Exhibit No.
Issue: Cost of Capital
Witness: Dr. James H. Vander Weide
Type of Exhibit:: Direct Testimony
Sponsoring Party: Empire District
Case No.

Before the Public Service Commission
Of the State of Missouri

Direct Testimony

of

Dr. James H. Vander Weide

February 2006

TABLE OF CONTENTS
OF
DR. JAMES H. VANDER WEIDE
ON BEHALF OF
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY
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I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS FOR THE RECORD.

A. My name is James H. Vander Weide. I am Research Professor of Finance and Economics at the Fuqua School of Business of Duke University. I am also President of Financial Strategy Associates, a firm that provides strategic and financial consulting services to business clients. My business address is 3606 Stoneybrook Drive, Durham, North Carolina.

Q. WOULD YOU PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PRIOR ACADEMIC EXPERIENCE?

A. I graduated from Cornell University with a Bachelor's Degree in Economics and from Northwestern University with a Ph.D. in Finance. After joining the faculty of the School of Business at Duke University, I was named Assistant Professor, Associate Professor, and then Professor.

Since joining the faculty I have taught courses in corporate finance, investment management, and management of financial institutions. I have taught a graduate seminar on the theory of public utility pricing and

lectured in executive development seminars on the cost of capital, financial analysis, capital budgeting, mergers and acquisitions, cash management, short-run financial planning, and competitive strategy. I have also served as Program Director of executive education programs at the Fuqua School of Business, including the Duke Advanced Management Program, the Duke Executive Program in Telecommunications, the Duke Competitive Strategies in Telecommunications Program, and the Duke Program for Manager Development for managers from the former Soviet Union.

I have conducted seminars and training sessions on financial analysis, financial strategy, cost of capital, cash management, depreciation policies, and short-run financial planning for a wide variety of U.S. and international companies, including ABB, Allstate, Ameritech, AT&T, Bell Atlantic, BellSouth, Carolina Power & Light, Contel, Fisons, Glaxo Wellcome, GTE, Lafarge, MidAmerican Energy, New Century Energies, Norfolk Southern, Pacific Bell Telephone, Progress Energy, Inc, The Rank Group, Siemens, Southern New England Telephone, TRW, and Wolseley Plc.

In addition to my teaching and executive education activities, I have written research papers on such topics as portfolio management, the cost of capital, capital budgeting, the effect of regulation on the performance of public utilities, the economics of universal service requirements, and cash management. My articles have been published in *American Economic*

Review, Financial Management, International Journal of Industrial Organization, Journal of Finance, Journal of Financial and Quantitative Analysis, Journal of Bank Research, Journal of Accounting Research, Journal of Cash Management, Management Science, The Journal of Portfolio Management, Atlantic Economic Journal, Journal of Economics and Business, and Computers and Operations Research. I have written a book titled *Managing Corporate Liquidity: an Introduction to Working Capital Management*, and a chapter for *The Handbook of Modern Finance*, "Financial Management in the Short Run."

Q. HAVE YOU PREVIOUSLY TESTIFIED ON FINANCIAL OR ECONOMIC ISSUES?

A. Yes. As an expert on financial and economic theory, I have testified on the cost of capital, competition, risk, incentive regulation, forward-looking economic cost, economic pricing guidelines, depreciation, accounting, valuation, and other financial and economic issues in approximately 370 cases before the U.S. Congress, the Canadian Radio-Television and Telecommunications Commission, the Federal Communications Commission, the National Telecommunications and Information Administration, the Federal Energy Regulatory Commission, the public service commissions of 40 states, the insurance commissions of five states, the Iowa State Board of Tax Review, the North Carolina Property Tax Commission, and the National Association of Securities Dealers. In addition, I have testified as an expert witness in proceedings before the

U.S. District Court, Northern District of California; U.S. District Court, District of Nebraska; U.S. District Court, Eastern District of North Carolina; Superior Court, North Carolina; the U.S. Bankruptcy Court, Southern District of West Virginia; and the U. S. District Court for the Eastern District of Michigan.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by the Empire District Electric Company (Empire) to prepare an independent appraisal of Empire's cost of equity, and to recommend to the Missouri Public Service Commission (the Commission) a rate of return on equity that is fair, that allows Empire to attract capital on reasonable terms, and that allows Empire to maintain its financial integrity.

Q. HOW DID YOU ESTIMATE EMPIRE'S COST OF EQUITY?

A. I estimated Empire's cost of equity in two steps. First, I applied several standard cost of equity methods to market data for proxy groups of comparable companies. Second, I adjusted the average cost of equity for my proxy groups for the difference in the perceived financial risk of my proxy companies in the marketplace and the financial risk implied by my recommended capital structure for Empire.

Q. WHY DID YOU APPLY YOUR COST OF EQUITY METHODS TO PROXY GROUPS OF COMPARABLE COMPANIES RATHER THAN SOLELY TO EMPIRE?

A. Standard cost of equity methodologies such as the discounted cash flow (DCF), risk premium, and Capital Asset Pricing Model (CAPM) require inputs of quantities that are not easily measured. Since these inputs can only be estimated, there is naturally some degree of uncertainty surrounding the estimate of the cost of equity for each company. However, the uncertainty in the estimate of the cost of equity for an individual company can be greatly reduced by applying cost of equity methodologies to a reasonably large sample of comparable companies. Intuitively, unusually high estimates for some individual companies are offset by unusually low estimates for other individual companies. Thus, financial economists invariably apply cost of equity methodologies to a group of comparable companies. In utility regulation, the practice of using a group of comparable companies is further supported by the regulatory standard that the utility should be allowed to earn a return on its investment that is commensurate with returns being earned on other investments of the same risk.[1]

Q. WHAT AVERAGE COST OF EQUITY DID YOU FIND FOR YOUR PROXY COMPANIES?

A. On the basis of my studies, I find that the average cost of equity for my proxy companies is equal to 11.3 percent. This conclusion is based on

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[1] See *Bluefield Water Works and Improvement Co. v. Public Service Comm'n.* 262 U.S. 679, 692 (1923) and *Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944).

my application of three standard cost of equity estimation techniques: (1) the discounted cash flow model; (2) the risk premium approach; and (3) the capital asset pricing model.

Q. DOES THE AVERAGE COST OF EQUITY OF YOUR PROXY COMPANIES DEPEND ON THEIR AVERAGE CAPITAL STRUCTURE?

A. Yes. The cost of equity for a company depends on its financial risk, which is measured by the market values of debt and equity in its capital structure. Since Empire's recommended capital structure in this proceeding embodies greater financial risk than the financial risk embodied in the cost of equity estimates for my proxy companies, the cost of equity for my proxy companies will have to be adjusted upward so that investors in Empire will have an opportunity to earn a return on their investment in Empire that is commensurate with returns they could earn on other investments of comparable risk. On the basis of my studies, I have determined that Empire requires a cost of equity of 11.7 percent to compensate investors for the higher financial risk of Empire's capital structure.

Q. WHAT IS YOUR RECOMMENDATION REGARDING EMPIRE'S COST OF EQUITY?

A. I recommend that Empire be allowed a rate of return on equity equal to 11.7 percent.

Q. DO YOU HAVE EXHIBITS ACCOMPANYING YOUR TESTIMONY?

A. Yes. I have prepared or supervised the preparation of nine schedules and three appendices that accompany my testimony.

II. ECONOMIC AND LEGAL PRINCIPLES

Q. HOW DO ECONOMISTS DEFINE THE REQUIRED RATE OF RETURN, OR COST OF CAPITAL, ASSOCIATED WITH PARTICULAR INVESTMENT DECISIONS SUCH AS THE DECISION TO INVEST IN ELECTRIC GENERATION, TRANSMISSION, AND DISTRIBUTION FACILITIES?

A. Economists define the cost of capital as the return investors expect to receive on alternative investments of comparable risk.

Q. HOW DOES THE COST OF CAPITAL AFFECT A FIRM'S INVESTMENT DECISIONS?

A. The goal of a firm is to maximize the value of the firm. This goal can be accomplished by accepting all investments in plant and equipment with an expected rate of return greater than the cost of capital. Thus, a firm should continue to invest in plant and equipment only so long as the return on its investment is greater than or equal to its cost of capital.

Q. HOW DOES THE COST OF CAPITAL AFFECT INVESTORS' WILLINGNESS TO INVEST IN A COMPANY?

A. The cost of capital measures the return investors can expect on investments of comparable risk. The cost of capital also measures the investor's required rate of return on investment because rational investors

will not invest in a particular investment opportunity if the expected return on that opportunity is less than the cost of capital. Thus, the cost of capital is a hurdle rate for both investors and the firm.

Q. DO ALL INVESTORS HAVE THE SAME POSITION IN THE FIRM?

A. No. Debt investors have a fixed claim on a firm's assets and income that must be paid prior to any payment to the firm's equity investors. Since the firm's equity investors have a residual claim on the firm's assets and income, equity investments are riskier than debt investments. Thus, the cost of equity exceeds the cost of debt.

Q. WHAT IS THE OVERALL OR AVERAGE COST OF CAPITAL?

A. The overall or average cost of capital is a weighted average of the cost of debt and cost of equity, where the weights are the percentages of debt and equity in a firm's capital structure.

Q. CAN YOU ILLUSTRATE THE CALCULATION OF THE OVERALL OR WEIGHTED AVERAGE COST OF CAPITAL?

A. Yes. Assume that the cost of debt is 7 percent, the cost of equity is 13 percent, and the percentages of debt and equity in the firm's capital structure are 50 percent and 50 percent, respectively. Then the weighted average cost of capital is expressed by .50 times 7 percent plus .50 times 13 percent, or 10.0 percent.

Q. HOW DO ECONOMISTS DEFINE THE COST OF EQUITY?

A. Economists define the cost of equity as the return investors expect to receive on alternative equity investments of comparable risk. Since the

return on an equity investment of comparable risk is not a contractual return, the cost of equity is more difficult to measure than the cost of debt. However, as I have already noted, there is agreement among economists that the cost of equity is greater than the cost of debt. There is also agreement among economists that the cost of equity, like the cost of debt, is both forward looking and market based.

Q. HOW DO ECONOMISTS MEASURE THE PERCENTAGES OF DEBT AND EQUITY IN A FIRM'S CAPITAL STRUCTURE?

A. Economists measure the percentages of debt and equity in a firm's capital structure by first calculating the market value of the firm's debt and the market value of its equity. Economists then calculate the percentage of debt by the ratio of the market value of debt to the combined market value of debt and equity, and the percentage of equity by the ratio of the market value of equity to the combined market values of debt and equity. For example, if a firm's debt has a market value of $25 million and its equity has a market value of $75 million, then its total market capitalization is $100 million, and its capital structure contains 25% debt and 75% equity.

Q. WHY DO ECONOMISTS MEASURE A FIRM'S CAPITAL STRUCTURE IN TERMS OF THE MARKET VALUES OF ITS DEBT AND EQUITY?

A. Economists measure a firm's capital structure in terms of the market values of its debt and equity because: (1) the weighted average cost of capital is defined as the return investors expect to earn on a portfolio of the company's debt and equity securities; (2) investors measure the

expected return and risk on their portfolios using market value weights, not book value weights; and (3) market values are the best measures of the amounts of debt and equity investors have invested in the company on a going forward basis.

Q. WHY DO INVESTORS MEASURE THE RETURN ON THEIR INVESTMENT PORTFOLIOS USING MARKET VALUE WEIGHTS RATHER THAN BOOK VALUE WEIGHTS?

A. Investors measure the return on their investment portfolios using market value weights because market value weights are the best measure of the amounts the investors currently have invested in each security in the portfolio. From the point of view of investors, the historical cost or book value of their investment is entirely irrelevant to the current risk and return on their portfolios because if they were to sell their investments, they would receive market value, not historical cost. Thus, the return can only be measured in terms of market values.

Q. IS THE ECONOMIC DEFINITION OF THE WEIGHTED AVERAGE COST OF CAPITAL CONSISTENT WITH REGULATORS' TRADITIONAL DEFINITION OF THE AVERAGE COST OF CAPITAL?

A. No. The economic definition of the weighted average cost of capital is based on the market costs of debt and equity, the market value percentages of debt and equity in a company's capital structure, and the future expected risk of investing in the company. In contrast, regulators have traditionally defined the weighted average cost of capital using the

embedded cost of debt and the book values of debt and equity in a company's capital structure.

Q. DOES THE REQUIRED RATE OF RETURN ON AN INVESTMENT VARY WITH THE RISK OF THAT INVESTMENT?

A. Yes. Since investors are averse to risk, they require a higher rate of return on investments with greater risk.

Q. DO ECONOMISTS AND INVESTORS CONSIDER FUTURE INDUSTRY CHANGES WHEN THEY ESTIMATE THE RISK OF A PARTICULAR INVESTMENT?

A. Yes. Economists and investors consider all the risks that a firm might incur over the future life of the company.

Q. ARE THESE ECONOMIC PRINCIPLES REGARDING THE FAIR RETURN FOR CAPITAL RECOGNIZED IN ANY SUPREME COURT CASES?

A. Yes. These economic principles, relating to the supply of and demand for capital, are recognized in two United States Supreme Court cases: (1) *Bluefield Water Works and Improvement Co. v. Public Service Comm'n.*; and (2) *Federal Power Comm'n v. Hope Natural Gas Co.* In the *Bluefield Water Works* case, the Court states:

> A public utility is entitled to such rates as will permit it to earn a return upon 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; but it has no

> constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably 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 the money necessary for the proper discharge of its public duties. [*Bluefield Water Works and Improvement Co. v. Public Service Comm'n.* 262 U.S. 679, 692 (1923)].

The Court clearly recognizes here that: (1) a regulated firm cannot remain financially sound unless the return it is allowed to earn on the value of its property is at least equal to the cost of capital (the principle relating to the demand for capital); and (2) a regulated firm will not be able to attract capital if it does not offer investors an opportunity to earn a return on their investment equal to the return they expect to earn on other investments of the same risk (the principle relating to the supply of capital).

In the *Hope Natural Gas* case, the Court reiterates the financial soundness and capital attraction principles of the *Bluefield* case:

> 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 to attract capital. [*Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944)].

Q. WHAT PRACTICAL DIFFICULTIES ARISE WHEN ONE ATTEMPTS TO APPLY THE ECONOMIC PRINCIPLES NOTED ABOVE TO A REGULATED FIRM?

A. The application of these principles to the debt and preferred stock components of a regulated firm's capital structure is straightforward. Several problems arise, however, when the principles are applied to common equity. These problems stem from the fact that the cash flows to the equity investors, over any period of time, are not fixed by contract, and thus are not known with certainty. To induce equity investors to part with their money, a firm must offer them an expected return that is commensurate with expected returns on equity investments of similar risk. The need to measure expected returns makes the application of the above principles difficult. These difficulties are especially pronounced today for a firm like Empire, which is part of an industry that faces increased demand uncertainty, increased operating cost uncertainty, and increased uncertainty regarding the investments required to provide safe and reliable service.

Q. HOW DO YOU ADDRESS THESE DIFFICULTIES IN YOUR TESTIMONY?

A. I address these difficulties by employing the comparable company approach to estimate Empire's cost of equity.

Q. WHAT IS THE COMPARABLE COMPANY APPROACH?

A. The comparable company approach estimates Empire's cost of equity by identifying a group of companies of similar risk. The cost of equity is then estimated for the companies in the proxy group.

III. BUSINESS AND FINANCIAL RISKS IN THE ELECTRIC ENERGY BUSINESS

Q. WHAT ARE THE PRIMARY FACTORS THAT AFFECT THE BUSINESS AND FINANCIAL RISKS OF ELECTRIC ENERGY COMPANIES SUCH AS EMPIRE?

A. The business and financial risks of investing in the electric energy business are affected by a number of factors, including:

1. Demand Uncertainty. The business risk of electric energy companies is increased by the high degree of demand uncertainty in the industry. Demand uncertainty is caused by: (a) the strong dependence of electric demand on the state of the economy and weather patterns; (b) the ability of customers to choose alternative forms of energy, such as natural gas or oil; (c) the ability of some customers to locate facilities in the service areas of competitors; (d) the ability of some customers to produce their own electricity under cogeneration or self-generation arrangements; and (e) the ability of municipalities to go into the energy business rather than renew the company's franchise. Demand uncertainty is a problem for electric companies because of the need to plan for infrastructure additions many years in advance of demand.

2. Operating Expense Uncertainty. The business risk of electric energy companies is also increased by the inherent uncertainty in the typical electric energy company's operating expenses. Operating expense uncertainty arises as a result of: (a) high volatility in fuel prices; (b) the prospect of rising employee health care and pension expenses; (c) uncertainty in the cost of purchased power; (d) variability in storm-related expenses due to severe weather; and (e) the prospect of increased expenses for security related to the threat of terrorist activities.

