk-free asset, the market portfolio, and a portfolio whose returns are perfectly negatively correlated with the riskless asset so as to hedge against unforeseen changes in the future risk-free rate. The higher the degree of protection offered by an asset against unforeseen changes in interest rates, the lower the required return, and conversely. Merton argues that low beta assets, like utility stocks, offer little protection against changes in interest rates, and require higher returns than suggested by the standard CAPM.

Another explanation for the CAPM's inability to fully explain the process determining security returns involves the use of an inadequate or incomplete market index. Empirical studies to validate the CAPM invariably rely on some stock market index as a proxy for the true market portfolio. The exclusion of several asset categories from the definition of market index mis-specifies the CAPM and biases the results found using only stock market data. Kolbe and Read (1983) illustrate the biases in beta estimates which result from applying the CAPM to public utilities. Unfortunately, no comprehensive and easily accessible data exist for several classes of assets, such as mortgages and business investments, so that the exact relation between return and stock betas predicted by the CAPM does not exist. This suggests that the empirical relationship between returns and stock betas is best estimated empirically (ECAPM) rather than by relying on theoretical and elegant CAPM models expanded to include missing assets

effects. In any event, stock betas may be highly correlated with the true beta measured with the true market index.

Yet another explanation for the CAPM's inability to fully explain the observed risk-return tradeoff involves the possibility of constraints on investor borrowing that run counter to the assumptions of the CAPM. In response to this inadequacy, several versions of the CAPM have been developed by researchers. One of these versions is the so-called zero-beta, or two-factor, CAPM which provides for a risk-free return in a market where borrowing and lending rates are divergent. If borrowing rates and lending rates differ, or there is no risk-free borrowing or lending, or there is risk-free lending but no risk-free borrowing, then the CAPM has the following form:

$$K = R_Z + \beta(R_m - R_F)$$

The model, christened the zero-beta model, is analogous to the standard CAPM, but with the return on a minimum risk portfolio which 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 found a flatter than predicted CAPM, consistent with the model and other researchers' findings.

The zero-beta CAPM cannot be literally employed in cost of capital projections, since the zero-beta portfolio is a statistical construct difficult to replicate.

**Empirical Evidence**

A summary of the empirical evidence on the magnitude of alpha is provided in the table below.

| Empirical Evidence on the Alpha Factor | | |
|---|---|---|
| **Author** | **Range of alpha** | **Period relied** |
| Black (1993) | -3.6% to 3.6% | 1931-1991 |
| Black, Jensen and Scholes (1972) | -9.61% to 12.24% | 1931-1965 |
| Fama and McBeth (1972) | 4.08% to 9.36% | 1935-1968 |
| Fama and French (1992) | 10.08% to 13.56% | 1941-1990 |
| Litzenberger and Ramaswamy (1979) | 5.32% to 8.17% | |
| Litzenberger, Ramaswamy and Sosin (1980) | 1.63% to 5.04% | 1926-1978 |
| Pettengill, Sundaram and Mathur (1995) | 4.6% | |
| Morin (1994) | 2.0% | 1926-1984 |
| Harris, Marston, Mishra, and O'Brien (2003) | 2.0% | 1983-1998 |

Given the observed magnitude of alpha, the empirical evidence indicates that the risk-return relationship is flatter than that predicted by the CAPM. Typical of the empirical evidence is the findings cited in Morin (1989) over the period 1926-1984 indicating that the observed expected return on a security is related to its risk by the following equation:

