Exhibit No.
Issue: Cost of Capital
Witness: 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

# James H. Vander Weide

**April 2004**

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Case No(s). ER-2004-0570
Date 2-06-04 Rptr KF

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# Direct Testimony

**of**

**James H. Vander Weide**

**April 2004**

**DIRECT TESTIMONY**
**OF**
**DR. JAMES H. VANDER WEIDE**
**ON BEHALF OF**
**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**BEFORE THE**
**MISSOURI PUBLIC SERVICE COMMISSION**
**CASE NO.**

## I. Witness Identification

**Q. Please state your name and business address.**

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. Please describe your educational background and academic experience.**

A. I graduated from Cornell University in 1966 with a Bachelor's Degree in Economics. I then attended Northwestern University where I earned a Ph.D. in Finance. In January 1972, I joined the faculty of the School of Business at Duke University and 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 at Duke on the cost of capital, financial analysis, capital budgeting, mergers and acquisitions, real options, cash management, short-run financial planning, and competitive strategy. I have also served as Program Director of several 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, real options, cash management, depreciation policies, and short-run financial planning for a wide variety of U.S. and international companies, including ABB, Accenture, 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 350 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 including Missouri, the insurance commissions of five states, the Iowa State Board of Tax Review, and the National Association of Securities Dealers. In addition, I have testified as an expert witness in proceedings before the 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 United States District Court for the Eastern District of Michigan.

## II. Purpose of Testimony

**Q. What is the purpose of your testimony?**

A. I have been asked by The Empire District Electric Company ("Empire" or "the Company") to prepare an independent appraisal of Empire's cost of equity, and to recommend to the Missouri Public Service Commission ("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 a proxy group of comparable companies. Second, I adjusted the average cost of equity

for my proxy group for the difference between the average capital structure of my proxy group and Empire's capital structure.

**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") and risk premium require inputs of quantities that are not easily measured, such as investors' growth expectations. 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 10.7 percent. This conclusion is based on my application of three standard cost of equity estimation techniques: (1) the discounted cash flow model; (2) the ex ante risk premium method; and (3) the ex post risk premium method.

**Q. Does your average cost of equity of your proxy companies depend on your proxy companies' 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 contains significantly more leverage than my proxy companies' average capital structures, 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

[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)*

of comparable risk. On the basis of my studies, I have determined that Empire requires a cost of equity of 11.3 percent to compensate investors for the higher financial leverage in 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 11.3 percent. My recommended cost of equity reflects both the 10.7 percent cost of equity of my proxy companies and Empire's more highly-leveraged capital structure.

**Q. Do you have any schedules accompanying your testimony?**

A. Yes. I have eight schedules and two appendices accompanying my testimony that were prepared by me or under my direction and supervision.

## III. 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. 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. Are there any practical difficulties that 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.

**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.

## IV. Business and Financial Risks in Electric Energy Business

**Q. Please define business risk.**

A. Business risk is defined as the uncertainty inherent in projections of a company's future rate of return on assets. Business risk arises, for example, as a result of demand variability, sales price variability, input cost variability, ability to adjust output prices for changes in input costs, ability to develop new products in a timely, cost-effective manner, and the extent to which costs are fixed.

**Q. Please define financial risk.**

A. Financial risk is the additional risk a company faces as a result of using debt financing. Debt financing is risky because interest and principle payments established by contract, and, thus, cannot be changed simply because a company's revenues decline or its operating costs increase.

The fixed-cost nature of debt financing increases the uncertainty regarding the company's projected rate of return on equity and increases the probability of bankruptcy.

**Q. What are the primary factors that affect Empire's business and financial risks?**

A. Empire's business and financial risks are affected by a number of economic factors, including:

1. 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.

2. Demand Uncertainty. The business risk of electric energy companies is increased by the high degree of demand uncertainty. 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; and (d) the ability of

some customers to produce their own electricity under cogeneration or self-generation arrangements.

3. Peak Demand. The need to invest substantial sums in fixed plant is further exacerbated by the peaking nature of electricity usage and society's demand for a high degree of system reliability. The peak demand for electricity is high relative to average sales in non-peak periods.

4. 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.

5. Technology Risk. Changing technology has reduced economies of scale in electric power generation to the point where distributed generation is an economically feasible alternative for many commercial and industrial users.