3. Investment Uncertainty. The electric energy business requires very large investments in the generation, transmission, and distribution facilities required to deliver energy to customers. The future amounts of required investments in these facilities are highly uncertain as a result of: (a) demand uncertainty; (b) the prospect that Congress or state legislatures will pass stricter environmental regulations and clean air requirements; (c) the prospect of needing to incur additional investments to insure the reliability of the company's transmission and distribution networks; (d) uncertainty regarding the regulatory and management structure of the electric transmission network; and (e) uncertainty regarding future decommissioning costs. Furthermore, the risk of investing in electric energy facilities is increased by the irreversible nature of the company's investments in generation, transmission, and distribution

facilities. For example, if an electric energy company decides to make a major capital expenditure in a coal-fired generation plant, and, as a result of new environmental regulations, energy produced by the plant becomes uneconomic, there is little the company can do to recover its investment.

4. High Operating Leverage. The electric energy business requires a large commitment to fixed costs in relation to the operating margin on sales, a situation known as high operating leverage. The relatively high degree of fixed costs in the electric energy business arises from the average electric energy company's large investment in fixed generation, transmission, and distribution facilities. High operating leverage causes the average electric energy company's operating income to be highly sensitive to revenue fluctuations.

5. High Degree of Financial Leverage. The large capital requirements for building economically efficient electric generation, transmission, and distribution facilities, along with the traditional regulatory preference for the use of debt, have encouraged electric utilities to maintain highly debt-leveraged capital structures as compared to non-utility firms. High debt leverage is a source of additional risk to utility stock investors because it increases the percentage of the firm's costs that are fixed. The use of financial leverage also reduces the firm's interest coverage and increases vulnerability to variations in earnings.

6. Regulatory Uncertainty. Investors' perceptions of the business and financial risks of electric energy companies are strongly influenced by their views of the quality of regulation. Investors are painfully aware that regulators in some jurisdictions have been unwilling at times to set rates that allow companies an opportunity to recover their cost of service and earn a fair and reasonable return on investment. As a result of their perceived increase in regulatory risk, investors will demand a higher rate of return for electric energy companies operating in those states. On the other hand, if investors perceive that regulators will provide a reasonable opportunity for the company to maintain its financial integrity and earn a fair rate of return on its investment, investors will view regulatory risk as minimal.

Q. HAVE ANY OF THESE RISK FACTORS CHANGED IN RECENT YEARS?

A. Yes. In recent years, the risk of investing in electric energy companies has increased as a result of greater uncertainty in demand, operating expenses, and investment costs. Since the risk factors that cause this increase in risk are unlikely to diminish in the foreseeable future, the Commission should recognize these additional risks in setting Empire's allowed rate of return in this proceeding.

Q. CAN THE RISKS FACING EMPIRE AND OTHER ELECTRIC ENERGY COMPANIES BE DISTINGUISHED FROM THE RISKS OF INVESTING IN COMPANIES IN OTHER INDUSTRIES?

A. Yes. The risks of investing in electric energy companies such as Empire can be distinguished from the risks of investing in companies in many other industries in several ways. First, the risks of investing in electric energy companies are increased because of the greater capital intensity of the electric energy business and the fact that most investments in electric energy facilities are irreversible once they are made. Second, unlike returns in unregulated industries, the returns from investment in the electric energy business are largely asymmetric. That is, there is little opportunity for electric energy companies to earn more than their required return, and a significant chance that they will earn less than their required return.

IV. COST OF EQUITY ESTIMATION METHODS

Q. WHAT METHODS DID YOU USE TO ESTIMATE THE COST OF COMMON EQUITY CAPITAL FOR EMPIRE?

A. I used three generally accepted methods for estimating Empire's cost of common equity. These are the Discounted Cash Flow (DCF), risk premium, and CAPM methods. The DCF method assumes that the current market price of a firm's stock is equal to the discounted value of all expected future cash flows. The risk premium method assumes that

investors' required return on an equity investment is equal to the interest rate on a long-term bond plus an additional equity risk premium to compensate the investor for the risks of investing in equities compared to bonds. The CAPM assumes that the investors' required rate of return is equal to a risk-free rate of interest plus the product of a company-specific risk factor, beta, and the expected risk premium on the market portfolio.

V. DISCOUNTED CASH FLOW (DCF) METHOD

Q. PLEASE DESCRIBE THE DCF MODEL.

A. The DCF model is based on the assumption that investors value an asset on the basis of the future cash flows they expect to receive from owning the asset. Thus, investors value an investment in a bond because they expect to receive a sequence of semi-annual coupon payments over the life of the bond and a terminal payment equal to the bond's face value at the time the bond matures. Likewise, investors value an investment in a firm's stock because they expect to receive a sequence of dividend payments and, perhaps, expect to sell the stock at a higher price sometime in the future.

A second fundamental principle of the DCF method is that investors value a dollar received in the future less than a dollar received today. A future dollar is valued less than a current dollar because investors could invest a current dollar in an interest earning account and increase their wealth. This principle is called the time value of money.

Applying the two fundamental DCF principles noted above to an investment in a bond leads to the conclusion that investors value their investment in the bond on the basis of the present value of the bond's future cash flows. Thus, the price of the bond should be equal to:

EQUATION 1

$$P_B = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \ldots + \frac{C+F}{(1+i)^n}$$

where:

P_B = Bond price;
C = Cash value of the coupon payment (assumed for notational convenience to occur annually rather than semi-annually);
F = Face value of the bond;
i = The rate of interest the investor could earn by investing his money in an alternative bond of equal risk; and
n = The number of periods before the bond matures.

Applying these same principles to an investment in a firm's stock suggests that the price of the stock should be equal to:

EQUATION 2

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

where:

P_S = Current price of the firm's stock;

$D_1, D_2...D_n$ = Expected annual dividend per share on the firm's stock;

P_n = Price per share of stock at the time the investor expects to sell the stock; and

k = Return the investor expects to earn on alternative investments of the same risk, i.e., the investor's required rate of return.

Equation (2) is frequently called the annual discounted cash flow model of stock valuation. Assuming that dividends grow at a constant annual rate, *g*, this equation can be solved for *k*, the cost of equity. The resulting cost of equity equation is $k = D_1/P_s + g$, where *k* is the cost of equity, D_1 is the expected next period annual dividend, P_s is the current price of the stock, and *g* is the constant annual growth rate in earnings, dividends, and book value per share. The term D_1/P_s is called the dividend yield component of the annual DCF model, and the term *g* is called the growth component of the annual DCF model.

Q. ARE YOU RECOMMENDING THAT THE ANNUAL DCF MODEL BE USED TO ESTIMATE EMPIRE'S COST OF EQUITY?

A. No. The DCF model assumes that a company's stock price is equal to the present discounted value of all expected future dividends. The annual DCF model is only a correct expression for the present value of future dividends if dividends are paid annually at the end of each year. Since the companies in my proxy group all pay dividends quarterly, the current market price that investors are willing to pay reflects the expected

quarterly receipt of dividends. Therefore, a quarterly DCF model must be used to estimate the cost of equity for these firms. The quarterly DCF model differs from the annual DCF model in that it expresses a company's price as the present value of a quarterly stream of dividend payments. A complete analysis of the implications of the quarterly payment of dividends on the DCF model is provided in Appendix 1. For the reasons cited there, I employed the quarterly DCF model throughout my calculations.

Q. PLEASE DESCRIBE THE QUARTERLY DCF MODEL YOU USED.

A. The quarterly DCF model I used is described on Schedule (JVW-1) and in Appendix 1. The quarterly DCF equation shows that the cost of equity is: the sum of the future expected dividend yield and the growth rate, where the dividend in the dividend yield is the equivalent future value of the four quarterly dividends at the end of the year, and the growth rate is the expected growth in dividends or earnings per share.

Q. HOW DID YOU ESTIMATE THE QUARTERLY DIVIDEND PAYMENTS IN YOUR QUARTERLY DCF MODEL?

A. The quarterly DCF model requires an estimate of the dividends, d_1, d_2, d_3, and d_4, investors expect to receive over the next four quarters. I estimated the next four quarterly dividends by multiplying the previous four quarterly dividends by the factor, (1 + the growth rate, g).

Q. CAN YOU ILLUSTRATE HOW YOU ESTIMATED THE NEXT FOUR QUARTERLY DIVIDENDS WITH DATA FOR A SPECIFIC COMPANY?

A. Yes. In the case of Alliant Energy, the first company shown in Schedule JVW-1, the last four quarterly dividends are equal to .263. Thus dividends, d_1, d_2, d_3, and d_4 are equal to .2729 [.263 x (1 + .0375) = .2729]. (As noted previously, the logic underlying this procedure is described in Appendix 1.)

Q. IN APPENDIX 1, YOU DEMONSTRATE THAT THE QUARTERLY DCF MODEL PROVIDES THE THEORETICALLY CORRECT VALUATION OF STOCKS WHEN DIVIDENDS ARE PAID QUARTERLY. DO INVESTORS, IN PRACTICE, RECOGNIZE THE ACTUAL TIMING AND MAGNITUDE OF CASH FLOWS WHEN THEY VALUE STOCKS AND OTHER SECURITIES?

A. Yes. In valuing long-term government or corporate bonds, investors recognize that interest is paid semi-annually. Thus, the price of a long-term government or corporate bond is simply the present value of the semi-annual interest and principal payments on these bonds. Likewise, in valuing mortgages, investors recognize that interest is paid monthly. Thus, the value of a mortgage loan is simply the present value of the monthly interest and principal payments on the loan. In valuing stock investments, stock investors correctly recognize that dividends are paid quarterly. Thus, a firm's stock price is the present value of the stream of quarterly dividends expected from owning the stock.

Q. WHEN VALUING BONDS, MORTGAGES, OR STOCKS, WOULD INVESTORS ASSUME THAT CASH FLOWS ARE RECEIVED ONLY AT

THE END OF THE YEAR, WHEN, IN FACT, THE CASH FLOWS ARE RECEIVED SEMI-ANNUALLY, QUARTERLY, OR MONTHLY?

A. No. Assuming that cash flows are received at the end of the year when they are received semi-annually, quarterly, or monthly would lead investors to make serious mistakes in valuing investment opportunities. No rational investor would make the mistake of assuming that dividends or other cash flows are paid annually when, in fact, they are paid more frequently.

Q. HOW DID YOU ESTIMATE THE GROWTH COMPONENT OF THE QUARTERLY DCF MODEL?

A. I used the analysts' estimates of future earnings per share (EPS) growth reported by I/B/E/S Thomson Financial.

Q. WHAT ARE THE ANALYSTS' ESTIMATES OF FUTURE EPS GROWTH?

A. As part of their research, financial analysts working at Wall Street firms periodically estimate EPS growth for each firm they follow. The EPS forecasts for each firm are then published. Investors who are contemplating purchasing or selling shares in individual companies review the forecasts. These estimates represent five-year forecasts of EPS growth.

Q. WHAT IS I/B/E/S?

A. I/B/E/S is a firm that reports analysts' EPS growth forecasts for a broad group of companies. The forecasts are expressed in terms of a mean

forecast and a standard deviation of forecast for each firm. Investors use the mean forecast as a consensus estimate of future firm performance.

Q. WHY DID YOU USE THE I/B/E/S GROWTH ESTIMATES?

A. The I/B/E/S growth rates: (1) are widely circulated in the financial community, (2) include the projections of reputable financial analysts who develop estimates of future EPS growth, (3) are reported on a timely basis to investors, and (4) are widely used by institutional and other investors.

Q. WHY DID YOU RELY ON ANALYSTS' PROJECTIONS OF FUTURE EPS GROWTH IN ESTIMATING THE INVESTORS' EXPECTED GROWTH RATE RATHER THAN LOOKING AT PAST HISTORICAL GROWTH RATES?

A. I relied on analysts' projections of future EPS growth because there is considerable empirical evidence that investors use analysts' forecasts to estimate future earnings growth.

Q. HAVE YOU PERFORMED ANY STUDIES CONCERNING THE USE OF ANALYSTS' FORECASTS AS AN ESTIMATE OF INVESTORS' EXPECTED GROWTH RATE, G?

A. Yes, I prepared a study in conjunction with Willard T. Carleton, Karl Eller Professor of Finance at the University of Arizona, on why analysts' forecasts are the best estimate of investors' expectation of future long-term growth. This study is described in a paper entitled "Investor Growth Expectations and Stock Prices: the Analysts versus Historical

Growth Extrapolation," published in the Spring 1988 edition of *The Journal of Portfolio Management.*

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR STUDY.

A. First, we performed a correlation analysis to identify the historically oriented growth rates which best described a firm's stock price. Then we did a regression study comparing the historical growth rates with the consensus analysts' forecasts. In every case, the regression equations containing the average of analysts' forecasts statistically outperformed the regression equations containing the historical growth estimates. These results are consistent with those found by Cragg and Malkiel, the early major research in this area (John G. Cragg and Burton G. Malkiel, *Expectations and the Structure of Share Prices*, University of Chicago Press, 1982). These results are also consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy and sell decisions. They provide overwhelming evidence that the analysts' forecasts of future growth are superior to historically-oriented growth measures in predicting a firm's stock price.

Q. HAS YOUR STUDY BEEN UPDATED TO INCLUDE MORE RECENT DATA?

A. Yes. Researchers at State Street Financial Advisors updated my study using data through year-end 2003. Their results continue to confirm that

analysts' growth forecasts are superior to historically-oriented growth measures in predicting a firm's stock price.

Q. WHAT PRICE DID YOU USE IN YOUR DCF MODEL?

A. I used a simple average of the monthly high and low stock prices for each firm for the three-month period ending November 2005. These high and low stock prices were obtained from Thomson Financial.

Q. WHY DID YOU USE THE THREE-MONTH AVERAGE STOCK PRICE IN APPLYING THE DCF METHOD?

A. I used the three-month average stock price in applying the DCF method because stock prices fluctuate daily, while financial analysts' forecasts for a given company are generally changed less frequently, often on a quarterly basis. Thus, to match the stock price with an earnings forecast, it is appropriate to average stock prices over a three-month period.

Q. DID YOU INCLUDE AN ALLOWANCE FOR FLOTATION COSTS IN YOUR DCF ANALYSIS?

A. No. Since Empire is seeking to recover its equity flotation costs as an expense over a five-year period, I have not included an allowance for flotation costs in my cost of equity calculations.

Q. HOW DID YOU APPLY THE DCF APPROACH TO OBTAIN THE COST OF EQUITY CAPITAL FOR EMPIRE?

A. I applied the DCF approach to the Value Line electric companies shown in Schedule (JVW-1) and to the Value Line natural gas companies shown in Schedule (JVW-2).

Q. HOW DID YOU SELECT YOUR PROXY GROUP OF ELECTRIC COMPANIES?

A. I selected all the companies in Value Line's groups of electric companies that: (1) paid dividends during every quarter of the last two years; (2) did not decrease dividends during any quarter of the past two years; (3) had at least three analysts included in the I/B/E/S mean growth forecast; (4) have an investment grade bond rating and a Value Line Safety Rank of 1, 2, or 3; and (5) have not announced a merger.

Q. WHY DID YOU ELIMINATE COMPANIES THAT HAVE EITHER DECREASED OR ELIMINATED THEIR DIVIDEND IN THE PAST TWO YEARS?

A. The DCF model requires the assumption that dividends will grow at a constant rate into the indefinite future. If a company has either decreased or eliminated its dividend in recent years, an assumption that the company's dividend will grow at the same rate into the indefinite future is questionable.

Q. WHY DID YOU ELIMINATE COMPANIES THAT HAVE FEWER THAN THREE ANALYSTS INCLUDED IN THE I/B/E/S MEAN FORECASTS?

A. The DCF model also requires a reliable estimate of a company's expected future growth. For most companies, the I/B/E/S mean growth forecast is the best available estimate of the growth term in the DCF model. However, the I/B/E/S estimate may be less reliable if the mean estimate is based on the inputs of very few analysts. On the basis of my professional

judgment, I believe that at least three analysts' estimates are a reasonable minimum number.

Q. WHY DID YOU ELIMINATE COMPANIES THAT HAVE ANNOUNCED MERGERS THAT ARE NOT YET COMPLETED?

A. A merger announcement can sometimes have a significant impact on a company's stock price because of anticipated merger-related cost savings and new market opportunities. Analysts' growth forecasts, on the other hand, are necessarily related to companies as they currently exist, and do not reflect investors' views of the potential cost savings and new market opportunities associated with mergers. The use of a stock price that includes the value of potential mergers in conjunction with growth forecasts that do not include the growth enhancing prospects of potential mergers produces DCF results that tend to distort a company's cost of equity.