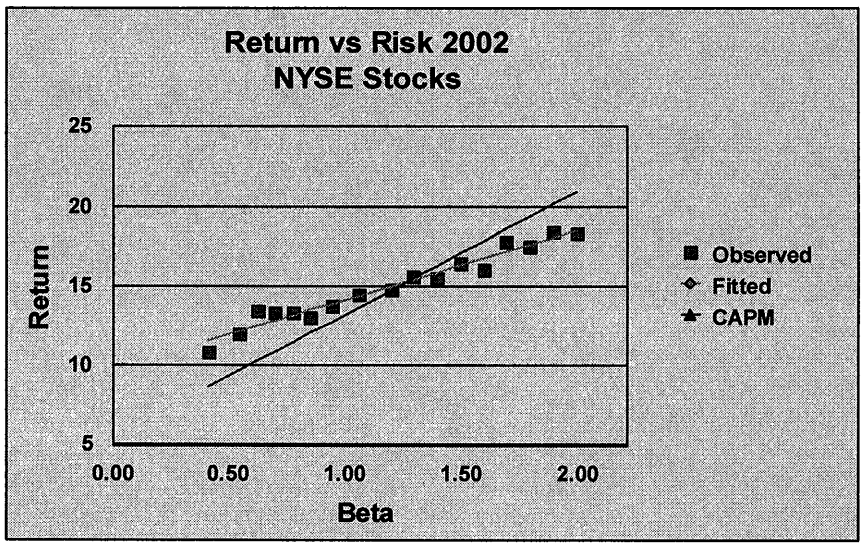
$$K = .0829 + .0520\,\beta$$

Given that the risk-free rate over the estimation period was approximately 6 percent, this relationship implies that the intercept of the risk-return relationship is higher than the 6 percent risk-free rate, contrary to the CAPM's prediction. Given that the average return on an average risk stock exceeded the risk-free rate by about 8.0 percent in that period, that is, the market risk premium ($R_M$ - $R_F$) = 8 percent, the intercept of the observed relationship between return and beta exceeds the risk-free rate by about 2 percent, suggesting an alpha factor of 2 percent.

Most of the empirical studies cited in the above table utilize raw betas rather than Value Line adjusted betas because the latter were not available over most of the time periods covered in these studies. A study of the relationship between return and adjusted beta is reported on Table 6-7 in Ibbotson Associates Valuation Yearbook 2001. If we

exclude the portfolio of very small cap stocks from the relationship due to significant size effects, the relationship between the arithmetic mean return and beta for the remaining portfolios is flatter than predicted and the intercept slightly higher than predicted by the CAPM, as shown on the graph below. It is noteworthy that the Ibbotson study relies on adjusted betas as stated on page 95 of the aforementioned study.

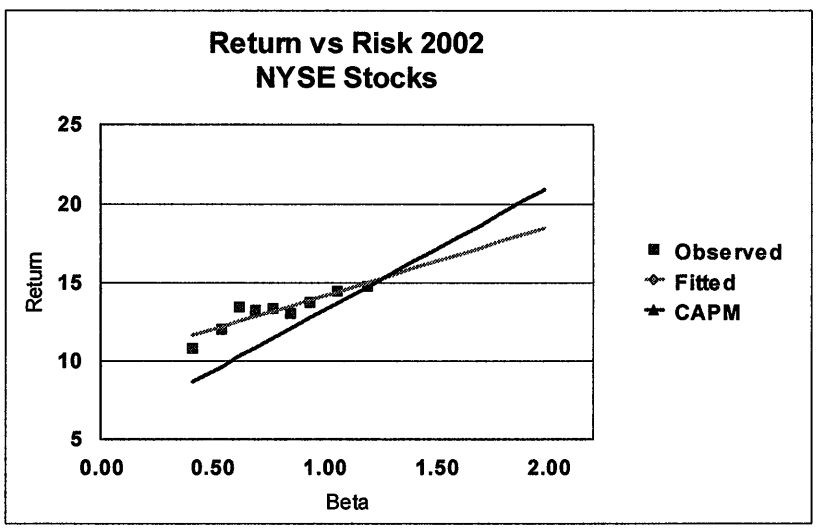
# CAPM vs ECAPM




Another study by Morin in May 2002 provides empirical support for the ECAPM. All the stocks covered in the Value Line Investment Survey for Windows for which betas and returns data were available were retained for analysis. There were nearly 2000 such stocks. The expected return was measured as the total shareholder return ("TSR") reported by Value Line over the past ten years. The Value Line adjusted beta was also retrieved from the same data base. The nearly 2000 companies for which all data were available were ranked in ascending order of beta, from lowest to highest. In order to palliate measurement error, the nearly 2000 securities were grouped into ten portfolios of approximately 180 securities for each portfolio. The average returns and betas for each portfolio were as follows:

| Portfolio # | Beta | Return |
|---|---|---|
| portfolio 1 | 0.41 | 10.87 |
| portfolio 2 | 0.54 | 12.02 |
| portfolio 3 | 0.62 | 13.50 |
| portfolio 4 | 0.69 | 13.30 |
| portfolio 5 | 0.77 | 13.39 |
| portfolio 6 | 0.85 | 13.07 |
| portfolio 7 | 0.94 | 13.75 |
| portfolio 8 | 1.06 | 14.53 |
| portfolio 9 | 1.19 | 14.78 |
| portfolio 10 | 1.48 | 20.78 |

It is clear from the graph below that the observed relationship between DCF returns and Value Line adjusted betas is flatter than that predicted by the plain vanilla CAPM. The observed intercept is higher than the prevailing risk-free rate of 5.7 percent while the slope is less than equal to the market risk premium of 7.7 percent predicted by the plain vanilla CAPM for that period.