6. Regulatory Uncertainty. The business and financial risks of electric energy companies such as Empire ultimately depend on their ability to charge rates that cover their costs. As long as regulators allow the company to charge rates that reflect its cost of providing service, including its cost of capital, risk is minimal. However, if regulatory authorities set rates that fail to reflect the company's cost of providing service, regulatory risk can be substantial. In Missouri, electric companies face the substantial risk that they will be unable to recover increases in fuel and purchased power costs. This risk arises because Missouri, unlike most states, does not have a fuel adjustment clause mechanism. In addition, Missouri does not allow Missouri utilities to include CWIP in rate base, and depreciation rates are significantly lower for electric utilities in Missouri than in other jurisdictions.

**Q. Have bond rating agencies such as Standard & Poor's developed metrics for assessing business risk in the electric energy business?**

A. Yes. Standard & Poor's has developed a ten-point ranking system for assessing business risk in the electric energy business, where 1 indicates the lowest business risk and 10 the highest business risk.

**Q. What is Standard & Poor's assessment of Empire's business position?**

A. Standard & Poor's assesses Empire's business position to be 5.

**Q. Has Standard & Poor's also developed a system for assessing the financial risk of electric energy companies such as Empire?**

A. Yes. Standard & Poor's has developed a process that considers both qualitative and quantitative factors to assess the financial risk of electric energy companies. Among the quantitative factors that Standard & Poor's considers are ratios of: (1) funds from operations to total debt; (2) funds from operations to interest expense; (3) pre-tax interest coverage; and (4) total debt to total capital.

**Q. Has Standard & Poor's established target values for these ratios that a company must achieve in order to be assigned a specific bond rating?**

A. Yes. Standard & Poor's has developed a matrix of target financial ratios for each business position and bond rating category. For a company such as Empire, with a business position is 5 and a bond rating of BBB, Standard & Poor's has determined that, to maintain its ratings, the company should have financial ratios of: (1) FFO/total debt – 20.5 to 27.0; (2) FFO/interest coverage – 3.0 to 4.0; (3) pre-tax interest coverage – 2.4 to 3.5; and (4) total debt/total capital – 47.0 to 55.0.

**Q. Are Empire's current financial ratios consistent with Standard & Poor's established targets for a BBB rating?**

A. No. Empire's current financial ratios in two categories are below the target ranges required for a BBB rating, one category is at the low end of the range, and only one category is above the midpoint of the target range. Specifically, Empire's FFO/total debt is 19.6, as compared to the target of 20.5 to 27.0; its FFO/interest coverage is 2.67, as compared to the target of 3.0 to 4.0; its pre-tax interest coverage is 2.45, compared to the target of 2.4 to 3.5; and its total debt/total capital is 52.8, compared to the target of 47.0 to 55.0.

**Q. What would be the impact if Standard & Poor's were to downgrade Empire from its current investment grade BBB rating to a non-investment grade rating of BB?**

A. If Standard & Poor's were to downgrade Empire's bond rating from BBB to BB, Empire's interest costs would be significantly increased and its access to capital markets would be severely limited.

**Q. Why would Empire's interest costs increase and its access to capital markets be severely limited if its current investment grade BBB rating were downgraded to a non-investment grade rating of BB?**

A. Empire's interest costs would increase and its access to capital markets would decrease because investors consider the risk of purchasing non-investment grade bonds to be significantly higher than the risk of purchasing investment grade bonds. Indeed, many institutional

investors are prohibited by their investment guidelines from purchasing bonds that are not investment grade.

**Q. Is BBB a reasonable target bond rating for Empire?**

A. No. As one of the smallest publicly-traded electric energy companies, Empire is subject to an additional element of risk stemming from its small size. As a result of its small size, Empire should maintain an additional margin of safety in order to retain its flexibility to invest in the facilities required to provide safe and reliable electric service in Missouri in both good times and bad. As an expert in finance, I believe Empire should seek to have a bond rating in the range BBB+ to A1.

**Q. How can the Commission help to insure that Empire has adequate flexibility to invest in the facilities required to provide safe and reliable electric service in Missouri?**

A. The Commission should provide Empire an opportunity to earn a reasonable rate of return on its investment on the facilities required to provide safe and reliable service in Missouri. My studies indicate that a reasonable rate of return for the equity portion of Empire's investment in Missouri is 11.3 percent.