Q. IS YOUR ELECTRIC COMPANY PROXY GROUP COMPARABLE IN RISK TO EMPIRE?

A. Yes. Many investors use the Value Line Safety Rank as a measure of equity risk. As shown on Schedule JVW-1, the average Value Line Safety Rank for my proxy group of electric companies is 2, on a scale where 1 is the most safe and 5 is the least safe, and the Value Line Safety Rank for Empire is 3. The average S&P bond rating of the electric companies in my proxy group is approximately BBB+. The S&P bond rating for Empire is BBB.

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR APPLICATION OF THE DCF MODEL TO THE VALUE LINE ELECTRIC COMPANY PROXY GROUP.

A. As shown on Schedule JVW-1, I obtain a DCF result of 9.9 percent. Given investors' perceptions that the risk of investing in electric utilities has increased in recent years, I believe that the DCF result for the Value Line electric companies understates Empire's true cost of equity. However, to be conservative, I will consider this result, along with my other cost of equity results, when I reach my conclusion regarding Empire's cost of equity.

Q. DOES THE DCF MODEL PRODUCE AN ECONOMICALLY REASONABLE ESTIMATE OF EMPIRE'S COST OF EQUITY AT THIS TIME?

A. No. There are several reasons why the results of applying the DCF model to electric utilities do not make economic sense at this time. First, the DCF results for the electric utilities have displayed considerable volatility over the last several years. In contrast to the general pattern of equity costs varying within a more narrow range than interest rates, the DCF result for the electric utilities has varied within a much wider range than interest rates over the last six years, 442 basis points for DCF results versus 330 basis points for interest rates. Furthermore, the standard deviation of the DCF results is 153 basis points, as compared to the standard deviation of interest rates of just 93 basis points. The high

volatility of DCF results for electric utilities compared to interest rates suggests that the DCF model is not providing an accurate indication of the electric utilities' cost of equity at this time.

Second, the DCF results for electric utilities deviate significantly from the cost of equity results obtained from other widely used cost of equity methodologies such as the risk premium and CAPM methodologies. The large deviation of the DCF results for electric utilities from the results of applying other cost of equity methods to the same companies suggests that the DCF model is not providing an appropriate indication of the electric utilities' cost of equity at this time.

Q. AS NOTED ABOVE, YOU ALSO APPLIED THE DCF MODEL TO A PROXY GROUP OF NATURAL GAS COMPANIES. WHY DID YOU APPLY THE DCF MODEL TO A PROXY GROUP OF NATURAL GAS COMPANIES?

A. I applied the DCF model to a proxy group of natural gas companies in addition to a group of electric companies because the natural gas companies are similar in risk to the electric companies, and, as a group, are experiencing less industry restructuring than the electric companies.[2] In addition, it is useful to examine the cost of equity results for a group of similar companies from a closely associated industry in order to test the

[2] The DCF model is based on the assumption that companies operate in a relatively stable environment. When companies are experiencing dramatic industry restructuring, the basic stability assumptions of the DCF model may not apply.

reasonableness of the results obtained by applying cost of equity methodologies to electric companies. Financial theory does not require that companies be in exactly the same industry to be comparable in risk.

Q. WHAT NATURAL GAS COMPANIES DID YOU INCLUDE IN YOUR PROXY GROUP OF NATURAL GAS COMPANIES?

A. I selected all the companies in Value Line's groups of natural gas companies that have regulated natural gas businesses and otherwise meet the same criteria as described above for the electric companies. The natural gas companies in my DCF group and the average DCF result are shown on Schedule JVW-2.

Q. HOW ARE YOUR PROXY NATURAL GAS COMPANIES SIMILAR TO EMPIRE?

A. Like Empire, my proxy natural gas companies: (1) employ a capital-intensive physical network that connects the customer to the source of energy; (2) sell transmission and/or distribution services at regulated rates to customers whose energy demand is primarily dependent on the state of the economy and the weather; (3) procure energy in energy markets with highly variable prices; and (4) are regulated by public utility commissions that have traditionally viewed electric and natural gas utilities as being comparable in risk.

Q. DO YOU HAVE ANY EMPIRICAL EVIDENCE THAT THE NATURAL GAS COMPANIES IN YOUR PROXY GROUP ARE A CONSERVATIVE PROXY FOR EMPIRE?

A. Yes. The average Value Line Safety Rank for my proxy group of natural gas companies is 2, on a scale where 1 is the most safe and 5 is the least safe, compared to the Safety Rank of 3 for Empire (see Schedule JVW-2). In addition, the average S&P bond rating for my natural gas companies is approximately A-. In contrast, as noted above, Empire's S&P bond rating is BBB. These data provide evidence that the natural gas proxy group is somewhat less risky than both Empire and the electric proxy group.

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR APPLICATION OF THE DCF METHOD TO THE VALUE LINE NATURAL GAS COMPANIES.

A. My application of the DCF method to the Value Line natural gas companies produces an average DCF result of 9.6 percent, as shown on Schedule JVW-2. I believe this result also understates Empire's true cost of equity because, as demonstrated above, the Value Line natural gas companies are less risky than both the electric proxy group and Empire.

VI. RISK PREMIUM METHOD

Q. PLEASE DESCRIBE THE RISK PREMIUM METHOD OF ESTIMATING EMPIRE'S COST OF EQUITY.

A. The risk premium method is based on the principle that investors expect to earn a return on an equity investment in Empire that reflects a "premium" over and above the return they expect to earn on an

investment in a portfolio of bonds. This equity risk premium compensates equity investors for the additional risk they bear in making equity investments versus bond investments.

Q. DOES THE RISK PREMIUM APPROACH SPECIFY WHAT DEBT INSTRUMENT SHOULD BE USED TO ESTIMATE THE INTEREST RATE COMPONENT IN THE METHODOLOGY?

A. No. The risk premium approach can be implemented using virtually any debt instrument. However, the risk premium approach does require that the debt instrument used to estimate the risk premium be the same as the debt instrument used to calculate the interest rate component of the risk premium approach. For example, if the risk premium on equity is calculated by comparing the returns on stocks and the returns on A-rated utility bonds, then the interest rate on A-rated utility bonds must be used to estimate the interest rate component of the risk premium approach.

Q. DOES THE RISK PREMIUM APPROACH REQUIRE THAT THE SAME COMPANIES BE USED TO ESTIMATE THE STOCK RETURN AS ARE USED TO ESTIMATE THE BOND RETURN?

A. No. For example, many analysts apply the risk premium approach by comparing the return on a portfolio of stocks to the return on Treasury securities such as long-term Treasury bonds. Clearly, in this widely-accepted application of the risk premium approach, the same companies are not used to estimate the stock return as are used to estimate the bond return, since the U.S. government is not a company.

Q. HOW DID YOU MEASURE THE REQUIRED RISK PREMIUM ON AN EQUITY INVESTMENT IN EMPIRE?

A. I used two methods to estimate the required risk premium on an equity investment in Empire. The first is called the ex ante risk premium method and the second is called the ex post risk premium method.

A. Ex Ante Risk Premium Method

Q. PLEASE DESCRIBE YOUR EX ANTE RISK PREMIUM APPROACH FOR MEASURING THE REQUIRED RISK PREMIUM ON AN EQUITY INVESTMENT IN EMPIRE.

A. My ex ante risk premium method is based on studies of the DCF expected return on proxy groups of electric and natural gas companies compared to the interest rate on Moody's A-rated utility bonds. Specifically, for each month in my study period, I calculated the risk premium using the equation,

$$RP_{PROXY} = DCF_{PROXY} - I_A$$

where:

RP_{PROXY} = the required risk premium on an equity investment in the proxy group of companies,

DCF_{PROXY} = average DCF estimated cost of equity on a portfolio of proxy companies; and

I_A = the yield to maturity on an investment in A-rated utility bonds.

I then performed a regression analysis to determine if there were a relationship between the calculated risk premium and interest rates.

Finally, I used the results of the regression analysis to estimate the investors' required risk premium. To estimate the cost of equity, I then added the required risk premium to the forecasted interest rate on A-rated utility bonds. A detailed description of my ex ante risk premium studies is contained in Appendix 2, and the underlying DCF results and interest rates are displayed in Schedule JVW-3.

Q. WHAT COST OF EQUITY DO YOU OBTAIN FROM YOUR EX ANTE RISK PREMIUM METHOD USING THE PROXY GROUP OF ELECTRIC COMPANIES?

A. To estimate the cost of equity using the ex ante risk premium method, one may add the estimated risk premium over the yield on A-rated utility bonds to the yield to maturity on A-rated utility bonds. At November 2005, the forecasted yield to maturity on A-rated utility bonds for 2007 is 6.9 percent.[3] My analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 4.0 percent. Adding an estimated risk premium of 4.0 percent to the 2007 forecasted 6.9 percent average yield to maturity on A-rated utility bonds produces a cost of equity estimate of 10.9 percent using the ex ante risk premium method.

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[3] This estimate is obtained from data supplied by Global Insight, December 2005, which forecasts an average AA-rated utility bond yield in 2007 of 6.59 percent (Global Insight does not provide a forecast for A-rated utility bonds). Global Insight's forecasted yield is 100 basis points higher than the November 2005 average yield on Moody's AA-rated utility bonds, 5.59 percent. I obtained the forecasted 6.9 percent yield for A-rated utility bonds by adding 100 basis points to the 5.9 percent average yield on Moody's A-rated utility bonds in November 2005.

Q. HAVE YOU ALSO APPLIED YOUR EX ANTE RISK PREMIUM APPROACH TO A PROXY GROUP OF NATURAL GAS COMPANIES?

A. Yes. Following the same procedure as described in Appendix 2, I applied my ex ante risk premium approach to my proxy group of natural gas companies compared to the interest rate on A-rated utility bonds. The underlying DCF results and interest rates for this study are displayed in Schedule JVW-4.

Q. WHAT COST OF EQUITY DO YOU OBTAIN FROM YOUR EX ANTE RISK PREMIUM METHOD USING THE PROXY GROUP OF NATURAL GAS COMPANIES?

A. For the natural gas proxy group, my analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 4.4 percent. Adding an estimated risk premium of 4.4 percent to the 6.9 percent forecasted yield to maturity on A-rated utility bonds produces a cost of equity estimate of 11.3 percent using the ex ante risk premium method.

Q. WHAT COST OF EQUITY DO YOU OBTAIN FROM YOUR EX ANTE RISK PREMIUM METHOD?

A. The ex ante risk premium method using the electric proxy group produced a cost of equity estimate of 10.9 percent, and using the natural gas proxy group, a cost of equity estimate of 11.3 percent. Averaging these estimates produces a cost of equity estimate of 11.1 percent using the ex ante risk premium method.

B. Ex Post Risk Premium Method

Q. PLEASE DESCRIBE YOUR EX POST RISK PREMIUM METHOD FOR MEASURING THE REQUIRED RISK PREMIUM ON AN EQUITY INVESTMENT IN EMPIRE.

A. I first performed a study of the comparable returns received by bond and stock investors over the 67 years of my study. I estimated the returns on stock and bond portfolios, using stock price and dividend yield data on the S&P 500 and bond yield data on Moody's A-rated Utility Bonds. My study consisted of making an investment of one dollar in the S&P 500 and Moody's A-rated utility bonds at the beginning of 1937, and reinvesting the principal plus return each year to 2004. The return associated with each stock portfolio is the sum of the annual dividend yield and capital gain (or loss) which accrued to this portfolio during the year(s) in which it was held. The return associated with the bond portfolio, on the other hand, is the sum of the annual coupon yield and capital gain (or loss) which accrued to the bond portfolio during the year(s) in which it was held. The resulting annual returns on the stock and bond portfolios purchased in each year between 1937 and 2004 are shown on Schedule (JVW-5). The average annual return on an investment in the S&P 500 stock portfolio was 11.67 percent, while the average annual return on an investment in the Moody's A-rated utility bond portfolio was 6.40 percent. The risk premium on the S&P 500 stock portfolio is, therefore, 5.27 percent.

I also conducted a second study using stock data on the S&P Utilities rather than the S&P 500. As shown on Schedule (JVW-6), the S&P Utility stock portfolio showed an average annual return of 10.57 percent per year. Thus, the return on the S&P Utility stock portfolio exceeded the return on the Moody's A-rated utility bond portfolio by 4.16 percent.

Q. WHY IS IT APPROPRIATE TO PERFORM YOUR EX POST RISK PREMIUM ANALYSIS USING BOTH THE S&P 500 AND THE S&P UTILITY STOCK INDICES?

A. I have performed my ex post risk premium analysis on both the S&P 500 and the S&P Utilities as upper and lower bounds for the required risk premium on an equity investment in Empire because I believe electric energy companies today face risks that are somewhere in between the average risk of the S&P Utilities and the S&P 500 over the years 1937 to 2004. Specifically, the risk premium on the S&P Utilities, 4.16 percent, represents a lower bound for the required risk premium on an equity investment in Empire because Empire is currently more risky than an investment in the average utility in the S&P Utilities index over the entire period 1936 to the present. On the other hand, the risk premium on the S&P 500, 5.27 percent, represents an upper bound because an investment in Empire is less risky than an investment in the S&P 500 over the period 1937 to the present. I use the average of the two risk premiums as my estimate of the required risk premium for Empire in my ex post risk premium method.

Q. WHY DID YOU ANALYZE INVESTORS' EXPERIENCES OVER SUCH A LONG TIME FRAME?

A. Because day-to-day stock price movements can be somewhat random, it is inappropriate to rely on short-run movements in stock prices in order to derive a reliable risk premium. Rather than buying and selling frequently in anticipation of highly volatile price movements, most investors employ a strategy of buying and holding a diversified portfolio of stocks. This buy-and-hold strategy will allow an investor to achieve a much more predictable long-run return on stock investments and at the same time will minimize transaction costs. The situation is very similar to the problem of predicting the results of coin tosses. I cannot predict with any reasonable degree of accuracy the result of a single, or even a few, flips of a balanced coin; but I can predict with a good deal of confidence that approximately 50 heads will appear in 100 tosses of this coin. Under these circumstances, it is most appropriate to estimate future experience from long-run evidence of investment performance.

Q. WOULD YOUR STUDY PROVIDE A DIFFERENT RISK PREMIUM IF YOU STARTED WITH A DIFFERENT TIME PERIOD?

A. Yes. The risk premium results do vary somewhat depending on the historical time period chosen. My policy was to go back as far in history as I could get reliable data. I thought it would be most meaningful to begin after the passage and implementation of the Public Utility Holding Company Act of 1935. This Act significantly changed the structure of the

public utility industry. Since the Public Utility Holding Company Act of 1935 was not implemented until the beginning of 1937, I felt that numbers taken from before this date would not be comparable to those taken after.

Q. WHY WAS IT NECESSARY TO EXAMINE THE YIELD FROM DEBT INVESTMENTS IN ORDER TO DETERMINE THE INVESTORS' REQUIRED RATE OF RETURN ON EQUITY CAPITAL?

A. As previously explained, investors expect to earn a return on their equity investment that exceeds currently available bond yields. This is because the return on equity, being a residual return, is less certain than the yield on bonds and investors must be compensated for this uncertainty. Second, the investors' current expectations concerning the amount by which the return on equity will exceed the bond yield will be strongly influenced by historical differences in returns to bond and stock investors. For these reasons, we can estimate investors' current expected returns from an equity investment from knowledge of current bond yields and past differences between returns on stocks and bonds.

Q. HAS THERE BEEN ANY SIGNIFICANT TREND IN THE EQUITY RISK PREMIUM OVER THE 1937 TO 2004 TIME PERIOD OF YOUR RISK PREMIUM STUDY?

A. No. Statisticians test for trends in data series by regressing the data observations against time. I have performed such a time series regression on my two data sets of historical risk premiums. As shown below in Tables 1 and 2, there is no statistically significant trend in my risk

premium data. Indeed, the coefficient on the time variable is insignificantly different from zero (if there were a trend, the coefficient on the time variable should be significantly different from zero).

Table 1
Regression Output for Risk Premium on S&P 500

Line No.		Intercept	Time	Adjusted R Square	F
1	Coefficient	0.015	0.001	0.002	1.124
2	T Statistic	0.354	1.060		

Table 2
Regression Output for Risk Premium on S&P Utilities

Line No.		Intercept	Time	Adjusted R Square	F
1	Coefficient	0.007	0.001	0.002	1.136
2	T Statistic	0.195	1.066		

Q. DO YOU HAVE ANY OTHER EVIDENCE THAT THERE HAS BEEN NO SIGNIFICANT TREND IN RISK PREMIUM RESULTS OVER TIME?

A. Yes. The Ibbotson Associates' *2005 Yearbook* contains an analysis of "trends" in risk premium data. Ibbotson Associates uses correlation analysis to determine if there is any pattern or "trend" in risk premiums over time. They also conclude that there are no trends in risk premiums over time.