In an article published in Financial Management, Harris, Marston, Mishra, and O'Brien ("HMMO") estimate ex ante expected returns for S&P 500 companies over the period 1983-1998[1]. HMMO measure the expected rate of return (cost of equity) of each dividend-paying stock in the S&P 500 for each month from January 1983 to August 1998 by using the constant growth DCF model. They then investigate the relation between the

risk premium (expected return over the 20-year U.S. Treasury Bond yield) estimates for each month to equity betas as of that same month (5-year raw betas).

The table below, drawn from HMMO Table 4, displays the average estimate prospective risk premium (Column 2) by industry and the corresponding beta estimate for that industry, both in raw form (Column 3) and adjusted form (Column 4). The latter were calculated with the traditional Value Line – Merrill Lynch – Bloomberg adjustment methodology by giving 1/3 weight of to a beta estimate of 1.00 and 2/3 weight to the raw beta estimate.

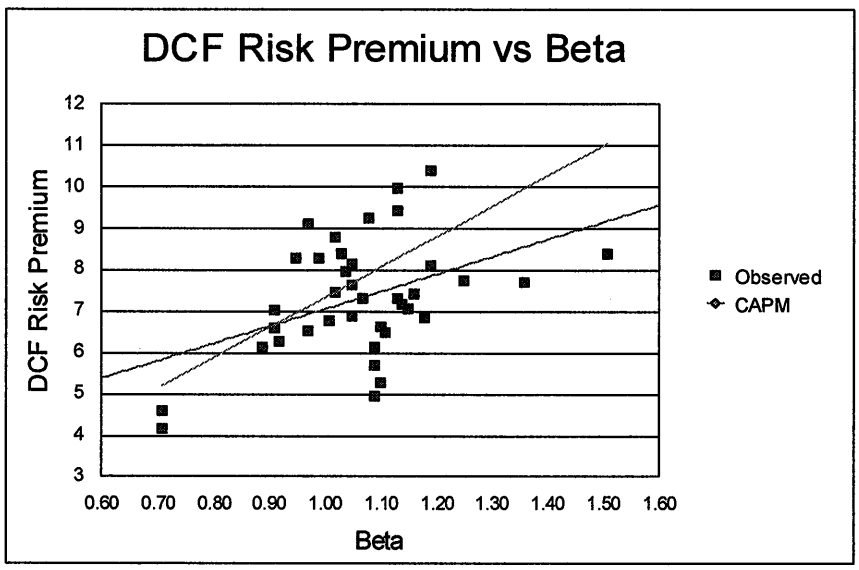
**Table A-1 Risk Premium and Beta Estimates by Industry**

| | Industry | DCF Risk Premium | Raw Industry Beta | Adjusted Industry Beta |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| 1 | Aero | 6.63 | 1.15 | 1.10 |
| 2 | Autos | 5.29 | 1.15 | 1.10 |
| 3 | Banks | 7.16 | 1.21 | 1.14 |
| 4 | Beer | 6.60 | 0.87 | 0.91 |
| 5 | BldMat | 6.84 | 1.27 | 1.18 |
| 6 | Books | 7.64 | 1.07 | 1.05 |
| 7 | Boxes | 8.39 | 1.04 | 1.03 |
| 8 | BusSv | 8.15 | 1.07 | 1.05 |
| 9 | Chems | 6.49 | 1.16 | 1.11 |
| 10 | Chips | 8.11 | 1.28 | 1.19 |
| 11 | Clths | 7.74 | 1.37 | 1.25 |
| 12 | Cnstr | 7.70 | 1.54 | 1.36 |
| 13 | Comps | 9.42 | 1.19 | 1.13 |
| 14 | Drugs | 8.29 | 0.99 | 0.99 |
| 15 | ElcEq | 6.89 | 1.08 | 1.05 |
| 16 | Energy | 6.29 | 0.88 | 0.92 |
| 17 | Fin | 8.38 | 1.76 | 1.51 |
| 18 | Food | 7.02 | 0.86 | 0.91 |
| 19 | Fun | 9.98 | 1.19 | 1.13 |
| 20 | Gold | 4.59 | 0.57 | 0.71 |
| 21 | Hlth | 10.40 | 1.29 | 1.19 |
| 22 | Hsld | 6.77 | 1.02 | 1.01 |
| 23 | Insur | 7.46 | 1.03 | 1.02 |
| 24 | LabEq | 7.31 | 1.10 | 1.07 |
| 25 | Mach | 7.32 | 1.20 | 1.13 |
| 26 | Meals | 7.98 | 1.06 | 1.04 |
| 27 | MedEq | 8.80 | 1.03 | 1.02 |
| 28 | Pap | 6.14 | 1.13 | 1.09 |
| 29 | PerSv | 9.12 | 0.95 | 0.97 |
| 30 | Retail | 9.27 | 1.12 | 1.08 |
| 31 | Rubber | 7.06 | 1.22 | 1.15 |