## V. 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, the ex ante risk premium, and the ex post risk premium 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 ex ante risk premium method assumes that an investor's current expectations regarding the equity risk premium can be estimated from recent data on the DCF expected rate of return on equity compared to the interest rate on long-term bonds. The ex post risk premium method assumes that an investor's current expectations regarding the equity-debt return differential is equal to the historical record of comparable returns on stock and bond investments. The cost of equity under both risk premium methods is then equal to the interest rate on bond investments plus the risk premium.

## VI. Discounted Cash Flow 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**

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

where:

| | | |
|---|---|---|
| $P_S$ | = | Current price of the firm's stock; |
| $D_1, D_2 \ldots D_n$ | = | 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 discounted 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 discounted 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 Schedule JVW-1 and 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 in 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. 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. Can you illustrate how you estimated the next four quarterly dividends with data for a specific company?**

A. Yes. In the case of ALLETE, the first company shown in Schedule JVW-1, each of the last four quarterly dividends is equal to 0.283. The next four future dividends are then equal to .3090 [.283 x (1 + .0917) = .3090]. (As noted previously, the logic underlying this procedure is described in Appendix 1.)

**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.

**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 an estimate of future earnings growth when making stock buy and sell decisions.

**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 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 average 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 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. 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 January 2004. These high and low stock prices were obtained from the Standard & Poor's *Stock Guide*, a source generally available to and used by investors.

**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 distribution companies ("LDCs") 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 electric groups that: (1) paid dividends during every quarter of the last five years; (2) did not decrease dividends during any quarter of the past five years; (3) had at least three analysts included in the I/B/E/S average growth forecast; and (4) have not announced a merger. In addition, each of the companies included in my proxy group has a Value Line Safety Rank of 1, 2, or 3.

**Q. Why did you eliminate companies that have either decreased or eliminated their dividend in the past five years?**

A. The DCF model requires the assumption that dividends will grow at a constant positive rate into the indefinite future. If a company has decreased its dividend in recent years, an assumption that the company's dividend will grow at the same positive rate into the indefinite future is questionable. I did not apply the DCF methodology to companies that have eliminated their dividends because the DCF model assumes that each future dividend is equal to the previous dividend times (1 + the growth rate, g). Under this assumption, if the current dividend is zero, then all future dividends will also be assumed to be zero. But if all future dividends are assumed to be zero, the stock price in the DCF model must also be zero, a clearly nonsensical result.

**Q. Why did you eliminate companies that have fewer than three analysts included in the I/B/E/S average 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 average 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 I/B/E/S average growth 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 is a reasonable minimum number for a company to be included in my proxy group.

**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. Which companies were eliminated from the Value Line electric group according to your selection criteria?**

A. The companies eliminated from the Value Line electric group because they had either decreased or eliminated their dividend or had fewer than three analysts in the I/B/E/S average growth forecast are shown in Schedule JVW-2. No companies were eliminated due to merger activity at this time. The large number of companies eliminated is an indication of the dramatic changes and increased risk in the electric utility industry.

**Q. Please summarize the results of your application of the DCF model to the Value Line electric energy companies.**

A. My application of the DCF model to the Value Line electric companies produces an average DCF result of 9.4 percent.

**Q. Is the Value Line electric company proxy group comparable in risk to Empire?**

A. The Value Line electric company proxy group is a conservative risk proxy for Empire. Many investors use the Value Line Safety Rank as a measure of equity risk. 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, while Empire's Value Line Safety Rank is 3. The average S&P bond rating of the electric companies in my proxy group is approximately BBB+, with a business profile of 5. Empire has an S&P bond rating of BBB with a business risk profile of 5.

**Q. Did you also apply your DCF model to a proxy group of LDCs?**

A. Yes.

**Q. Why did you apply your DCF model to a proxy group of LDCs?**

A. I applied my DCF model to a proxy group of LDCs in addition to a group of electric companies because the LDCs are similar in risk to the electric companies, and 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 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. How did you select your group of LDCs?**

A. I selected all the companies in Value Line's natural gas industry groups that: (1) are primarily in the business of natural gas distribution; (2) paid dividends during every quarter of the last five years; (3) did not decrease dividends during any quarter of the past five years; (4) had at least three analysts included in the I/B/E/S average growth forecast; and (5) have not announced a merger. In addition, all of the LDCs included in my group have a Value Line Safety Rank of 1, 2, or 3. The LDCs in my DCF group and the average DCF result are shown on Schedule JVW-3.