Q. WHAT IS THE SIGNIFICANCE OF THE EVIDENCE THAT HISTORICAL RISK PREMIUMS HAVE NO TREND OR OTHER STATISTICAL PATTERN OVER TIME?

A. The significance of this evidence is that the average historical risk premium is a good estimate of the future expected risk premium. As Ibbotson notes:

> The significance of this evidence is that the realized equity risk premium next year will not be dependent on the realized equity risk premium from this year. That is, there is no discernable pattern in the realized equity risk premium—it is virtually impossible to forecast next year's realized risk premium based on the premium of the previous year. For example, if this year's difference between the riskless rate and the return on the stock market is higher than last year's, that does not imply that next year's will be higher than this year's. It is as likely to be higher as it is lower. The best estimate of the expected value of a variable that has behaved randomly in the past is the average (or arithmetic mean) of its past values. [Ibbotson Associates' Valuation Edition 2005 Yearbook, page 79.]

Q. YOU NOTED THAT IBBOTSON ASSOCIATES ALSO PROVIDES RISK PREMIUM DATA. HOW DO THE IBBOTSON ASSOCIATES' RISK PREMIUMS COMPARE TO YOUR RISK PREMIUMS?

A. Ibbotson Associates obtains a 7.2 percent risk premium on the S&P 500 versus long-term government bonds. Since the yield on long - term government bonds is currently approximately 100 basis points less than the yield on A - rated utility bonds, the Ibbotson Associates' data would indicate an approximate 6.2 percent risk premium on the S&P 500 over A - rated utility bonds. As shown on Schedules JVW-5 and JVW-6, my

studies produce a risk premium over A - rated utility bonds in the range of 4.16 percent to 5.27 percent.

Q. WHAT CONCLUSIONS DO YOU DRAW FROM YOUR EX POST RISK PREMIUM ANALYSES ABOUT THE REQUIRED RETURN ON AN EQUITY INVESTMENT IN EMPIRE?

A. My own studies provide strong evidence that investors today require an equity return of approximately 4.16 to 5.27 percentage points above the expected yield on A-rated utility bonds. The forecasted interest rate on Moody's A - rated utility bonds for 2007 is 6.9 percent. Adding a 4.16 to 5.27 percentage point risk premium to an expected yield of 6.9 percent on A-rated utility bonds, I obtain an expected return on equity in the range 11.1 percent to 12.2 percent, with a midpoint of 11.7 percent.

VII. CAPITAL ASSET PRICING MODEL (CAPM)

Q. WHAT IS THE CAPM?

A The CAPM is an equilibrium model of the security markets in which the expected or required return on a given security is equal to the risk-free rate of interest, plus the company equity "beta," times the market risk premium:

Cost of equity = Risk-free rate + Equity beta x Market risk premium

The risk-free rate in this equation is the expected rate of return on a risk-free government security, the equity beta is a measure of the company's risk relative to the market as a whole, and the market risk premium is the

premium investors require to invest in the market basket of all securities compared to the risk-free security.

Q. HOW DO YOU USE THE CAPM TO ESTIMATE THE COST OF EQUITY FOR YOUR PROXY COMPANIES?

A. The CAPM requires an estimate of the risk-free rate, the company-specific risk factor or beta, and the expected return on the market portfolio. For my estimate of the risk-free rate, I use the forecasted yield to maturity on long-term Treasury bonds from Global Insight for 2007, 5.50 percent. For my estimate of the company-specific risk, or beta, I use the average 0.84 Value Line beta for my proxy companies. For my estimate of the expected risk premium on the market portfolio, I use two approaches. First, I estimate the risk premium on the market portfolio from the difference between the arithmetic mean return on the S&P 500 and the income return on 20-year Treasury bonds as reported by Ibbotson Associates' *2005 Yearbook,* 7.2 percent. Second, I estimate the risk premium on the market portfolio from the difference between the DCF cost of equity for the S&P 500 and the yield to maturity on 20-year Treasury bonds. My second approach produces a risk premium equal to 8.0 percent.

A. Historical CAPM

Q. WHY DO YOU RECOMMEND THAT THE RISK PREMIUM ON THE MARKET PORTFOLIO BE ESTIMATED USING THE DIFFERENCE

BETWEEN THE ARITHMETIC MEAN RETURN ON THE S&P 500 AND THE INCOME RETURN ON 20-YEAR TREASURY BONDS?

A. As Ibbotson Associates explains in *Stocks, Bonds, Bills, and Inflation Valuation Edition 2005 Yearbook*, the arithmetic mean return is the best approach for calculating the return investors expect to receive in the future:

> The equity risk premium data presented in this book are arithmetic average risk premia as opposed to geometric average risk premia. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return. [Ibbotson Associates, *op. cit.*, p. 75.]

A discussion of the importance of using arithmetic mean returns in the context of CAPM or risk premium studies is contained in Schedule JVW-7.

Q. WHAT CAPM RESULT DO YOU OBTAIN WHEN YOU ESTIMATE THE EXPECTED RISK PREMIUM ON THE MARKET PORTFOLIO FROM THE ARITHMETIC MEAN DIFFERENCE BETWEEN THE RETURN ON THE MARKET AND THE YIELD ON 20-YEAR TREASURY BONDS?

A. I obtain a CAPM estimate of 11.5 percent, as shown on Schedule JVW-8.

B. DCF CAPM

Q. WHAT CAPM RESULT DO YOU OBTAIN WHEN YOU ESTIMATE THE EXPECTED RETURN ON THE MARKET PORTFOLIO BY APPLYING THE DCF MODEL TO THE S&P 500?

A. I obtain a CAPM result of 12.2 percent (see Schedule JVW-9).

Q. IS THERE ANY EVIDENCE THAT A REASONABLE APPLICATION OF THE CAPM MAY PRODUCE HIGHER COST OF EQUITY RESULTS THAN YOU HAVE JUST REPORTED?

A. Yes. There are several reasons why a reasonable application of the CAPM may produce higher results than I have just reported. First, there is substantial evidence that the CAPM tends to underestimate the cost of equity for companies whose equity beta is less than 1.0 and to overestimate the cost of equity for companies whose equity beta is greater than 1.0. Second, there is strong evidence that a size premium should be added to the CAPM result for some of my electric and natural gas proxy companies.

Q. WHAT EVIDENCE DO YOU HAVE THAT THE CAPM TENDS TO UNDERESTIMATE THE COST OF EQUITY FOR COMPANIES WITH BETAS LESS THAN 1.0?

A. The original evidence that the unadjusted CAPM tends to underestimate the cost of equity for companies whose equity beta is less than 1.0 and to overestimate the cost of equity for companies whose equity beta is greater than 1.0 was presented in a paper by Black, Jensen, and Scholes,

"The Capital Asset Pricing Model: Some Empirical Tests." Numerous subsequent papers have validated the Black, Jensen, and Scholes findings, including those by Litzenberger and Ramaswamy, Banz, Fama and French, and Fama and MacBeth.[4]

Q. DO YOU HAVE ANY EVIDENCE THAT THE CAPM EQUATION MUST BE ADJUSTED TO ACCOUNT FOR A COMPANY'S SIZE AS MEASURED BY MARKET CAPITALIZATION?

A. Yes. Chapter 7 of the Ibbotson Associates' *2005 Yearbook, Valuation Edition*, provides evidence that investors in smaller capitalization companies require a higher rate of return than is indicated by the unadjusted CAPM equation. In addition, Ibbotson Associates provides estimates of the size premium required to be added to the basic CAPM cost of equity, shown below in Table 3.

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[4] Fischer Black, Michael C. Jensen, and Myron Scholes, "The Capital Asset Pricing Model: Some Empirical Tests," in *Studies in the Theory of Capital Markets*, M. Jensen, ed. New York: Praeger, 1972; Eugene Fama and James MacBeth, "Risk, Return, and Equilibrium: Empirical Tests," *Journal of Political Economy* 81 (1973), pp. 607-36; Robert Litzenberger and Krishna Ramaswamy, "The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence," *Journal of Financial Economics* 7 (1979), pp. 163-95.; Rolf Banz, "The Relationship between Return and Market Value of Common Stocks," *Journal of Financial Economics* (March 1981), pp. 3-18; and Eugene Fama and Kenneth French, "The Cross-Section of Expected Returns," *Journal of Finance* (June 1992), pp. 427-465.

Table 3
Ibbotson Estimates of Premiums for Company Size

Size	Smallest Mkt. Cap. ($000s)	Premium
Large-Cap (No Adjustment)	6,241,953	-
Mid-Cap	1,607,854	0.95%
Low-Cap	505,437	1.81%
Micro-Cap	1.393	4.02%

VIII. FAIR RATE OF RETURN ON EQUITY

Q. BASED ON YOUR APPLICATION OF SEVERAL COST OF EQUITY METHODS TO YOUR PROXY COMPANIES, WHAT IS YOUR CONCLUSION REGARDING YOUR PROXY COMPANIES' COST OF EQUITY?

A. Based on my application of several cost of equity methods to my proxy companies, I conclude that my proxy companies' cost of equity is 11.3 percent. As shown in Table 4 below, 11.3 percent is the simple average of the cost of equity results I obtain from my cost of equity models.

TABLE 4
Cost of Equity Model Results

Method	Cost of Equity
DCF	9.8%
Ex Ante Risk Premium	11.1%
Ex Post Risk Premium	11.7%
Historical CAPM	11.5%
DCF CAPM	12.2%
Average All Cost of Equity Methods	11.3%

Q. DOES YOUR 11.3 PERCENT COST OF EQUITY CONCLUSION FOR YOUR PROXY GROUPS DEPEND ON THE PERCENTAGES OF DEBT

AND EQUITY IN YOUR PROXY COMPANIES' AVERAGE CAPITAL STRUCTURE?

A. Yes. The 11.3 percent cost of equity for my proxy groups reflects the financial risk associated with my proxy companies' average capital structures, where the capital structure weights are measured in terms of market values.[5] Since financial leverage, that is, the use of debt financing, increases the risk of investing in the proxy companies' equity, the cost of equity would be higher for a capital structure containing more leverage.

Q. WHAT ARE THE AVERAGE PERCENTAGES OF DEBT AND EQUITY IN YOUR PROXY COMPANIES' CAPITAL STRUCTURES?

A. As shown below in Table 5, my electric proxy company group has an average capital structure containing 37.71 percent debt, 0.82 percent preferred stock, and 61.46 percent common equity. My natural gas proxy company group has an average capital structure containing 26.99 percent debt, 0.09 percent preferred equity, and 72.91 percent equity, as shown in Table 6.

Q. HOW DOES EMPIRE'S CAPITAL STRUCTURE AT SEPTEMBER 30, 2005, COMPARE TO THE AVERAGE CAPITAL STRUCTURE OF YOUR PROXY COMPANIES?

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[5] See Section II above for a discussion of why investors use market value capital structure weights to assess a company's financial risk.

A. Empire's capital structure at September 30, 2005, contains 42.45 percent long-term debt, 6.11 percent trust preferred stock, and 51.45 percent common equity. [6] Although this capital structure contains an appropriate mix of debt and equity and is a reasonable capital structure for ratemaking purposes, from an investors' viewpoint, Empire's ratemaking capital structure embodies greater financial risk than is reflected in my cost of equity estimates from my proxy companies.

Q. YOU NOTED EARLIER THAT THE COST OF EQUITY DEPENDS ON A COMPANY'S CAPITAL STRUCTURE. IS THERE ANY WAY TO ADJUST THE 11.3 PERCENT COST OF EQUITY FOR YOUR PROXY COMPANIES TO REFLECT THE HIGHER FINANCIAL RISK EMBODIED IN EMPIRE'S RECOMMENDED CAPITAL STRUCTURE IN THIS PROCEEDING?

A. Yes. Since my proxy groups are comparable in risk to Empire, Empire should have the same weighted average cost of capital as my proxy companies. It is a simple matter to determine what cost of equity Empire should have in order to have the same weighted average cost of capital as my proxy companies.

Q. HAVE YOU PERFORMED SUCH A CALCULATION?

A. Yes. I adjusted the 11.3 percent average cost of equity for my proxy groups by recognizing that to attract capital, Empire must have the same

[6] This capital structure does not include any debt or equity associated with Empire's unregulated operations.

weighted average cost of capital as my proxy group. As shown in Table 5, the weighted average cost of capital for my proxy group of electric companies is 8.361 percent. The weighted average cost of capital for my proxy group of natural gas companies is 9.217 percent, as shown in Table 6. To be conservative, I will use the lower 8.361 percent weighted average cost of capital for my proxy electric companies in calculating my recommended cost of equity in this proceeding. As shown in Table 7, Empire would require a 11.7 percent cost of equity in order to have the same weighted average cost of capital as the electric proxy group.

TABLE 5
Weighted Average Cost of Capital Electric Proxy Group

Line No.	Capital Source	Percent	After-tax Cost Rate	Weighted Cost
1	Long-term Debt	37.71%	3.60%	1.357%
2	Preferred Stock	0.82%	7.15%	0.059%
3	Common Equity	61.46%	11.30%	6.945%
4		100.00%		8.361%

TABLE 6
Weighted Average Cost of Capital Natural Gas Company Proxy Group

Line No.	Capital Source	Percent	After-tax Cost Rate	Weighted Cost
1	Long-term Debt	26.99%	3.60%	0.971%
2	Preferred Stock	0.09%	7.15%	0.007%
3	Common Equity	72.91%	11.30%	8.239%
4		100.00%		9.217%

TABLE 7
Weighted Average Cost of Capital Empire

Line No.	Capital Source	Percent	After-tax Cost Rate	Weighted Cost
1	Long-term Debt	42.45%	4.29%	1.823%
2	Preferred Stock	6.11%	8.91%	0.544%
3	Common Equity	51.45%	11.65%	5.994%
4		100.00%		8.361%

Q. WHAT IS YOUR RECOMMENDATION AS TO A FAIR RATE OF RETURN ON COMMON EQUITY FOR EMPIRE?

A. I recommend that Empire be allowed a fair rate of return on common equity equal to 11.7 percent.

Q. ARE YOU AWARE THAT IN THIS PROCEEDING EMPIRE IS REQUESTING A FUEL ADJUSTMENT CLAUSE?

A. Yes.

Q. WOULD A FUEL ADJUSTMENT CLAUSE REDUCE EMPIRE'S INVESTMENT RISK?

A. Yes. Assuming all else equal, a fuel adjustment clause would reduce Empire's investment risk because it would provide greater assurance that Empire would recover its fuel costs on a timely basis.

Q. IS THE LOWER RISK OF EMPIRE'S RECOMMENDED FUEL ADJUSTMENT CLAUSE ALREADY REFLECTED IN YOUR 11.7 PERCENT RECOMMENDED RATE OF RETURN ON COMMON EQUITY?

A. Yes. Since my proxy companies generally operate under fuel adjustment clauses, my recommended rate of return on common equity reflects the lower risk of having such a clause.

Q. WOULD YOU RECOMMEND A HIGHER RATE OF RETURN ON EQUITY IF THE COMMISSION WERE TO REJECT EMPIRE'S PROPOSAL FOR A FUEL ADJUSTMENT CLAUSE?