[1] Harris, R. S., Marston, F. C., Mishra, D. R., and O'Brien, T. J., "*Ex Ante* Cost of Equity Estimates of S&P 500 Firms: The Choice Between Global and Domestic CAPM," Financial Management, Autumn 2003, pp. 51-66.

| | | | | |
|---|---|---|---|---|
| 32 | Ships | 1.95 | 0.95 | 0.97 |
| 33 | Stee | 4.96 | 1.13 | 1.09 |
| 34 | Telc | 6.12 | 0.83 | 0.89 |
| 35 | Toys | 7.42 | 1.24 | 1.16 |
| 36 | Trans | 5.70 | 1.14 | 1.09 |
| 37 | Txtls | 6.52 | 0.95 | 0.97 |
| 38 | Util | 4.15 | 0.57 | 0.71 |
| 39 | Whlsl | 8.29 | 0.92 | 0.95 |
| | **MEAN** | **7.19** | | |

The observed statistical relationship between expected return and **adjusted beta** is shown in the graph below along with the CAPM prediction:




If the plain vanilla version of the CAPM is correct, then the intercept of the graph should be zero, recalling that the vertical axis represents returns in excess of the risk-free rate. Instead, the observed intercept is approximately 2 percent, that is approximately equal to 25 percent of the expected market risk premium of 7.2 percent shown at the bottom of Column 2 over the 1983-1998 period, as predicted by the ECAPM. The same is true for the slope of the graph. If the plain vanilla version of the CAPM is correct, then the slope of the relationship should equal the market risk premium of 7.2 percent. Instead, the observed slope of close to 5 percent is approximately equal to 75 percent of the expected market risk premium of 7.2 percent, as predicted by the ECAPM.

In short, the HMMO empirical findings are quite consistent with the predictions of the ECAPM.

**Practical Implementation of the ECAPM**

The empirical evidence reviewed above suggests that the expected return on a security is related to its risk by the following relationship:

$$K = R_F + \alpha + \beta\ (MRP - \alpha) \qquad (5)$$

or, alternatively by the following equivalent relationship:

$$K = R_F + a\,MRP + (1\text{-}a)\,\beta\,MRP \qquad (6)$$

The empirical findings support values of $\alpha$ from approximately 2 percent to 7 percent. If one is using the short-term U.S. Treasury Bills yield as a proxy for the risk-free rate, and given that utility stocks have lower than average betas, an alpha in the lower range of the empirical findings, 2 percent - 3 percent is reasonable, albeit conservative.

Using the long-term U.S. Treasury yield as a proxy for the risk-free rate, a lower alpha adjustment is indicated. This is because the use of the long-term U.S. Treasury yield as a proxy for the risk-free rate partially incorporates the desired effect of using the ECAPM[2]. An alpha in the range of 1 percent - 2 percent is therefore reasonable.