**Q. Which companies were eliminated according to your criteria?**

A. Of the Value Line LDCs, Cascade, Laclede, NUI, Piedmont, and South Jersey were not included because they have fewer than three analyst's

growth forecasts; Southern Union was not included because it pays no dividends; SEMCO was eliminated because it has reduced its dividend payment.

**Q. How are the LDCs similar to Empire?**

A. Like Empire, the LDCs: (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; and (3) are regulated by public utility commissions that have traditionally viewed electric and natural gas utilities as being comparable in risk.

**Q. Does your LDC proxy group meet the standards of the *Hope* and *Bluefield* cases cited above?**

A. Yes. The *Hope* and *Bluefield* standard states that a public utility should be allowed to earn a return on its investment that is commensurate with the returns investors are able to earn on investments having similar risk. The LDCs are a group of companies that meet the standards of the *Hope* and *Bluefield* cases because they are similar in risk to Empire. Indeed, the LDCs are a conservative proxy for Empire.

**Q. Do you have any empirical evidence that the LDCs in your proxy group are a conservative proxy for Empire?**

A. Yes. The average Value Line Safety Rank for my proxy group of LDCs is 2, on a scale where 1 is the most safe and 5 is the least safe, whereas Empire's Value Line Safety Rank is 3. The average S&P bond rating of the LDCs in my proxy group is approximately A, with a business profile of 4, whereas, as noted above, Empire has an S&P bond rating of BBB with a business risk profile of 5.

**Q. Please summarize the results of your application of the DCF method to the LDC proxy group.**

A. My application of the DCF method to the LDC proxy group produces an average DCF result of 10.4 percent, as shown on Schedule JVW-3.

**Q. You have presented the results of two DCF analyses. Based on your DCF studies, what is your conclusion regarding Empire's DCF-based cost of equity?**

A. My application of the DCF model produces an average DCF result of 9.7 percent for the electric energy companies and 10.4 percent for the LDCs. Based on these data, I conclude that the DCF cost of equity for Empire is 9.9 percent.

## VII. 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. 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 a study of the DCF expected return on a proxy group of electric companies compared to the interest rate on Moody's A-rated utility bonds. Specifically, for each month in my 53-month 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 electric companies

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

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

I utilized a 53-month period because that was as far back as I could obtain the data.

**Q. What proxy companies did you use to estimate the cost of equity in your ex ante risk premium approach?**

A. I began with the Moody's group of 24 electric companies shown in Schedule JVW-4. Of these 24 companies, I eliminated five companies for the following reasons: Exelon and Potomac Electric Power Company did not pay dividends in most months of my ex ante risk premium study; 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.

**Q. What were the results of your ex ante risk premium study?**

A. The results of my ex ante risk premium study are described in Schedule JVW-5. Over my 53-month study period, the average DCF estimated cost of equity on an investment in the portfolio of electric companies was equal to 11.95 percent, while the average yield to maturity on A-rated utility bonds was 7.51 percent. Thus, the average estimated risk premium on an investment in my portfolio of electric companies was 4.45 percent over the yield on A-rated utility bonds.

**Q. Does the ex ante risk premium vary with the level of interest rates?**

A. Yes. 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.

**Q. Have you performed a statistical analysis to determine whether this inverse relationship holds for your ex ante risk premium data?**

A. Yes. 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 Moody's electric group;

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

e = a random residual; and

a, b = coefficients estimated by the regression procedure.

**Q. Regression analysis assumes that the statistical residuals from the regression equation are random. Did you examine whether this assumption is valid for your data?**

A. Yes. 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).

**Q. Did you make any adjustments in your data to correct for the possibility of serial correlation in the residuals?**

A. Yes. 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. This procedure produced ***a*** and ***b*** coefficient estimates equal to 7.61 and –0.475, respectively, indicating that for every 100 basis point change in the yield to maturity on A-rated utility bonds, the risk premium changes by approximately 48 basis points in the opposite direction.

**Q. Using your knowledge of the statistical relationship between the yield to maturity on A-rated utility bonds and the required risk premium, what is your estimate of the ex ante risk premium on an investment in electric stocks?**

A. As noted above, my estimate of the ex ante risk premium on an investment in electric stocks as compared to an investment in A-rated utility bonds is given by the equation:

$$RP_{PROXY} = 7.61 - .475 \times I_A.$$

Using the 6.16 percent average yield to maturity on A-rated utility bonds in January 2004, the regression equation produces an ex ante risk premium equal to 4.68 percent (7.61 – .475 x 6.16 = 4.68).