A. Yes.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

LIST OF SCHEDULES AND APPENDICES

Schedule JVW-1	Summary of Discounted Cash Flow Analysis for Electric Energy Companies.
Schedule JVW-2	Summary of Discounted Cash Flow Analysis for Natural Gas Companies.
Schedule JVW-3	Comparison of the DCF Expected Return on an Investment in Electric Companies to the Interest Rate on Moody's A-Rated Utility Bonds
Schedule JVW-4	Comparison of the DCF Expected Return on an Investment in Natural Gas Companies to the Interest Rate on Moody's A-Rated Utility Bonds
Schedule JVW-5	Comparative Returns on S&P 500 Stock Index and Moody's A-Rated Bonds 1937—2003
Schedule JVW-6	Comparative Returns on S&P Utility Stock Index and Moody's A-Rated Bonds 1937—2003
Schedule JVW-7	Using the Arithmetic Mean to Estimate the Cost of Equity Capital
Schedule JVW-8	Calculation of Capital Asset Pricing Model Cost of Equity Using Ibbotson Associates' 7.2% Risk Premium
Schedule JVW-9	Calculation of Capital Asset Pricing Model Cost of Equity Using DCF Estimate of the Expected Rate of Return on the Market Portfolio
Appendix 1	Derivation of the Quarterly DCF Model
Appendix 2	Ex Ante Risk Premium Method
Appendix 3	Ex Post Risk Premium Method

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-1
SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS
FOR ELECTRIC ENERGY COMPANIES

Line No.	*Company*	d_0	P_0	*Growth*	*Cost of Equity*
1	Alliant Energy	0.263	28.292	3.75%	7.7%
2	Amer. Elec. Power	0.370	37.808	3.70%	7.7%
3	Ameren Corp.	0.635	52.812	4.42%	9.6%
4	Consol. Edison	0.570	46.607	3.23%	8.4%
5	Constellation Energy	0.335	56.410	10.40%	13.0%
6	Dominion Resources	0.670	79.423	6.00%	9.7%
7	DTE Energy	0.515	44.395	5.60%	10.7%
8	Edison Int'l	0.250	44.692	6.50%	9.0%
9	Energy East Corp.	0.290	24.493	3.75%	8.6%
10	Entergy Corp.	0.540	71.559	6.63%	10.0%
11	FirstEnergy Corp.	0.430	49.349	4.57%	8.2%
12	FPL Group	0.355	44.212	5.63%	9.1%
13	G't Plains Energy	0.415	29.408	3.00%	9.0%
14	Hawaiian Elec.	0.310	26.923	3.10%	8.0%
15	IDACORP Inc.	0.300	29.567	4.00%	8.4%
16	MDU Resources	0.190	33.663	7.25%	9.7%
17	NiSource Inc.	0.230	23.260	3.57%	7.8%
18	Northeast Utilities	0.175	18.997	4.50%	8.3%
19	NSTAR	0.290	28.050	4.25%	8.7%
20	OGE Energy	0.333	27.140	3.33%	8.6%
21	Otter Tail Corp.	0.280	30.022	4.75%	8.8%
22	Pepco Holdings	0.250	22.077	3.67%	8.5%
23	Pinnacle West Capital	0.500	42.678	4.50%	9.4%
24	PNM Resources	0.200	26.863	10.64%	14.0%
25	PPL Corp.	0.250	31.190	5.94%	9.1%
26	Progress Energy	0.590	43.580	3.73%	9.6%
27	Puget Energy Inc.	0.250	22.002	4.00%	8.9%
28	SCANA Corp.	0.390	40.718	4.50%	8.6%
29	Sempra Energy	0.290	44.620	5.71%	8.4%
30	Southern Co.	0.373	34.778	5.00%	9.6%
31	TXU Corp.	0.563	101.567	14.33%	17.0%
32	Vectren Corp.	0.305	27.355	3.67%	8.3%
33	Wisconsin Energy	0.220	38.677	7.71%	10.3%
34	Xcel Energy Inc.	0.215	18.985	3.00%	7.7%
35	Market Wtd. Average				9.9%

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-1 (CONTINUED)

Notes:

d_0	=	Most recent quarterly dividend.
d1,d2,d3,d4	=	Next four quarterly dividends, calculated by multiplying the last four quarterly dividends per Value Line by the factor (1 + g).
P_0	=	Average of the monthly high and low stock prices during the three months ending November 2005 per Thomson Financial.
g	=	I/B/E/S forecast of future earnings growth November 2005.
k	=	Cost of equity using the quarterly version of the DCF model.

$$k = \frac{d_1(1+k)^{.75} + d_2(1+k)^{.50} + d_3(1+k)^{.25} + d_4}{P_0} + g$$

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-1 (CONTINUED)
EMPIRE DISTRICT ELECTRIC COMPANY
RISK RATINGS
OF PROXY ELECTRIC ENERGY COMPANIES

Company	Safety Rank	S&P BOND RATING	S&P BOND RATING (Numerical)
Alliant Energy	3	BBB+	7
Amer. Elec. Power	3	BBB	8
Ameren Corp.	1	BBB+	7
Consol. Edison	1	A	5
Constellation Energy	2	BBB+	7
Dominion Resources	2	BBB+	7
DTE Energy	3	BBB	8
Edison Int'l	3	BBB	8
Energy East Corp.	2	BBB+	7
Entergy Corp.	2	BBB	8
FirstEnergy Corp.	3	BBB	8
FPL Group	1	A	5
G't Plains Energy	2	BBB	8
Hawaiian Elec.	2	BBB	8
IDACORP Inc.	3	BBB+	7
MDU Resources	1	A-	6
NiSource Inc.	3	BBB	8
Northeast Utilities	3	BBB	8
NSTAR	1	A	5
OGE Energy	2	BBB+	7
Otter Tail Corp.	2	BBB+	7
Pepco Holdings	3	BBB+	7
Pinnacle West Capital	1	BBB	8
PNM Resources	2	BBB	8
PPL Corp.	3	BBB	8
Progress Energy	2	BBB	8
Puget Energy Inc.	3	BBB-	9
SCANA Corp.	2	A-	6
Sempra Energy	2	BBB+	7
Southern Co.	1	A	5
TXU Corp.	3	BBB-	9
Vectren Corp.	2	A-	6
Wisconsin Energy	2	BBB+	7
Xcel Energy Inc.	2	BBB	8
Average	2.1	BBB+	7.2

Source of data: Standard & Poor's, December 2005; The Value Line Investment Analyzer December 2005

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-2
SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS
FOR NATURAL GAS COMPANIES

Line No.	Company	D_0	P_0	Growth	Cost of Equity
1	AGL Resources	0.310	35.810	4.64%	8.4%
2	Atmos Energy	0.315	27.417	5.92%	10.9%
3	Energen	0.100	39.232	6.50%	7.6%
4	Equitable Resources	0.210	38.045	9.40%	11.9%
5	KeySpan Corp.	0.455	35.817	3.70%	9.2%
6	National Fuel Gas	0.290	32.067	5.03%	8.9%
7	New Jersey Resources	0.360	44.060	5.25%	8.7%
8	NICOR Inc.	0.465	40.558	2.17%	7.0%
9	Northwest Nat. Gas	0.345	35.620	5.30%	9.3%
10	ONEOK Inc.	0.280	31.005	6.00%	9.9%
11	Piedmont Natural Gas	0.230	23.823	5.00%	9.2%
12	Questar Corp.	0.225	80.052	9.71%	11.0%
13	WGL Holdings Inc.	0.333	31.291	4.00%	8.5%
14	Market-Weighted Average				9.6%

Notes:

d_0 = Most recent quarterly dividend.
d_1,d2,d3,d4 = Next four quarterly dividends, calculated by multiplying the last four quarterly dividends per Value Line by the factor (1 + g).
P0 = Average of the monthly high and low stock prices during the three months ending November 2005 per Thomson Financial.
g = I/B/E/S forecast of future earnings growth November 2005.
k = Cost of equity using the quarterly version of the DCF model.

$$k = \frac{d_1(1+k)^{.75} + d_2(1+k)^{.50} + d_3(1+k)^{.25} + d_4}{P_0} + g$$

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-2 (CONTINUED)
RISK RATINGS
OF PROXY GAS COMPANIES

Line No.	Company	Safety Rank	Dec 2005 S&P BOND RATING	Dec 2005 S&P BOND RATING (Numerical)
1	AGL Resources	3	A-	6
2	Atmos Energy	1	BBB	8
3	Energen	3	BBB+	7
4	Equitable Resources	1	A-	6
5	KeySpan Corp.	1	A	5
6	National Fuel Gas	2	BBB+	7
7	New Jersey Resources	2	A+	4
8	NICOR Inc.	2	AA	2
9	Northwest Nat. Gas	3	A+	4
10	ONEOK Inc.	2	BBB	8
11	Piedmont Natural Gas	2	A	5
12	Questar Corp.	1	A-	6
13	WGL Holdings Inc.	2	AA-	3
14	Average	1.7	A-	5.8

Source of data: Standard & Poor's, December 2005; The Value Line Investment Analyzer December 2005.

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-3
COMPARISON OF DCF EXPECTED RETURN ON AN INVESTMENT IN ELECTRIC COMPANIES
TO THE INTEREST RATE ON MOODY'S A-RATED UTILITY BONDS

Line No.	Date	DCF	A-Rated Bond Yield
1	Sep-99	0.1138	0.0793
2	Oct-99	0.1146	0.0806
3	Nov-99	0.1176	0.0794
4	Dec-99	0.1224	0.0814
5	Jan-00	0.1216	0.0835
6	Feb-00	0.1259	0.0825
7	Mar-00	0.1298	0.0828
8	Apr-00	0.1225	0.0829
9	May-00	0.1210	0.0870
10	Jun-00	0.1234	0.0836
11	Jul-00	0.1244	0.0825
12	Aug-00	0.1218	0.0813
13	Sep-00	0.1154	0.0823
14	Oct-00	0.1156	0.0814
15	Nov-00	0.1162	0.0811
16	Dec-00	0.1145	0.0784
17	Jan-01	0.1179	0.0780
18	Feb-01	0.1185	0.0774
19	Mar-01	0.1190	0.0768
20	Apr-01	0.1254	0.0794
21	May-01	0.1280	0.0799
22	Jun-01	0.1286	0.0785
23	Jul-01	0.1299	0.0778
24	Aug-01	0.1305	0.0759
25	Sep-01	0.1330	0.0775
26	Oct-01	0.1307	0.0763
27	Nov-01	0.1311	0.0757
28	Dec-01	0.1307	0.0783
29	Jan-02	0.1288	0.0766
30	Feb-02	0.1299	0.0754
31	Mar-02	0.1261	0.0776
32	Apr-02	0.1225	0.0757
33	May-02	0.1232	0.0752
34	Jun-02	0.1211	0.0741
35	Jul-02	0.1292	0.0731
36	Aug-02	0.1241	0.0717
37	Sep-02	0.1259	0.0708
38	Oct-02	0.1261	0.0723
39	Nov-02	0.1208	0.0714
40	Dec-02	0.1179	0.0707

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-3
COMPARISON OF DCF EXPECTED RETURN ON AN INVESTMENT IN ELECTRIC COMPANIES
TO THE INTEREST RATE ON MOODY'S A-RATED UTILITY BONDS

Line No.	Date	DCF	A-Rated Bond Yield
41	Jan-03	0.1144	0.0706
42	Feb-03	0.1178	0.0693
43	Mar-03	0.1140	0.0679
44	Apr-03	0.1101	0.0664
45	May-03	0.1045	0.0636
46	Jun-03	0.1001	0.0621
47	Jul-03	0.1009	0.0657
48	Aug-03	0.1008	0.0678
49	Sep-03	0.0980	0.0656
50	Oct-03	0.0964	0.0643
51	Nov-03	0.0952	0.0637
52	Dec-03	0.0924	0.0627
53	Jan-04	0.0899	0.0615
54	Feb-04	0.0896	0.0615
55	Mar-04	0.0893	0.0597
56	Apr-04	0.0904	0.0635
57	May-04	0.0941	0.0662
58	Jun-04	0.0940	0.0646
59	Jul-04	0.0935	0.0627
60	Aug-04	0.0939	0.0614
61	Sep-04	0.0932	0.0598
62	Oct-04	0.0929	0.0594
63	Nov-04	0.0888	0.0597
64	Dec-04	0.0908	0.0592
65	Jan-05	0.0910	0.0578
66	Feb-05	0.0908	0.0561
67	Mar-05	0.0903	0.0583
68	Apr-05	0.0904	0.0564
69	May-05	0.0900	0.0553
70	Jun-05	0.0904	0.0540
71	Jul-05	0.0892	0.0551
72	Aug-05	0.0902	0.0550
73	Sep-05	0.0922	0.0552
74	Oct-05	0.0941	0.0579
75	Nov-05	0.0944	0.0588
76	Average	0.1105	0.0703

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-3
COMPARISON OF DCF EXPECTED RETURN ON AN INVESTMENT IN ELECTRIC COMPANIES
TO THE INTEREST RATE ON MOODY'S A-RATED UTILITY BONDS

Notes: Utility bond yield information from *Mergent Bond Record* (formerly Moody's). See Appendix 3 for a description of my ex ante risk premium approach. DCF results are calculated using a quarterly DCF model as follows:

d_0	=	Latest quarterly dividend per Value Line
P_0	=	Average of the monthly high and low stock prices for each month per Thomson Financial
g	=	I/B/E/S forecast of future earnings growth for each month.
k	=	Cost of equity using the quarterly version of the DCF model.

$$k = \left[\frac{d_0 (1+g)^{\frac{1}{4}}}{P_0} \right]^4 - 1$$

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-4
COMPARISON OF DCF EXPECTED RETURN ON AN INVESTMENT IN NATURAL GAS COMPANIES
TO THE INTEREST RATE ON MOODY'S A-RATED UTILITY BONDS

Line No.	Date	DCF	A-Rated Bond Yield
1	June-98	0.1081	0.0703
2	July-98	0.1105	0.0703
3	August-98	0.1176	0.0700
4	September-98	0.1229	0.0693
5	October-98	0.1229	0.0696
6	November-98	0.1171	0.0703
7	December-98	0.1133	0.0691
8	January-99	0.1148	0.0697
9	February-99	0.1189	0.0709
10	March-99	0.1215	0.0726
11	April-99	0.1221	0.0722
12	May-99	0.1193	0.0747
13	June-99	0.1185	0.0774
14	July-99	0.1197	0.0771
15	August-99	0.1194	0.0791
16	September-99	0.1200	0.0793
17	October-99	0.1213	0.0806
18	November-99	0.1229	0.0794
19	December-99	0.1269	0.0814
20	January-00	0.1291	0.0835
21	February-00	0.1335	0.0825
22	March-00	0.1321	0.0828
23	April-00	0.1298	0.0829
24	May-00	0.1269	0.0870
25	June-00	0.1268	0.0836
26	July-00	0.1293	0.0825
27	August-00	0.1268	0.0813
28	September-00	0.1240	0.0823
29	October-00	0.1244	0.0814
30	November-00	0.1220	0.0811
31	December-00	0.1202	0.0784
32	January-01	0.1224	0.0780
33	February-01	0.1233	0.0774
34	March-01	0.1246	0.0768
35	April-01	0.1218	0.0794
36	May-01	0.1285	0.0799
37	June-01	0.1290	0.0785
38	July-01	0.1313	0.0778
39	August-01	0.1314	0.0759
40	September-01	0.1218	0.0775

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-4
COMPARISON OF DCF EXPECTED RETURN ON AN INVESTMENT IN NATURAL GAS COMPANIES
TO THE INTEREST RATE ON MOODY'S A-RATED UTILITY BONDS

Line No.	Date	DCF	A-Rated Bond Yield
41	October-01	0.1230	0.0763
42	November-01	0.1237	0.0757
43	December-01	0.1218	0.0783
44	January-02	0.1196	0.0766
45	February-02	0.1202	0.0754
46	March-02	0.1140	0.0776
47	April-02	0.1106	0.0757
48	May-02	0.1105	0.0752
49	June-02	0.1113	0.0741
50	July-02	0.1189	0.0731
51	August-02	0.1178	0.0717
52	September-02	0.1216	0.0708
53	October-02	0.1199	0.0723
54	November-02	0.1166	0.0714
55	December-02	0.1163	0.0707
56	January-03	0.1167	0.0706
57	February-03	0.1182	0.0693
58	March-03	0.1155	0.0679
59	April-03	0.1130	0.0664
60	May-03	0.1085	0.0636
61	June-03	0.1076	0.0621
62	July-03	0.1077	0.0657
63	August-03	0.1086	0.0678
64	September-03	0.1072	0.0656
65	October-03	0.1069	0.0643
66	November-03	0.1035	0.0637
67	December-03	0.1016	0.0627
68	January-04	0.1039	0.0615
69	February-04	0.1019	0.0615
70	March-04	0.1016	0.0597
71	April-04	0.1019	0.0635
72	May-04	0.1022	0.0662
73	June-04	0.1015	0.0646
74	July-04	0.0991	0.0627
75	August-04	0.0988	0.0614
76	September-04	0.0980	0.0598
77	October-04	0.0980	0.0594
78	November-04	0.0968	0.0597
79	December-04	0.0977	0.0592
80	January-05	0.0971	0.0578
81	February-05	0.0960	0.0561

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-4
COMPARISON OF DCF EXPECTED RETURN ON AN INVESTMENT IN NATURAL GAS COMPANIES
TO THE INTEREST RATE ON MOODY'S A-RATED UTILITY BONDS

Line No.	Date	DCF	A-Rated Bond Yield
82	March-05	0.0960	0.0583
83	April-05	0.0970	0.0564
84	May-05	0.0963	0.0553
85	June-05	0.0960	0.0540
86	July-05	0.0950	0.0551
87	August-05	0.0953	0.0550
88	September-05	0.0957	0.0552
89	October-05	0.0966	0.0579
90	November-05	0.0984	0.0588
91	Average	0.1140	0.0706