To illustrate, consider a utility with a beta of 0.80. The risk-free rate is 5 percent, the MRP is 7 percent, and the alpha factor is 2 percent. The cost of capital is determined as follows:

$$K = R_F + \alpha + \beta\ (MRP - \alpha)$$
$$K = 5\% + 2\% + 0.80(7\% - 2\%)$$
$$= 11\%$$

[2] The Security Market Line (SML) using the long-term risk-free rate has a higher intercept and a flatter slope than the SML using the short-term risk-free rate

A practical alternative is to rely on the second variation of the ECAPM:

$$K = R_F + a\,MRP + (1-a)\,\beta\,MRP$$

With an alpha of 2 percent, a MRP in the 6 percent - 8 percent range, the 'a" coefficient is 0.25, and the ECAPM becomes[3]:

$$K = R_F + 0.25\,MRP + 0.75\,\beta\,MRP$$

Returning to the numerical example, the utility's cost of capital is:

$$K = 5\% + 0.25 \times 7\% + 0.75 \times 0.80 \times 7\%$$
$$= 11\%$$

For reasonable values of beta and the MRP, both renditions of the ECAPM produce results that are virtually identical[4].

[3] Recall that alpha equals 'a' times MRP, that is, alpha = a MRP, and therefore a = alpha/MRP. If alpha is 2 percent, then a = 0.25

[4] In the Morin (1994) study, the value of "a" was actually derived by systematically varying the constant "a" in equation 6 from 0 to 1 in steps of 0.05 and choosing that value of 'a' that minimized the mean square error between the observed relationship between return and beta:

$$K = 0.0829 + .0520\,\beta$$

The value of a that best explained the observed relationship was 0.25.

## REFERENCES

Black, Fischer, "Beta and Return," The Journal of Portfolio Management, Fall 1993, 8-18.

Black, Fischer, Michael C. Jensen and Myron Scholes, "The Capital Asset Pricing Model: Some Empirical Tests, from Jensen, M. (ed.) Studies in the Theory of Capital Markets, Praeger, New York, 1972, 79-121.

Breenan, M. (1973) "Taxes, Market Valuation, and Corporate Financial Policy," National Tax Journal, 23, 417-427.

Fama, Eugene F. and James D. MacBeth, "Risk, Returns and Equilibrium: Empirical Tests," Journal of Political Economy, September 1972, pp. 607-636.

Fama, Eugene F. and Kenneth R. French, "The Cross-Section of Expected Stock Returns," Journal of Finance, Vol. 47, June 1992, pp. 427-465.

Friend, I., Westerfield, R., and Granito, M. (1978) "New Evidence on the Capital Asset Pricing Model, Journal of Finance, 23, 903-916.

Harris, R. S., Marston, F. C., Mishra, D. R., and O'Brien, T. J., "Ex Ante Cost of Equity Estimates of S&P 500 Firms: The Choice Between Global and Domestic CAPM," Financial Management, Autumn 2003, pp. 51-66.

Kraus, A. and Litzenberger, R.H. (1976) "Skewness Preference and the Valuation of Risk Assets, Journal of Finance, 31, 1085-99.

Litzenberger, R. H. and Ramaswamy, K. "The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence." Journal of Financial Economics, June 1979, 163-196.

Litzenberger, R. H., Ramaswamy, K. and Sosin, H. (1980) "On the CAPM Approach to the Estimation of a Public Utility's Cost of Equity Capital, Journal of Finance, 35, May 1980, 369-83.

Merton, R.C. (1973) "An Intertemporal Capital Asset Pricing Model", Econometrica, 41, 867-887.

Morin, R.A. (1981) "Intertemporal Market-Line Theory: An Empirical Test," Financial Review, Proceedings of the Eastern Finance Association, 1981.

Morin, R.A. (1989) Arizona Corporation Commission, Rebuttal Testimony of Dr. Ra. Morin on behalf of US West Communications, Appendix B, 1989.

Pettengill, Glenn N., Sridhar Sundaram and Ike Mathur, "The Conditional Relation between Beta and Returns," Journal of Financial and Quantitative Analysis, Vol. 30, No. 1, March 1995, pp. 101-116.

Rubinstein, M.E. (1973) "A Mean-Variance Synthesis of Corporate Financial Theory, Journal of Financial Economics, March 1973, 167-82.

# *APPENDIX B*

## *FLOTATION COST ALLOWANCE*

To obtain the final cost of equity financing from the investors' expected rate of return, it is necessary to make allowance for underpricing, which is the sum of market pressure, costs of flotation, and underwriting fees associated with new issues. Allowance for market pressure should be made because large blocks of new stock may cause significant pressure on market prices even in stable markets. Allowance must also be made for company costs of flotation (including such items as printing, legal and accounting expenses) and for underwriting fees.