**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 current yield to maturity on A-rated utility bonds. In January 2004, the average yield to maturity on A-rated utility bonds was 6.16 percent. As noted above, my analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 4.68 percent. Adding an estimated risk premium of 4.68 percent to the 6.16 percent average yield to maturity on A-rated utility bonds produces a cost of equity estimate of 10.84 percent using the ex ante risk premium method.

**Q. Have you also applied your ex ante risk premium approach to a proxy group of LDCs?**

A. Yes. Following the same procedure as described above, I applied my ex ante risk premium approach to my proxy group of LDCs compared to the interest rate on A-rated utility bonds. Specifically, for each of the last 68 months, 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 natural gas distribution companies;

$DCF_{PROXY}$ = average DCF estimated cost of equity on a portfolio of natural gas distribution companies serving as a proxy for Empire; and

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

**Q. What were the results of your ex ante risk premium study?**

A. The results of my ex ante risk premium study are described in Schedule JVW-6. Over the last 68 months,[2] the average DCF estimated cost of equity on an investment in a portfolio of proxy LDCs was equal to 11.91 percent, while the average yield to maturity on A-rated utility bonds was 7.44 percent. Thus, the average estimated risk premium on an investment in the proxy group of LDCs over the last 68 months was 4.47 percent over the yield on A-rated utility bonds.

**Q. What is your estimate of the ex ante risk premium on an investment in your proxy group of LDCs?**

A. My estimate of the ex ante risk premium on an investment in my proxy group of LDC stocks as compared to an investment in A-rated utility bonds is given by the equation:

$$RP_{PROXY} = 7.75 - 0.440 \times I_A.$$

[2] I used 68 months of data because that was as far back as I could obtain the monthly stock price data required to perform the DCF analysis for my natural gas proxy group.

The 7.75 and -0.440 coefficients were calculated in the same manner as in the regression analysis for my electric proxy group. Using the January 2004 average yield to maturity on A-rated utility bonds of 6.16 percent, the regression equation produces an ex ante risk premium equal to 5.03 percent (7.75 – 0.440 x 6.16 = 5.03)[3].

**Q. What cost of equity do you obtain from your ex ante risk premium method using the proxy group of LDCs?**

A. For the LDC proxy group, my analyses produce an estimated risk premium over the yield on A-rated utility bonds equal to 5.03 percent. Adding an estimated risk premium of 5.03 percent to the 6.16 percent average yield to maturity on A-rated utility bonds produces a cost of equity estimate of 11.19 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 10.84 percent, and using the LDC proxy group, a cost of equity estimate of 11.19 percent. Averaging these estimates produces a cost of equity estimate of 11.02 percent using the ex ante risk premium method.

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[3] Apparent discrepancy due to rounding.

**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 last 66 years. 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 2003. 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 2003 are shown in Schedule JVW-7. The average annual return on an investment in the S&P 500 stock portfolio was 11.42 percent, while the average annual return on an investment in the Moody's A-rated utility bond portfolio was 6.19 percent. The risk premium on the S&P 500 stock portfolio is, therefore, 5.22 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-8, the S&P Utility stock portfolio showed an average annual return of 10.81 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 4.61 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 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 2003. Specifically, the risk premium on the S&P Utilities, 4.61 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, 5.22 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 2003 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 | 0.106 | -0.001 | 0.004 | 1.236 |
| 2 | T Statistic | 2.015 | -1.112 | | |

**TABLE 2**
**REGRESSION OUTPUT FOR RISK PREMIUM ON S&P UTILITIES**

| Line No. | | Intercept | Time | Adjusted R Square | F |
|---|---|---|---|---|---|
| 1 | Coefficient | 0.075 | -0.001 | -0.008 | 0.483 |
| 2 | T Statistic | 1.652 | -0.695 | | |

**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' *2003 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 2003 Yearbook*, page 75.]