Notes: Utility bond yield information from *Mergent Bond Record* (formerly Moody's). See Appendix 3 for a description of my ex ante risk premium approach. DCF results are calculated using a quarterly DCF model as follows:

d_0 = Latest quarterly dividend per Value Line
P_0 = Average of the monthly high and low stock prices for each month per Thomson Financial
g = I/B/E/S forecast of future earnings growth for each month.
k = Cost of equity using the quarterly version of the DCF model.

$$k = \left[\frac{d_0 (1+g)^{\frac{1}{4}}}{P_0} \right]^4 - 1$$

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-5
COMPARATIVE RETURNS ON S&P 500 STOCK INDEX
AND MOODY'S A-RATED BONDS 1937—2004

Line No.	Year	S&P 500 Stock Price	Stock Dividend Yield	Stock Return	Bond Price	Bond Return
1	2004	1,132.52	0.0161		$70.87	
2	2003	895.84	0.0180	28.22%	$62.26	20.27%
3	2002	1,140.21	0.0138	-20.05%	$57.44	15.35%
4	2001	1,335.63	0.0116	-13.47%	$56.40	8.93%
5	2000	1,425.59	0.0118	-5.13%	$52.60	14.82%
6	1999	1,248.77	0.0130	15.46%	$63.03	-10.20%
7	1998	963.35	0.0162	31.25%	$62.43	7.38%
8	1997	766.22	0.0195	27.68%	$56.62	17.32%
9	1996	614.42	0.0231	27.02%	$60.91	-0.48%
10	1995	465.25	0.0287	34.93%	$50.22	29.26%
11	1994	472.99	0.0269	1.05%	$60.01	-9.65%
12	1993	435.23	0.0288	11.56%	$53.13	20.48%
13	1992	416.08	0.0290	7.50%	$49.56	15.27%
14	1991	325.49	0.0382	31.65%	$44.84	19.44%
15	1990	339.97	0.0341	-0.85%	$45.60	7.11%
16	1989	285.41	0.0364	22.76%	$43.06	15.18%
17	1988	250.48	0.0366	17.61%	$40.10	17.36%
18	1987	264.51	0.0317	-2.13%	$48.92	-9.84%
19	1986	208.19	0.0390	30.95%	$39.98	32.36%
20	1985	171.61	0.0451	25.83%	$32.57	35.05%
21	1984	166.39	0.0427	7.41%	$31.49	16.12%
22	1983	144.27	0.0479	20.12%	$29.41	20.65%
23	1982	117.28	0.0595	28.96%	$24.48	36.48%
24	1981	132.97	0.0480	-7.00%	$29.37	-3.01%
25	1980	110.87	0.0541	25.34%	$34.69	-3.81%
26	1979	99.71	0.0533	16.52%	$43.91	-11.89%
27	1978	90.25	0.0532	15.80%	$49.09	-2.40%
28	1977	103.80	0.0399	-9.06%	$50.95	4.20%
29	1976	96.86	0.0380	10.96%	$43.91	25.13%
30	1975	72.56	0.0507	38.56%	$41.76	14.75%
31	1974	96.11	0.0364	-20.86%	$52.54	-12.91%
32	1973	118.40	0.0269	-16.14%	$58.51	-3.37%
33	1972	103.30	0.0296	17.58%	$56.47	10.69%
34	1971	93.49	0.0332	13.81%	$53.93	12.13%
35	1970	90.31	0.0356	7.08%	$50.46	14.81%
36	1969	102.00	0.0306	-8.40%	$62.43	-12.76%
37	1968	95.04	0.0313	10.45%	$66.97	-0.81%
38	1967	84.45	0.0351	16.05%	$78.69	-9.81%
39	1966	93.32	0.0302	-6.48%	$86.57	-4.48%
40	1965	86.12	0.0299	11.35%	$91.40	-0.91%
41	1964	76.45	0.0305	15.70%	$92.01	3.68%
42	1963	65.06	0.0331	20.82%	$93.56	2.61%
43	1962	69.07	0.0297	-2.84%	$89.60	8.89%

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-6
COMPARATIVE RETURNS ON S&P UTILITY STOCK INDEX
AND MOODY'S A-RATED BONDS 1937—2004

LINE NO.	YEAR	S&P UTILITIES STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	BOND PRICE	BOND RETURN
1	2004	139.79			$70.87	
2	2003	114.11	0.0508	27.58%	62.26	20.27%
3	2002	142.14	0.0454	-15.18%	57.44	15.35%
4						
5	2002	243.79	0.0362		57.44	
6	2001	307.70	0.0287	-17.90%	56.40	8.93%
7	2000	239.17	0.0413	32.78%	52.60	14.82%
8	1999	253.52	0.0394	-1.72%	63.03	-10.20%
9	1998	228.61	0.0457	15.47%	62.43	7.38%
10	1997	201.14	0.0492	18.58%	56.62	17.32%
11	1996	202.57	0.0454	3.83%	60.91	-0.48%
12	1995	153.87	0.0584	37.49%	50.22	29.26%
13	1994	168.70	0.0496	-3.83%	60.01	-9.65%
14	1993	159.79	0.0537	10.95%	53.13	20.48%
15	1992	149.70	0.0572	12.46%	49.56	15.27%
16	1991	138.38	0.0607	14.25%	44.84	19.44%
17	1990	146.04	0.0558	0.33%	45.60	7.11%
18	1989	114.37	0.0699	34.68%	43.06	15.18%
19	1988	106.13	0.0704	14.80%	40.10	17.36%
20	1987	120.09	0.0588	-5.74%	48.92	-9.84%
21	1986	92.06	0.0742	37.87%	39.98	32.36%
22	1985	75.83	0.0860	30.00%	32.57	35.05%
23	1984	68.50	0.0925	19.95%	31.49	16.12%
24	1983	61.89	0.0948	20.16%	29.41	20.65%
25	1982	51.81	0.1074	30.20%	24.48	36.48%
26	1981	52.01	0.0978	9.40%	29.37	-3.01%
27	1980	50.26	0.0953	13.01%	34.69	-3.81%
28	1979	50.33	0.0893	8.79%	43.91	-11.89%
29	1978	52.40	0.0791	3.96%	49.09	-2.40%
30	1977	54.01	0.0714	4.16%	50.95	4.20%
31	1976	46.99	0.0776	22.70%	43.91	25.13%
32	1975	38.19	0.0920	32.24%	41.76	14.75%
33	1974	48.60	0.0713	-14.29%	52.54	-12.91%
34	1973	60.01	0.0556	-13.45%	58.51	-3.37%
35	1972	60.19	0.0542	5.12%	56.47	10.69%
36	1971	63.43	0.0504	-0.07%	53.93	12.13%
37	1970	55.72	0.0561	19.45%	50.46	14.81%
38	1969	68.65	0.0445	-14.38%	62.43	-12.76%
39	1968	68.02	0.0435	5.28%	66.97	-0.81%
40	1967	70.63	0.0392	0.22%	78.69	-9.81%
41	1966	74.50	0.0347	-1.72%	86.57	-4.48%
42	1965	75.87	0.0315	1.34%	91.40	-0.91%
43	1964	67.26	0.0331	16.11%	92.01	3.68%
44	1963	63.35	0.0330	9.47%	93.56	2.61%
45	1962	62.69	0.0320	4.25%	89.60	8.89%
46	1961	52.73	0.0358	22.47%	89.74	4.29%

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-6
COMPARATIVE RETURNS ON S&P UTILITY STOCK INDEX
AND MOODY'S A-RATED BONDS 1937—2004

LINE NO.	YEAR	S&P UTILITIES STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	BOND PRICE	BOND RETURN
47	1960	44.50	0.0403	22.52%	84.36	11.13%
48	1959	43.96	0.0377	5.00%	91.55	-3.49%
49	1958	33.30	0.0487	36.88%	101.22	-5.60%
50	1957	32.32	0.0487	7.90%	100.70	4.49%
51	1956	31.55	0.0472	7.16%	113.00	-7.35%
52	1955	29.89	0.0461	10.16%	116.77	0.20%
53	1954	25.51	0.0520	22.37%	112.79	7.07%
54	1953	24.41	0.0511	9.62%	114.24	2.24%
55	1952	22.22	0.0550	15.36%	113.41	4.26%
56	1951	20.01	0.0606	17.10%	123.44	-4.89%
57	1950	20.20	0.0554	4.60%	125.08	1.89%
58	1949	16.54	0.0570	27.83%	119.82	7.72%
59	1948	16.53	0.0535	5.41%	118.50	4.49%
60	1947	19.21	0.0354	-10.41%	126.02	-2.79%
61	1946	21.34	0.0298	-7.00%	126.74	2.59%
62	1945	13.91	0.0448	57.89%	119.82	9.11%
63	1944	12.10	0.0569	20.65%	119.82	3.34%
64	1943	9.22	0.0621	37.45%	118.50	4.49%
65	1942	8.54	0.0940	17.36%	117.63	4.14%
66	1941	13.25	0.0717	-28.38%	116.34	4.55%
67	1940	16.97	0.0540	-16.52%	112.39	7.08%
68	1939	16.05	0.0553	11.26%	105.75	10.05%
69	1938	14.30	0.0730	19.54%	99.83	9.94%
70	1937	24.34	0.0432	-36.93%	103.18	0.63%
71	Return 1937—2004					
72	Stocks		10.57%			
73	Bonds		6.40%			
74	Risk Premium		4.16%			

Note: See Appendix 3 for an explanation of how stock and bond returns are derived and the source of the data presented. In 2002, S&P discontinued its S&P Utilities stock index, and S&P no longer reports dividend yields for electric utilities. Thus, for this study, the utility stock returns beginning in 2002 are computed based on the companies contained in the S&P electric company index, as listed in the *S&P Security Price Record*. The dividend yields for these stocks are the January dividend yields reported by Value Line.

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-7
USING THE ARITHMETIC MEAN TO ESTIMATE THE COST OF EQUITY CAPITAL

Consider an investment that in a given year generates a return of 30 percent with probability equal to .5 and a return of -10 percent with a probability equal to .5. For each one dollar invested, the possible outcomes of this investment at the end of year one are:

Ending Wealth	Probability
$1.30	0.50
$0.90	0.50

At the end of year two, the possible outcomes are:

Ending Wealth			Probability	Value x Probability
(1.30) (1.30)	=	$1.69	0.25	0.4225
(1.30) (.9)	=	$1.17	0.50	0.5850
(.9) (.9)	=	$0.81	0.25	0.2025
Expected Wealth	=			$1.21

The expected value of this investment at the end of year two is $1.21. In a competitive capital market, the cost of equity is equal to the expected rate of return on an investment. In the above example, the cost of equity is that rate of return which will make the initial investment of one dollar grow to the expected value of $1.21 at the end of two years. Thus, the cost of equity is the solution to the equation:

$$1(1+k)^2 = 1.21 \text{ or}$$

$$k = (1.21/1)^{.5} - 1 = 10\%.$$

The arithmetic mean of this investment is:

$$(30\%)\ (.5) + (-10\%)\ (.5) = 10\%.$$

Thus, the arithmetic mean is equal to the cost of equity capital.

The geometric mean of this investment is:

$$[(1.3)\ (.9)]^{.5} - 1 = .082 = 8.2\%.$$

Thus, the geometric mean is not equal to the cost of equity capital.

The lesson is obvious: for an investment with an uncertain outcome, the arithmetic mean is the best measure of the cost of equity capital.

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-8
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING IBBOTSON ASSOCIATES' 7.2 PERCENT RISK PREMIUM

Risk-free Rate	5.50%	*Forecasted Long-term Treasury bond yield*
Beta	0.84	*Average Beta Proxy Companies*
Risk Premium	7.20%	*Long-horizon Ibbotson risk premium*
Beta x Risk Premium	6.05%	
CAPM cost of equity	11.55%	

Forecasted Treasury bond yield from Global Insight December 2005.

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-8
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING IBBOTSON ASSOCIATES' 7.2 PERCENT RISK PREMIUM

PROXY COMPANY BETAS

Company Name	Ticker	Beta	Market Cap $ (Mil)
Alliant Energy	LNT	0.85	3,293
Amer. Elec. Power	AEP	1.20	14,534
Ameren Corp.	AEE	0.75	10,763
Consol. Edison	ED	0.60	10,286
Constellation Energy	CEG	0.95	10,041
Dominion Resources	D	0.90	27,083
DTE Energy	DTE	0.70	7,734
Edison Int'l	EIX	1.05	14,561
Energy East Corp.	EAS	0.80	3,613
Entergy Corp.	ETR	0.75	15,020
FirstEnergy Corp.	FE	0.75	16,275
FPL Group	FPL	0.75	17,419
G't Plains Energy	GXP	0.85	2,194
Hawaiian Elec.	HE	0.70	2,178
IDACORP Inc.	IDA	0.95	1,248
MDU Resources	MDU	0.90	4,030
NiSource Inc.	NI	0.80	6,334
Northeast Utilities	NU	0.80	2,464
NSTAR	NST	0.70	2,996
OGE Energy	OGE	0.75	2,451
Otter Tail Corp.	OTTR	0.55	877
Pepco Holdings	POM	0.90	4,177
Pinnacle West Capital	PNW	0.90	4,217
PNM Resources	PNM	0.90	1,846
PPL Corp.	PPL	0.95	11,855
Progress Energy	PGN	0.85	10,939
Puget Energy Inc.	PSD	0.80	2,207
SCANA Corp.	SCG	0.75	4,642
Sempra Energy	SRE	1.00	11,423
Southern Co.	SO	0.65	25,972
TXU Corp.	TXU	1.00	24,396
Vectren Corp.	VVC	0.80	2,082
Wisconsin Energy	WEC	0.70	4,525
Xcel Energy Inc.	XEL	0.80	7,640
AGL Resources	ATG	0.85	2,768
Atmos Energy	ATO	0.70	2,199
Energen	EGN	0.70	2,833
Equitable Resources	EQT	0.80	4,600
KeySpan Corp.	KSE	0.80	6,243
National Fuel Gas	NFG	0.80	2,690

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-8
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING IBBOTSON ASSOCIATES' 7.2 PERCENT RISK PREMIUM

Company Name	Ticker	Beta	Market Cap $ (Mil)
New Jersey Resources	NJR	0.75	1,212
NICOR Inc.	GAS	1.10	1,789
Northwest Nat. Gas	NWN	0.70	983
ONEOK Inc.	OKE	0.95	3,125
Piedmont Natural Gas	PNY	0.75	1,827
Questar Corp.	STR	0.85	6,804
WGL Holdings Inc.	WGL	0.80	1,524
Market-Wtd. Ave.		0.84	

Data from Value Line Investment Analyzer December 2005.

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-9
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING DCF ESTIMATE OF THE EXPECTED RATE OF RETURN ON THE MARKET PORTFOLIO

Risk-free rate	5.50%	*Forecasted Long-term Treasury bond yield*
Beta	0.84	*Average Beta Proxy Companies*
DCF S&P 500	13.52%	*DCF Cost of Equity S&P 500 (see following)*
Risk Premium	8.02%	
Beta x Risk Premium	6.74%	
CAPM cost of equity	12.24%	

Forecasted Treasury bond yield from Global Insight December 2005.