## 1. MAGNITUDE OF FLOTATION COSTS

According to empirical studies, underwriting costs and expenses average at least 4% of gross proceeds for utility stock offerings in the U.S. (See Logue & Jarrow: "Negotiations vs. Competitive Bidding in the Sale of Securities by Public Utilities", Financial Management, Fall 1978.) A study of 641 common stock issues by 95 electric utilities identified a flotation cost allowance of 5.0%. (See Borum & Malley: "Total Flotation Cost for Electric Company Equity Issues", Public Utilities Fortnightly, Feb. 20, 1986.)

Empirical studies suggest an allowance of 1% for market pressure in U.S. studies. Logue and Jarrow found that the absolute magnitude of the relative price decline due to market pressure was less than 1.5%. Bowyer and Yawitz examined 278 public utility stock issues and found an average market pressure of 0.72%. (See Bowyer & Yawitz, "The Effect of New Equity Issues on Utility Stock Prices", Public Utilities Fortnightly, May 22, 1980.)

Eckbo & Masulis ("Rights vs. Underwritten Stock Offerings: An Empirical Analysis", University of British Columbia, Working Paper No. 1208, Sept., 1987) found an average flotation cost of 4.175% for utility common stock offerings. Moreover, flotation costs increased progressively for

smaller size issues. They also found that the relative price decline due to market pressure in the days surrounding the announcement amounted to slightly more than 1.5%. In a classic and monumental study published in the prestigious Journal of Financial Economics by a prominent scholar, a market pressure effect of 3.14% for industrial stock issues and 0.75% for utility common stock issues was found (see Smith, C.W., "Investment Banking and the Capital Acquisition Process," Journal of Financial Economics 15, 1986). Other studies of market pressure are reported in Logue ("On the Pricing of Unseasoned Equity Offerings, Journal of Financial and Quantitative Analysis, Jan. 1973), Pettway ("The Effects of New Equity Sales Upon Utility Share Prices," Public Utilities Fortnightly, May 10 1984), and Reilly and Hatfield ("Investor Experience with New Stock Issues," Financial Analysts' Journal, Sept.-Oct. 1969). In the Pettway study, the market pressure effect for a sample of 368 public utility equity sales was in the range of 2% to 3%. Adding the direct and indirect effects of utility common stock issues, the indicated total flotation cost allowance is above 5.0%, corroborating the results of earlier studies.

As shown in the table below, a comprehensive empirical study by Lee, Lochhead, Ritter, and Zhao, "The Costs of Raising Capital," Journal of Financial Research, Vol. XIX, NO. 1, Spring 1996, shows average direct flotation costs for equity offerings of 3.5% - 5% for stock issues between $60 and $500 million. Allowing for market pressure costs raises the flotation cost allowance to well above 5%.

## FLOTATION COSTS: RAISING EXTERNAL CAPITAL

(Percent of Total Capital Raised)

| Amount Raised in $ Millions | Average Flotation Cost: Common Stock | Average Flotation Cost: New Debt |
|---|---|---|
| $ 2 - 9.99 | 13.28% | 4.39% |
| 10 - 19.99 | 8.72 | 2.76 |
| 20 - 39.99 | 6.93 | 2.42 |
| 40 - 59.99 | 5.87 | 1.32 |
| 60 - 79.99 | 5.18 | 2.34 |
| 80 - 99.99 | 4.73 | 2.16 |
| 100 - 199.99 | 4.22 | 2.31 |
| 200 - 499.99 | 3.47 | 2.19 |
| 500 and Up | 3.15 | 1.64 |

Note: Flotation costs for IPOs are about 17 percent of the value of common stock issued if the amount raised is less than $10 million and about 6 percent if more than $500 million is raised. Flotation costs are somewhat lower for utilities than others.

Source: Lee, Inmoo, Scott Lochhead, Jay Ritter, and Quanshui Zhao, "The Costs of Raising Capital," *The Journal of Financial Research,* Spring 1996.

Therefore, based on empirical studies, total flotation costs including market pressure amount to approximately 5% of gross proceeds. I have therefore assumed a 5% gross total flotation cost allowance in my cost of capital analyses.

## 2. APPLICATION OF THE FLOTATION COST ADJUSTMENT

The section below shows: 1) why it is necessary to apply an allowance of 5% to the dividend

yield component of equity cost by dividing that yield by 0.95 (100% - 5%) to obtain the fair return on equity capital, and 2) why the flotation adjustment is permanently required to avoid confiscation even if no further stock issues are contemplated. Flotation costs are only recovered if the rate of return is applied to total equity, including retained earnings, in all future years.