**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 7.0 percent risk premium on the S&P 500 versus long-term government bonds. Since the yield on long-term government bonds in January 2004 is approximately 125 basis points less than the yield on A-rated utility bonds, the Ibbotson Associates' data would indicate an approximate 5.75 percent risk premium on the S&P 500 over A-rated utility bonds. As shown in Schedules JVW-7 and

JVW-8, my studies produce a risk premium over A-rated utility bonds in the range of 4.61 percent to 5.22 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 studies provide strong evidence that investors today require an equity return of approximately 4.61 to 5.22 percentage points above the expected yield on A-rated utility bonds. The average interest rate on Moody's seasoned A-rated utility bonds for the three months November 2003 through January 2004 has ranged from 6.16 percent to 6.36 percent. On the basis of this information, I conclude that investors would expect a long-term yield of approximately 6.3 percent on A-rated utility bonds. Adding a 4.6 to 5.2 percentage point risk premium to an expected yield of 6.3 percent on A-rated utility bonds, I obtain an expected cost of equity for Empire using the ex post risk premium method in the range 10.9 to 11.5 percent, with a midpoint of 11.2 percent.

## VIII. Fair Rate of Return on Equity

**Q. Please summarize your findings concerning the average cost of equity for your proxy groups of companies.**

A. My DCF analysis suggests that the average cost of equity for the companies in my proxy group is 9.9 percent. My application of the ex

ante risk premium method produces a cost of equity result equal to 11.0 percent. My application of the ex post risk premium method produces a cost of equity of 11.2 percent. Based on my three recommended methodologies, I conclude that the average cost of equity for the companies in my proxy groups is 10.7 percent.

**Q. Does your 10.7 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 10.7 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. 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 3, my electric proxy company group has an average capital structure containing 41.76 percent debt, 2.37 percent preferred stock, and 55.87 percent common equity. My LDC proxy company group has an average capital structure containing

37.39 percent debt, 0.60 percent preferred equity, and 62.01 percent equity, as shown in Table 4.

**Q. How does the average capital structure of your proxy companies compare to Empire's capital structure at December 31, 2003?**

A. As described in the testimony of Ms. Walters, Empire's capital structure at December 31, 2003, contains 43.89 percent debt, 6.30 percent preferred stock, and 49.81 percent common equity. Thus, Empire's capital structure is more highly leveraged than the average capital structures of my proxy company groups.

**Q. You noted earlier that the cost of equity depends on a company's capital structure. Is there any way to adjust the 10.7% cost of equity for your proxy companies to reflect the higher leverage in Empire's capital structure?**

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 10.71 percent average cost of equity for my proxy groups by recognizing that to attract capital, Empire must have the same weighted average cost of capital as my proxy group. As shown in Table

3, the weighted average cost of capital for my proxy group of electric companies is 7.71 percent. The weighted average cost of capital for my proxy group of LDCs is 8.08 percent, as shown in Table 4. The average cost of capital for both proxy groups is 7.90 percent. As shown in Table 5, Empire would require an 11.27 percent cost of equity in order to have the same weighted average cost of capital as the proxy groups.

**TABLE 3**
**Weighted Average Cost of Capital Electric Proxy Group**

| Line No. | Capital Source | Percent | After-tax Cost Rate | Weighted Cost |
|---|---|---|---|---|
| 1 | Long-term Debt | 41.76% | 3.75% | 1.57% |
| 2 | Preferred Stock | 2.37% | 6.80% | 0.16% |
| 3 | Common Equity | 55.87% | 10.71% | 5.98% |
| 4 | | 100.00% | | 7.71% |

**TABLE 4**
**Weighted Average Cost of Capital LDC Proxy Group**

| Line No. | Capital Source | Percent | After-tax Cost Rate | Weighted Cost |
|---|---|---|---|---|
| 1 | Long-term Debt | 37.39% | 3.75% | 1.40% |
| 2 | Preferred Stock | 0.60% | 6.80% | 0.04% |
| 3 | Common Equity | 62.01% | 10.71% | 6.64% |
| 4 | | 100.00% | | 8.08% |

**TABLE 5**
**Weighted Average Cost of Capital Empire**

| Line No. | Capital Source | Percent | After-tax Cost Rate | Weighted Cost |
|---|---|---|---|---|
| 1 | Long-term Debt | 43.89% | 4.42% | 1.94% |
| 2 | Preferred Stock | 6.30% | 5.44% | 0.34% |
| 3 | Common Equity | 49.81% | 11.27% | 5.62% |
| 4 | | 100.00% | | 7.90% |