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-9
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING DCF ESTIMATE OF THE EXPECTED RATE OF RETURN ON THE MARKET PORTFOLIO

SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS FOR S&P 500 COMPANIES

COMPANY	P_0	D_0	Growth	Cost of Equity
3M	74.19	1.68	11.64%	14.32%
ABBOTT LABS.	42.51	1.10	9.40%	12.41%
ACE	49.34	0.92	11.66%	13.87%
AIR PRDS.& CHEMS.	56.34	1.28	9.34%	11.98%
ALBERTO CULVER	43.51	0.46	11.50%	12.75%
ALLSTATE	53.97	1.28	10.40%	13.18%
ALTRIA GROUP INCO.	72.24	3.20	8.50%	13.65%
AMBAC FINANCIAL	70.95	0.60	11.33%	12.32%
AMER.STANDARD	42.17	0.60	13.33%	15.04%
AMERICAN EXPRESS	49.90	0.48	13.21%	14.36%
AMERICAN INTL.GP.	63.46	0.60	13.08%	14.21%
AMERIPRISE FINL.	37.32	0.44	10.60%	11.98%
AMERISOURCEBERGEN	76.69	0.20	11.95%	12.26%
AMSOUTH BANC.	25.46	1.04	7.67%	12.38%
ANADARKO PETROLEUM	91.23	0.72	13.00%	13.94%
APACHE	69.22	0.40	11.83%	12.51%
AT&T	23.77	1.29	5.98%	12.17%
AUTOMATIC DATA PROC.	44.82	0.74	12.13%	14.09%
AVERY DENNISON	55.05	1.56	11.00%	14.35%
AVON PRODUCTS	27.72	0.66	11.57%	14.39%
BANK OF AMERICA	43.45	2.00	8.79%	14.16%
BANK OF NEW YORK CO.	30.73	0.84	10.79%	14.01%
BAXTER INTL.	38.74	0.58	11.25%	13.01%
BB & T	41.01	1.52	9.30%	13.63%
BECTON DICKINSON	53.29	0.86	12.18%	14.10%
BRUNSWICK	38.95	0.60	12.40%	14.23%
BURLINGTON RES.	73.82	0.40	12.25%	12.89%
CAPITAL ONE FINL.	78.70	0.11	13.73%	13.90%
CARDINAL HEALTH	62.33	0.24	12.79%	13.25%
CATERPILLAR	55.84	1.00	11.75%	13.87%
CENTERPOINT EN.	13.87	0.24	9.75%	11.76%
CENTEX	65.96	0.16	14.67%	14.96%
CHARLES SCHWAB	14.35	0.10	13.78%	14.62%
CHUBB	90.58	1.72	11.18%	13.42%
CINCINNATI FIN.	41.96	1.22	10.25%	13.66%
CINTAS	40.86	0.32	13.89%	14.83%
CIRCUIT CITY STORES	17.80	0.07	14.53%	15.00%
CIT GP.	46.19	0.64	10.70%	12.32%
CITIGROUP	46.05	1.76	9.58%	14.06%
CITIZENS COMMS.	12.97	1.00	4.75%	13.52%
CLEAR CHL.COMMS.	31.87	0.75	11.88%	14.68%

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-9
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING DCF
ESTIMATE OF THE EXPECTED RATE OF RETURN ON THE MARKET PORTFOLIO

COMPANY	P_0	D_0	Growth	Cost of Equity
CLOROX	54.95	1.16	9.13%	11.58%
COCA COLA	42.77	1.12	9.03%	12.07%
COLGATE-PALM.	52.74	1.16	9.67%	12.23%
COMERICA	58.52	2.20	8.11%	12.45%
COMPASS BANCSHARES	46.98	1.40	9.46%	12.93%
CONSTELLATION EN.	56.41	1.34	11.36%	14.17%
COOPER INDS.	69.49	1.48	9.36%	11.83%
COSTCO WHOLESALE	45.78	0.46	13.50%	14.71%
COUNTRYWIDE FINL.	33.04	0.60	12.30%	14.46%
CVS	27.23	0.14	14.23%	14.85%
DARDEN RESTAURANTS	31.76	0.08	11.92%	12.22%
DOMINION RES.	79.42	2.68	8.00%	11.89%
DOW CHEMICALS	44.13	1.34	11.57%	15.18%
DU PONT E I DE NEMOURS	40.70	1.48	9.80%	14.06%
EATON	61.86	1.24	10.83%	13.19%
ECOLAB	32.55	0.35	13.00%	14.28%
ELI LILLY	52.58	1.52	9.43%	12.80%
EMERSON ELECTRIC	70.42	1.78	10.81%	13.79%
ENGELHARD	28.06	0.48	10.33%	12.33%
FAMILY DOLLAR STORES	21.71	0.38	11.31%	13.37%
FEDERATED DEPT.STRS.	64.44	1.00	10.44%	12.26%
FEDERATED INVRS.'B'	33.90	0.60	10.89%	12.97%
FIFTH THIRD BANCORP	39.39	1.52	10.12%	14.66%
FIRST DATA	41.14	0.24	12.85%	13.54%
FIRST HORIZON NATIONAL	37.90	1.80	7.88%	13.37%
FLUOR	64.18	0.64	12.10%	13.28%
FORTUNE BRANDS	79.88	1.44	12.40%	14.55%
FRANK.RES.	86.64	0.40	13.70%	14.25%
GAP	17.49	0.18	12.53%	13.75%
GENERAL DYNAMICS	117.40	1.60	10.54%	12.13%
GENERAL ELECTRIC	34.10	1.00	11.14%	14.61%
GENERAL MILLS	47.67	1.32	8.33%	11.52%
GENERAL MOTORS	28.31	2.00	5.33%	13.38%
GOLDEN WEST FINL.	60.32	0.32	13.28%	13.91%
GOLDMAN SACHS GP.	121.78	1.00	12.27%	13.24%
GRAINGER W W	65.52	0.96	12.29%	14.03%
H & R BLOCK	24.84	0.50	11.17%	13.54%
HARLEY-DAVIDSON	49.68	0.64	12.50%	14.03%
HARTFORD FINL.SVS.GP.	78.51	1.20	11.15%	12.95%
HASBRO	19.74	0.36	10.33%	12.46%
HCA	48.48	0.60	12.01%	13.48%
HEALTH MAN.AS.A	22.63	0.24	13.83%	15.11%

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-9
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING DCF
ESTIMATE OF THE EXPECTED RATE OF RETURN ON THE MARKET PORTFOLIO

COMPANY	P_0	D_0	Growth	Cost of Equity
HEWLETT-PACKARD	28.24	0.32	11.63%	12.97%
HOME DEPOT	40.30	0.40	12.84%	14.02%
HONEYWELL INTL.	36.18	0.82	11.58%	14.27%
ILLINOIS TOOL WKS.	83.62	1.32	13.10%	14.99%
IMS HEALTH	24.86	0.08	12.59%	12.97%
INGERSOLL-RAND	38.44	0.64	12.29%	14.27%
INTERNATIONAL BUS.MACH.	82.15	0.80	10.71%	11.85%
ITT INDUSTRIES	106.61	0.72	12.76%	13.56%
JEFFERSON PILOT	52.41	1.67	7.93%	11.60%
JOHNSON & JOHNSON	62.85	1.32	11.03%	13.51%
JOHNSON CONTROLS	64.82	1.12	12.50%	14.56%
JONES APPAREL GROUP	28.04	0.48	10.00%	12.00%
JP MORGAN CHASE & CO.	35.66	1.36	9.74%	14.21%
KELLOGG	44.95	1.11	9.02%	11.88%
KEYCORP	32.36	1.30	7.16%	11.76%
L3 COMMUNICATIONS	78.89	0.50	12.63%	13.38%
LEHMAN BROS.HDG.	116.45	0.64	12.11%	12.76%
LIMITED BRANDS	20.55	0.60	11.28%	14.74%
LINCOLN NAT.	50.82	1.52	10.94%	14.47%
LIZ CLAIBORNE	37.27	0.22	11.88%	12.58%
LOCKHEED MARTIN	60.92	1.00	10.94%	12.87%
M&T BK.	106.61	1.80	10.00%	11.97%
MARSH & MCLENNAN	29.28	0.68	10.83%	13.56%
MARSHALL & ILSLEY	42.92	0.96	9.83%	12.44%
MATTEL	16.35	0.50	9.75%	13.33%
MBIA	58.46	1.12	10.43%	12.67%
MBNA	25.38	0.56	9.41%	11.97%
MCCORMICK & CO NV.	31.13	0.72	9.42%	12.11%
MCGRAW-HILL	48.63	0.66	11.78%	13.39%
MCKESSON	46.59	0.24	14.36%	14.98%
MELLON FINL.	32.32	0.80	10.25%	13.15%
MEREDITH	50.14	0.56	11.83%	13.15%
MERRILL LYNCH & CO.	62.57	0.80	10.65%	12.15%
MICROSOFT	26.61	0.32	10.88%	12.29%
MOLSON COORS BREWING 'B'	64.49	1.28	11.87%	14.23%
MORGAN STANLEY	53.39	1.08	11.86%	14.26%
MOTOROLA	22.45	0.16	12.04%	12.88%
NAT.CITY	34.37	1.48	7.77%	12.74%
NEWELL RUBBERMAID	22.76	0.84	8.87%	13.16%
NORDSTROM	34.83	0.34	12.58%	13.74%
NORTH FORK BANCORP.	25.58	0.88	9.64%	13.66%
NORTHERN TRUST	50.90	0.92	11.81%	13.95%

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-9
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING DCF
ESTIMATE OF THE EXPECTED RATE OF RETURN ON THE MARKET PORTFOLIO

COMPANY	P_0	D_0	Growth	Cost of Equity
OFFICEMAX	29.81	0.60	11.67%	14.05%
OMNICOM GP.	81.96	0.90	12.25%	13.55%
PARKER-HANNIFIN	64.81	0.92	12.50%	14.19%
PENNEY JC	49.54	0.50	13.96%	15.18%
PEPSICO	57.36	1.04	10.94%	13.07%
PNC FINL.SVS.GP.	59.31	2.00	8.51%	12.41%
PPG INDUSTRIES	59.60	1.88	8.52%	12.17%
PRAXAIR	48.47	0.72	10.66%	12.40%
PRINCIPAL FINL.GP.	48.53	0.65	12.09%	13.68%
PROCTER & GAMBLE	56.86	1.12	11.00%	13.32%
PRUDENTIAL FINL.	69.96	0.78	12.75%	14.08%
PULTE HOMES	40.81	0.16	14.67%	15.14%
RADIOSHACK	23.57	0.25	11.00%	12.24%
REEBOK INTL.	57.02	0.30	13.14%	13.77%
REGIONS FINL.NEW	32.10	1.36	8.22%	13.13%
REYNOLDS AMERICAN	83.46	4.20	6.00%	11.73%
ROCKWELL COLLINS	46.14	0.48	13.57%	14.82%
ROHM & HAAS	42.34	1.16	9.73%	12.93%
SABRE HDG.	20.34	0.36	10.00%	12.06%
SAFECO	53.92	1.00	10.67%	12.85%
SARA LEE	18.44	0.79	8.27%	13.24%
SHERWIN-WILLIAMS	43.27	0.82	11.75%	14.00%
SIEBEL SYS.	10.02	0.10	11.67%	12.85%
SNAP-ON	35.96	1.00	11.67%	14.98%
ST.PAUL TRAVELERS	43.99	0.92	9.87%	12.31%
STANLEY WORKS	46.25	1.16	12.00%	14.99%
STATE STREET	52.60	0.72	12.30%	13.93%
SUNTRUST BANKS	71.01	2.20	9.31%	12.92%
T ROWE PRICE GP.	65.42	0.92	12.33%	14.00%
TECO ENERGY	17.40	0.76	6.60%	11.59%
TEKTRONIX	24.75	0.24	12.25%	13.40%
TEXTRON	72.22	1.40	11.83%	14.13%
THE HERSHEY COMPANY	56.60	0.98	10.13%	12.15%
TIFFANY & CO	39.17	0.32	12.82%	13.79%
TIME WARNER	18.04	0.20	12.14%	13.45%
TJX COS.	21.78	0.24	13.10%	14.42%
TYCO INTL.	27.76	0.40	13.33%	15.06%
UNITED TECHNOLOGIES	51.54	0.88	11.11%	13.12%
US BANCORP	29.12	1.20	9.96%	14.81%
UST	40.46	2.20	6.25%	12.46%
V F	55.78	1.16	9.33%	11.74%
VIACOM 'B'	32.80	0.28	13.20%	14.22%

EMPIRE DISTRICT ELECTRIC COMPANY
SCHEDULE JVW-9
CALCULATION OF CAPITAL ASSET PRICING MODEL COST OF EQUITY USING DCF
ESTIMATE OF THE EXPECTED RATE OF RETURN ON THE MARKET PORTFOLIO

COMPANY	P_0	D_0	Growth	Cost of Equity
WACHOVIA	49.96	2.04	9.59%	14.38%
WALT DISNEY	25.08	0.24	13.02%	14.16%
WASHINGTON MUTUAL	40.02	1.96	9.44%	15.19%
WASTE MAN.	28.76	0.80	11.40%	14.70%
WENDY'S INTL.	47.06	0.68	11.71%	13.42%
WRIGLEY WILLIAM JR.	70.24	1.12	10.67%	12.54%
XL CAP.'A'	67.11	2.00	11.65%	15.19%
YUM! BRANDS	49.17	0.46	11.22%	12.32%
ZIONS BANCORP.	72.07	1.44	10.75%	13.10%
Market-Weighted Average				13.52%

Notes: In applying the DCF model to the S&P 500, I included in the DCF analysis only those companies in the S&P 500 group which pay a dividend, have a positive growth rate, and have at least three analysts' long-term growth estimates. To be conservative, I also eliminated those 25% of companies with the highest and lowest DCF results (the result for all companies in the S&P 500 was 13.77%.).

D_0 = Current dividend per Thomson Financial.
P_0 = Average of the monthly high and low stock prices during the three months ending November 2005 per Thomson Financial.
g = I/B/E/S forecast of future earnings growth November 2005.
k = Cost of equity using the quarterly version of the DCF model shown below:

$$k = \left[\frac{d_0 (1+g)^{\frac{1}{4}}}{P_0} \right]^4 - 1$$

EMPIRE DISTRICT ELECTRIC COMPANY
APPENDIX 1
DERIVATION OF THE QUARTERLY DCF MODEL

The simple DCF Model assumes that a firm pays dividends only at the end of each year. Since firms in fact pay dividends quarterly and investors appreciate the time value of money, the annual version of the DCF Model generally underestimates the value investors are willing to place on the firm's expected future dividend stream. In these workpapers, we review two alternative formulations of the DCF Model that allow for the quarterly payment of dividends.

When dividends are assumed to be paid annually, the DCF Model suggests that the current price of the firm's stock is given by the expression:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \ldots + \frac{D_n + P_n}{(1+k)^n} \quad (1)$$

where

P_0 = current price per share of the firm's stock,
$D_1, D_2, \ldots, D_n$ = expected annual dividends per share on the firm's stock,
P_n = price per share of stock at the time investors expect to sell the stock, and
k = return investors expect to earn on alternative investments of the same risk, i.e., the investors' required rate of return.

Unfortunately, expression (1) is rather difficult to analyze, especially for the purpose of estimating k. Thus, most analysts make a number of simplifying assumptions. First, they assume that dividends are expected to grow at the constant rate g into the indefinite future. Second, they assume that the stock

price at time n is simply the present value of all dividends expected in periods subsequent to n. Third, they assume that the investors' required rate of return, k, exceeds the expected dividend growth rate g. Under the above simplifying assumptions, a firm's stock price may be written as the following sum:

$$P_0 = \frac{D_0(1+g)}{(1+k)} + \frac{D_0(1+g)^2}{(1+k)^2} + \frac{D_0(1+g)^3}{(1+k)^3} + \ldots, \qquad (2)$$

where the three dots indicate that the sum continues indefinitely.

As we shall demonstrate shortly, this sum may be simplified to:

$$P_0 = \frac{D_0(1+g)}{(k-g)}$$

First, however, we need to review the very useful concept of a geometric progression.

Geometric Progression

Consider the sequence of numbers 3, 6, 12, 24,..., where each number after the first is obtained by multiplying the preceding number by the factor 2. Obviously, this sequence of numbers may also be expressed as the sequence 3, 3 x 2, 3 x 2^2, 3 x 2^3, etc. This sequence is an example of a geometric progression.

Definition: A geometric progression is a sequence in which each term after the first is obtained by multiplying some fixed number, called the common ratio, by the preceding term.

A general notation for geometric progressions is: a, the first term, r, the common ratio, and n, the number of terms. Using this notation, any geometric progression may be represented by the sequence:

$$a, ar, ar^2, ar^3, \ldots, ar^{n-1}.$$

In studying the DCF Model, we will find it useful to have an expression for the sum of n terms of a geometric progression. Call this sum S_n. Then

$$S_n = a + ar + \ldots + ar^{n-1} . \qquad (3)$$

However, this expression can be simplified by multiplying both sides of equation (3) by r and then subtracting the new equation from the old. Thus,

$$rS_n = ar + ar^2 + ar^3 + \ldots + ar^n$$

and

$$S_n - rS_n = a - ar^n ,$$

or

$$(1 - r) S_n = a (1 - r^n) .$$

Solving for S_n, we obtain:

$$S_n = \frac{a(1 - r^n)}{(1 - r)} \qquad (4)$$

as a simple expression for the sum of n terms of a geometric progression. Furthermore, if $|r| < 1$, then S_n is finite, and as n approaches infinity, S_n approaches a ÷ (1-r). Thus, for a geometric progression with an infinite number of terms and $|r| < 1$, equation (4) becomes:

$$S = \frac{a}{1 - r} \qquad (5)$$

Application to DCF Model

Comparing equation (2) with equation (3), we see that the firm's stock price (under the DCF assumption) is the sum of an infinite geometric progression with the first term

$$a = \frac{D_0(1+g)}{(1+k)}$$

and common factor

$$r = \frac{(1+g)}{(1+k)}$$

Applying equation (5) for the sum of such a geometric progression, we obtain

$$S = a \bullet \frac{1}{(1-r)} = \frac{D_0(1+g)}{(1+k)} \bullet \frac{1}{1-\frac{1+g}{1+k}} = \frac{D_0(1+g)}{(1+k)} \bullet \frac{1+k}{k-g} = \frac{D_0(1+g)}{k-g}$$

as we suggested earlier.