Flotation costs are just as real as costs incurred to build utility plant. Fair regulatory treatment absolutely must permit the recovery of these costs. An analogy with bond issues is useful to understand the treatment of flotation costs in the case of common stocks.

In the case of a bond issue, flotation costs are not expensed but are rather amortized over the life of the bond, and the annual amortization charge is embedded in the cost of service. This is analogous to the process of depreciation, which allows the recovery of funds invested in utility plant. The recovery of bond flotation expense continues year after year, irrespective of whether the company issues new debt capital in the future, until recovery is complete. In the case of common stock that has no finite life, flotation costs are not amortized. Therefore, the recovery of flotation cost requires an upward adjustment to the allowed return on equity. Roger A. Morin, Regulatory Finance, Public Utilities Reports Inc., Arlington, Va., 1994, provides numerical illustrations that show that even if a utility does not contemplate any additional common stock issues, a flotation cost adjustment is still permanently required. Examples there also demonstrate that the allowance applies to retained earnings as well as to the original capital.

From the standard DCF model, the investor's required return on equity capital is expressed as:

$$K = D_1/P_o + g$$

If $P_o$ is regarded as the proceeds per share actually received by the company from which dividends and earnings will be generated, that is, $P_o$ equals $B_o$, the book value per share, then the company's required return is:

$$r = D_1/B_o + g$$

Denoting the percentage flotation costs 'f', proceeds per share $B_o$ are related to market price $P_o$ as follows:

$$P - fP = B_o$$

$$P(1 - f) = B_0$$

Substituting the latter equation into the above expression for return on equity, we obtain:

$$r = D_1/P(1-f) + g$$

that is, the utility's required return adjusted for underpricing. For flotation costs of 5%, dividing the expected dividend yield by 0.95 will produce the adjusted cost of equity capital. For a dividend yield of 6% for example, the magnitude of the adjustment is 32 basis points: .06/.95 = .0632.

In deriving DCF estimates of fair return on equity, it is therefore necessary to apply a conservative after-tax allowance of 5% to the dividend yield component of equity cost.

Even if no further stock issues are contemplated, the flotation adjustment is still permanently required to keep shareholders whole. Flotation costs are only recovered if the rate of return is applied to total equity, including retained earnings, in all future years, even if no future financing is contemplated. This is demonstrated by the numerical example contained in pages 7-9 of this Appendix. Moreover, even if the stock price, hence the DCF estimate of equity return, fully reflected the lack of permanent allowance, the company always nets less than the market price. Only the net proceeds from an equity issue are used to add to the rate base on which the investor earns. A permanent allowance for flotation costs must be authorized in order to insure that in each year the investor earns the required return on the total amount of capital actually supplied.

The example shown on pages 7-9 shows the flotation cost adjustment process using illustrative, yet realistic, market data. The assumptions used in the computation are shown on page 7. The stock is selling in the market for $25, investors expect the firm to pay a dividend of $2.25 that will grow at a rate of 5% thereafter. The traditional DCF cost of equity is thus k = D/P + g = 2.25/25 + .05 = 14%. The firm sells one share stock, incurring a flotation cost of 5%. The traditional DCF cost of equity adjusted for flotation cost is thus ROE = D/P(1-f) + g = .09/.95 + .05 = 14.47%.

The initial book value (rate base) is the net proceeds from the stock issue, which are $23.75, that is, the market price less the 5% flotation costs. The example demonstrates that only if the company is allowed to earn 14.47% on rate base will investors earn their cost of equity of 14%. On page 8, Column

1 shows the initial common stock account, Column 2 the cumulative retained earnings balance, starting at zero, and steadily increasing from the retention of earnings. Total equity in Column 3 is the sum of common stock capital and retained earnings. The stock price in Column 4 is obtained from the seminal DCF formula: $D_1/(k - g)$. Earnings per share in Column 6 are simply the allowed return of 14.47% times the total common equity base. Dividends start at $2.25 and grow at 5% thereafter, which they must do if investors are to earn a 14% return. The dividend payout ratio remains constant, as per the assumption of the DCF model. All quantities, stock price, book value, earnings, and dividends grow at a 5% rate, as shown at the bottom of the relevant columns. Only if the company is allowed to earn 14.47% on equity do investors earn 14%. For example, if the company is allowed only 14%, the stock price drops from $26.25 to $26.13 in the second year, inflicting a loss on shareholders. This is shown on page 9. The growth rate drops from 5% to 4.53%. Thus, investors only earn 9% + 4.53% = 13.53% on their investment. It is noteworthy that the adjustment is always required each and every year, whether or not new stock issues are sold in the future, and that the allowed return on equity must be earned on total equity, including retained earnings, for investors to earn the cost of equity.