Quarterly DCF Model

The Annual DCF Model assumes that dividends grow at an annual rate of g% per year (see Figure 1).

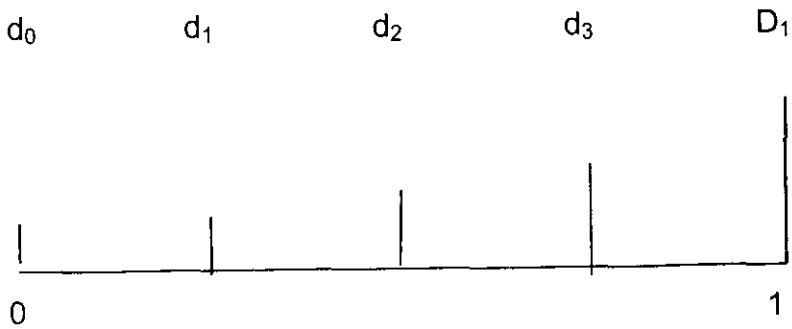
Figure 1

Annual DCF Model

$D_0 = 4d_0$ $D_1 = D_0(1 + g)$

Figure 2

Quarterly DCF Model (Constant Growth Version)



$d_1 = d_0(1+g)^{.25}$ $d_2 = d_0(1+g)^{.50}$

$d_3 = d_0(1+g)^{.75}$ $d_4 = d_0(1+g)$

In the Quarterly DCF Model, it is natural to assume that quarterly dividend payments differ from the preceding quarterly dividend by the factor $(1 + g)^{.25}$, where g is expressed in terms of percent per year and the decimal .25 indicates that the growth has only occurred for one quarter of the year. (See Figure 2.) Using this assumption, along with the assumption of constant growth and $\boldsymbol{k} > \boldsymbol{g}$, we obtain a new expression for the firm's stock price, which takes account of the quarterly payment of dividends. This expression is:

$$P_0 = \frac{d_0(1+g)^{\frac{1}{4}}}{(1+k)^{\frac{1}{4}}} + \frac{d_0(1+g)^{\frac{2}{4}}}{(1+k)^{\frac{2}{4}}} + \frac{d_0(1+g)^{\frac{3}{4}}}{(1+k)^{\frac{3}{4}}} + \ldots \qquad \textbf{(6)}$$

where d_0 is the last quarterly dividend payment, rather than the last annual dividend payment. (We use a lower case d to remind the reader that this is not the annual dividend.)

Although equation (6) looks formidable at first glance, it too can be greatly simplified using the formula [equation (4)] for the sum of an infinite geometric progression. As the reader can easily verify, equation (6) can be simplified to:

$$P_0 = \frac{d_0(1+g)^{\frac{1}{4}}}{(1+k)^{\frac{1}{4}} - (1+g)^{\frac{1}{4}}} \qquad \textbf{(7)}$$

Solving equation (7) for *k*, we obtain a DCF formula for estimating the cost of equity under the quarterly dividend assumption:

$$k = \left[\frac{d_0(1+g)^{\frac{1}{4}}}{P_0} + (1+g)^{\frac{1}{4}} \right]^4 - 1 \qquad \textbf{(8)}$$

An Alternative Quarterly DCF Model

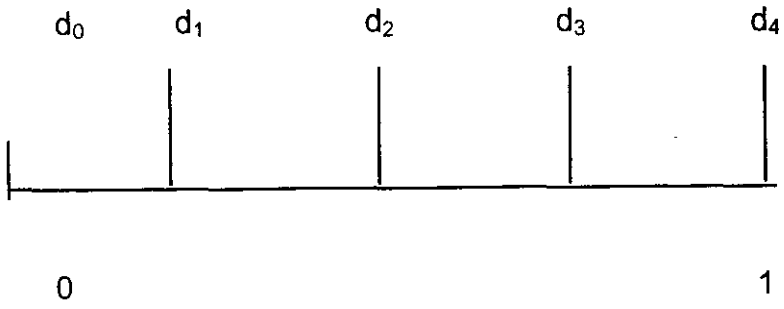
Although the constant growth Quarterly DCF Model [equation (8)] allows for the quarterly timing of dividend payments, it does require the assumption that the firm increases its dividend payments each quarter. Since this assumption is difficult for some analysts to accept, we now discuss a second Quarterly DCF Model that allows for constant quarterly dividend payments within each dividend year.

Assume then that the firm pays dividends quarterly and that each dividend payment is constant for four consecutive quarters. There are four cases to consider, with each case distinguished by varying assumptions about where we are evaluating the firm in relation to the time of its next dividend increase. (See Figure 3.)

Figure 3

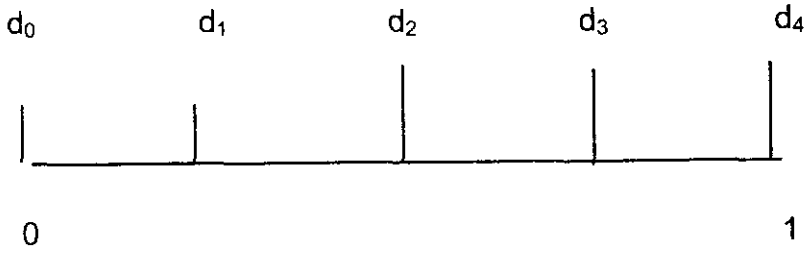
Quarterly DCF Model (Constant Dividend Version)

Case 1



$$d_1 = d_2 = d_3 = d_4 = d_0(1+g)$$

Case 2

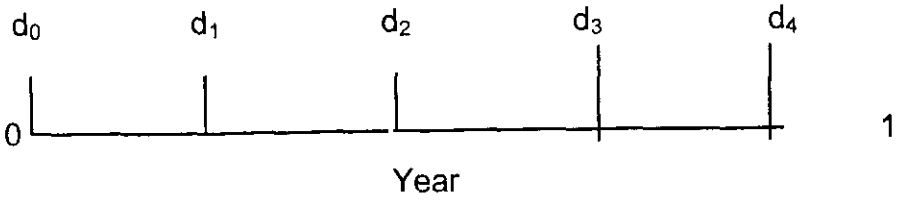


$$d_1 = d_0$$

$$d_2 = d_3 = d_4 = d_0(1+g)$$

Figure 3 (continued)

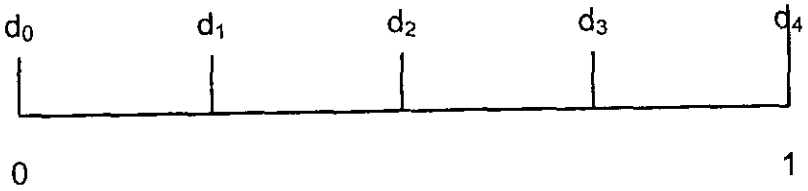
Case 3



$$d_1 = d_2 = d_0$$

$$d_3 = d_4 = d_0(1+g)$$

Case 4



$$d_1 = d_2 = d_3 = d_0$$

$$d_4 = d_0(1+g)$$

If we assume that the investor invests the quarterly dividend in an alternative investment of the same risk, then the amount accumulated by the end of the year will in all cases be given by

$$D_1^* = d_1 (1+k)^{3/4} + d_2 (1+k)^{1/2} + d_3 (1+k)^{1/4} + d_4$$

where d_1, d_2, d_3 and d_4 are the four quarterly dividends. Under these new assumptions, the firm's stock price may be expressed by an Annual DCF Model of the form (2), with the exception that

$$D_1^* = d_1 (1 + k)^{3/4} + d_2 (1 + k)^{1/2} + d_3 (1 + k)^{1/4} + d_4 \quad \textbf{(9)}$$

is used in place of $D_0(1+g)$. But, we already know that the Annual DCF Model may be reduced to

$$P_0 = \frac{D_0 (1 + g)}{k - g}$$

Thus, under the assumptions of the second Quarterly DCF Model, the firm's cost of equity is given by

$$k = \frac{D_1^*}{P_0} + g \quad \textbf{(10)}$$

with D_1^* given by (9).

Although equation (10) looks like the Annual DCF Model, there are at least two very important practical differences. First, since D_1^* is always greater than $D_0(1+g)$, the estimates of the cost of equity are always larger (and more accurate) in the Quarterly Model (10) than in the Annual Model. Second, since D_1^* depends on k through equation (9), the unknown "k" appears on both sides of (10), and an iterative procedure is required to solve for k.

EMPIRE DISTRICT ELECTRIC COMPANY
APPENDIX 2
EX ANTE RISK PREMIUM APPROACH

My ex ante risk premium method is based on studies of the DCF expected return on proxy companies compared to the interest rate on Moody's A-rated utility bonds. Specifically, for each month in my study period, I calculate the risk premium using the equation,

$$RP_{PROXY} = DCF_{PROXY} - I_A$$

where:

RP_{PROXY} = the required risk premium on an equity investment in the proxy group of companies,

DCF_{PROXY} = average DCF estimated cost of equity on a portfolio of proxy companies; and

I_A = the yield to maturity on an investment in A-rated utility bonds.

Electric Company Ex Ante Risk Premium Analysis. For my ex ante risk premium electric proxy group DCF analysis, I began with the Moody's group of 24 electric companies shown in Table 1. I used the Moody's group of electric companies because they are a widely followed group of electric utilities, and use of this constant group greatly simplified the data collection task required to estimate the ex ante risk premium over the months of my study. Simplifying the data collection task was desirable because the ex ante risk premium approach requires that the DCF model be estimated for every company in every month of the study period. The Ex Ante Risk Premium Schedule in my direct testimony displays the average DCF estimated cost of equity on an investment in the portfolio of electric companies and the yield to maturity on A-rated utility bonds in each month of the study.

Previous studies have shown that the ex ante risk premium tends to vary inversely with the level of interest rates, that is, the risk premium tends to increase when interest rates decline, and decrease when interest rates go up. To test whether my studies also indicate that the ex ante risk premium varies inversely with the level of interest rates, I performed a regression analysis of the relationship between the ex ante risk premium and the yield to maturity on A-rated utility bonds, using the equation,

$$RP_{PROXY} = a + (b \times I_A) + e$$

where:

RP_{PROXY} = risk premium on proxy company group;

I_A = yield to maturity on A-rated utility bonds;

ϵ = a random residual; and

a, b = coefficients estimated by the regression procedure.

Regression analysis assumes that the statistical residuals from the regression equation are random. My examination of the residuals revealed that there is a significant probability that the residuals are serially correlated (non-zero serial correlation indicates that the residual in one time period tends to be correlated with the residual in the previous time period). Therefore, I made adjustments to my data to correct for the possibility of serial correlation in the residuals.

The common procedure for dealing with serial correlation in the residuals is to estimate the regression coefficients in two steps. First, a multiple regression analysis is used to estimate the serial correlation coefficient, *r*. Second, the estimated serial correlation coefficient is used to transform the original variables into new variables whose serial correlation is approximately zero. The regression coefficients are then re-estimated using the transformed variables as inputs in the regression equation. Based on my knowledge of the statistical relationship between the yield to maturity on A-rated utility bonds and the required risk premium, my estimate of the ex ante risk premium on an investment in my proxy electric company group as compared to an investment in A-rated utility bonds is given by the equation:

$$RP_{PROXY} = 6.09 - .3040 \times I_A.$$

Using the 2007 forecasted 6.9 percent yield to maturity on A-rated utility bonds available from Global Insight as of December 2005, the regression equation produces an ex ante risk premium cost of equity based on the electric proxy group equal to 4.00 percent (6.09 – .3040 x 6.9 = 4.00).

To estimate the cost of equity using the ex ante risk premium method, one may add the estimated risk premium over the yield on A-rated utility bonds to the yield to maturity on A-rated utility bonds. As noted above, the forecasted yield on A-rated utility bonds is 6.9 percent. My analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to

4.00 percent. Adding an estimated risk premium of 4.00 percent to the 6.9 percent forecasted yield to maturity on A-rated utility bonds produces a cost of equity estimate of 10.9 percent for the electric company proxy group using the ex ante risk premium method.

Natural Gas Company Ex Ante Risk Premium Analysis. My second ex ante risk premium study was applied to a natural gas proxy group and followed the procedures described above. To select my ex ante risk premium natural gas proxy group of companies, I used the same criteria that I use when estimating the DCF cost of equity, namely, I selected all the companies in Value Line's groups of natural gas companies that: (1) paid dividends during every quarter of the last two years; (2) did not decrease dividends during any quarter of the past two years; (3) had at least three analysts included in the I/B/E/S mean growth forecast; (4) have an investment grade bond rating and a Value Line Safety Rank of 1, 2, or 3; and (5) have not announced a merger. The LDC Ex Ante Risk Premium Schedule in my direct testimony displays the results of my ex ante risk premium study, showing the average DCF estimated cost of equity on an investment in the portfolio of natural gas companies and the yield to maturity on A-rated utility bonds in each month. [7]

Based on my knowledge of the statistical relationship between the yield to maturity on A-rated utility bonds and the required risk premium, my estimate of the ex ante risk premium on an investment in my proxy natural gas companies as compared to an investment in A-rated utility bonds is given by the equation:

$$RP_{PROXY} = 5.88 - .2184 \times I_A.$$

Using the 6.9 percent forecasted yield to maturity on A-rated utility bonds for 2007, the regression equation produces an ex ante risk premium for the natural gas company proxy group equal to 4.37 percent (5.88 – .2184 x 6.9 = 4.37).

To estimate the cost of equity using the ex ante risk premium method, one may add the estimated risk premium over the yield on A-rated utility bonds to the yield to maturity on A-rated utility bonds. As noted above, the forecasted yield on A-rated utility bonds in 2007 is 6.9 percent.

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[7] My two ex ante risk premium studies cover slightly different time periods, with the natural gas company risk premium study extending over a longer period of time, because I began doing an ex ante study using natural gas companies before I began performing a similar study for the electric companies.

As also noted above, my analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 4.37 percent. Adding an estimated risk premium of 4.37 percent to the 6.9 percent average yield to maturity on A-rated utility bonds produces a cost of equity estimate of 11.3 percent for the natural gas proxy group using the ex ante risk premium method.

TABLE 1

MOODY'S ELECTRIC COMPANIES

American Electric Power
Constellation Energy
Progress Energy
CH Energy Group
Cinergy Corp.
Consolidated Edison Inc.
DPL Inc.
DTE Energy Co.
Dominion Resources Inc.
Duke Energy Corp.
Energy East Corp.
FirstEnergy Corp.
Reliant Energy Inc.
IDACORP. Inc.
IPALCO Enterprises Inc.
NiSource Inc.
OGE Energy Corp.
Exelon Corp.
PPL Corp.
Potomac Electric Power Co.
Public Service Enterprise Group
Southern Company
Teco Energy Inc.
Xcel Energy Inc.

Source of data: Mergent Public Utility Manual, August 2002. Of these 24 companies, I eliminated three companies from my ex ante risk premium DCF analysis because there was insufficient data to perform a DCF analysis for most of my study period. Specifically, IPALCO merged with a company that is not in the electric utility industry; Reliant divested its electric utility operations; and CH Energy does not have any I/B/E/S analysts' estimates of long-term growth.

EMPIRE DISTRICT ELECTRIC COMPANY
APPENDIX 4
RISK PREMIUM APPROACH

Source

Stock price and yield information is obtained from Standard & Poor's Security Price publication. Standard & Poor's derives the stock dividend yield by dividing the aggregate cash dividends (based on the latest known annual rate) by the aggregate market value of the stocks in the group. The bond price information is obtained by calculating the present value of a bond due in 30 years with a $4.00 coupon and a yield to maturity of a particular year's indicated Moody's A-rated Utility bond yield. The values shown on Schedules JVW-5 and JVW-6 are the January values of the respective indices.

Calculation of Stock and Bond Returns

Sample calculation of "Stock Return" column:

$$\text{Stock Return (2003)} = \left[\frac{\text{Stock Price (2004) - Stock Price (2003) + Dividend (2003)}}{\text{Stock Price (2003)}}\right]$$

where Dividend (2003) = Stock Price (2003) x Stock Div. Yield (2003)

Sample calculation of "Bond Return" column:

$$\text{Bond Return (2003)} = \left[\frac{\text{Bond Price (2004) - Bond Price (2003) + Interest (2003)}}{\text{Bond Price (2003)}}\right]$$

where Interest = $4.00.