## ASSUMPTIONS:

| | |
|---|---|
| ISSUE PRICE = | $25.00 |
| FLOTATION COST = | 5.00% |
| DIVIDEND YIELD = | 9.00% |
| GROWTH = | 5.00% |

| | |
|---|---|
| EQUITY RETURN = (D/P + g) | **14.00%** |
| ALLOWED RETURN ON EQUITY = (D/P(1-f) + g) | **14.47%** |

| Yr | COMMON STOCK (1) | RETAINED EARNINGS (2) | TOTAL EQUITY (3) | STOCK PRICE (4) | MARKET/ BOOK RATIO (5) | EPS (6) | DPS (7) | PAYOUT (8) |
|---|---|---|---|---|---|---|---|---|
| 1 | $23.75 | $0.000 | $23.750 | $25.000 | 1.0526 | $3.438 | $2.250 | 65.45% |
| 2 | $23.75 | $1.188 | $24.938 | $26.250 | 1.0526 | $3.609 | $2.363 | 65.45% |
| 3 | $23.75 | $2.434 | $26.184 | $27.563 | 1.0526 | $3.790 | $2.481 | 65.45% |
| 4 | $23.75 | $3.744 | $27.494 | $28.941 | 1.0526 | $3.979 | $2.605 | 65.45% |
| 5 | $23.75 | $5.118 | $28.868 | $30.388 | 1.0526 | $4.178 | $2.735 | 65.45% |
| 6 | $23.75 | $6.562 | $30.312 | $31.907 | 1.0526 | $4.387 | $2.872 | 65.45% |
| 7 | $23.75 | $8.077 | $31.827 | $33.502 | 1.0526 | $4.607 | $3.015 | 65.45% |
| 8 | $23.75 | $9.669 | $33.419 | $35.178 | 1.0526 | $4.837 | $3.166 | 65.45% |
| 9 | $23.75 | $11.340 | $35.090 | $36.936 | 1.0526 | $5.079 | $3.324 | 65.45% |
| 10 | $23.75 | $13.094 | $36.844 | $38.783 | 1.0526 | $5.333 | $3.490 | 65.45% |
| | | | **5.00%** | **5.00%** | | **5.00%** | **5.00%** | |

| Yr | COMMON STOCK (1) | RETAINED EARNINGS (2) | TOTAL EQUITY (3) | STOCK PRICE (4) | MARKET/ BOOK RATIO (5) | EPS (6) | DPS (7) | PAYOUT (8) |
|---|---|---|---|---|---|---|---|---|
| 1 | $23.75 | $0.000 | $23.750 | $25.000 | 1.0526 | $3.325 | $2.250 | 67.67% |
| 2 | $23.75 | $1.075 | $24.825 | $26.132 | 1.0526 | $3.476 | $2.352 | 67.67% |
| 3 | $23.75 | $2.199 | $25.949 | $27.314 | 1.0526 | $3.633 | $2.458 | 67.67% |
| 4 | $23.75 | $3.373 | $27.123 | $28.551 | 1.0526 | $3.797 | $2.570 | 67.67% |
| 5 | $23.75 | $4.601 | $28.351 | $29.843 | 1.0526 | $3.969 | $2.686 | 67.67% |
| 6 | $23.75 | $5.884 | $29.634 | $31.194 | 1.0526 | $4.149 | $2.807 | 67.67% |
| 7 | $23.75 | $7.225 | $30.975 | $32.606 | 1.0526 | $4.337 | $2.935 | 67.67% |
| 8 | $23.75 | $8.627 | $32.377 | $34.082 | 1.0526 | $4.533 | $3.067 | 67.67% |
| 9 | $23.75 | $10.093 | $33.843 | $35.624 | 1.0526 | $4.738 | $3.206 | 67.67% |
| 10 | $23.75 | $11.625 | $35.375 | $37.237 | 1.0526 | $4.952 | $3.351 | 67.67% |
| | | | **4.53%** | **4.53%** | | **4.53%** | **4.53%** | |