**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 11.3 percent.

**Q. Does this conclude your testimony?**

A. Yes, it does.

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| Schedule JVW-1 | Summary of Discounted Cash Flow Analysis for Electric Energy Companies. |
| Schedule JVW-2 | Companies Not Included in Electric Company Discounted Cash Flow Analysis. |
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| Schedule JVW-4 | Moody's Electric Group |
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# LIST OF SCHEDULES AND APPENDICES
# (CONTINUED)

Appendix 1 Derivation of the Quarterly DCF Model

Appendix 2 Risk Premium Method

**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**SCHEDULE JVW-1**
**DISCOUNTED CASH FLOW ANALYSIS FOR ELECTRIC ENERGY COMPANIES**

| Company | Dividend | Price | Growth | Cost of Equity |
|---|---|---|---|---|
| ALLETE | 0.283 | 30.715 | 9.17% | 13.4% |
| Ameren Corp. | 0.635 | 45.185 | 3.00% | 9.0% |
| Avista Corp. | 0.125 | 17.780 | 4.33% | 7.3% |
| Black Hills | 0.310 | 30.752 | 5.57% | 9.9% |
| Cinergy Corp. | 0.470 | 37.367 | 3.80% | 9.1% |
| Consol. Edison | 0.560 | 41.658 | 2.90% | 8.6% |
| Dominion Resources | 0.645 | 61.923 | 5.48% | 10.0% |
| DPL Inc. | 0.240 | 19.897 | 4.33% | 9.5% |
| DTE Energy | 0.515 | 38.015 | 3.87% | 9.7% |
| Duke Energy | 0.275 | 19.330 | 4.02% | 10.2% |
| Energy East Corp. | 0.260 | 22.668 | 4.50% | 9.3% |
| Entergy Corp. | 0.450 | 55.138 | 5.92% | 9.3% |
| FirstEnergy Corp. | 0.375 | 35.112 | 4.33% | 8.9% |
| FPL Group | 0.600 | 64.570 | 4.47% | 8.5% |
| G't Plains Energy | 0.415 | 32.067 | 4.00% | 9.6% |
| Hawaiian Elec. | 0.620 | 47.067 | 2.88% | 8.5% |
| MDU Resources | 0.170 | 23.573 | 7.07% | 10.2% |
| NSTAR | 0.555 | 48.145 | 4.00% | 8.9% |
| OGE Energy | 0.333 | 23.672 | 3.33% | 9.4% |
| Otter Tail Corp. | 0.270 | 26.903 | 5.00% | 9.4% |
| Pinnacle West Capital | 0.450 | 38.968 | 4.17% | 9.0% |
| PPL Corp. | 0.385 | 42.317 | 4.71% | 8.6% |
| Progress Energy | 0.575 | 43.953 | 4.04% | 9.6% |
| Public Serv. Enterprise | 0.540 | 42.397 | 4.27% | 9.8% |
| Southern Co. | 0.350 | 29.650 | 3.94% | 9.0% |
| Vectren Corp. | 0.285 | 24.177 | 6.83% | 12.0% |
| WPS Resources | 0.545 | 45.380 | 4.00% | 9.1% |
| Market Weighted Average | | | | 9.4% |

Notes:

$d_1,d_2,d_3,d_4$ = 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 January 2004 per S&P Stock Guide.

g = I/B/E/S forecast of future earnings growth January 2004.

k = Cost of equity using the quarterly version of the DCF model.

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

**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**SCHEDULE JVW-2**
**ELECTRIC COMPANIES ELIMINATED FROM DISCOUNTED CASH FLOW ANALYSIS**

| Zero or Reduced Dividends | Fewer than 3 I/B/E/S Analysts |
|---|---|
| Allegheny Energy | Aquila Inc. |
| Alliant Energy | Central Vermont Public Service |
| American Electric Power | CH Energy |
| Aquila Inc. | Cleco Corp. |
| Centerpoint Energy | El Paso Electric |
| CMS Energy Corp. | Empire District Electric |
| Constellation | Green Mountain Power |
| Duquesne Light Hldgs | IDACORP |
| Edison International | MGE Energy |
| El Paso Electric | PNM Resources |
| Empire District Electric | UIL Holding Corp. |
| Exelon | Westar Energy |
| IDACORP | |
| NiSource | |
| Northeast Utilities | |
| Pepco Holdings | |
| PG&E | |
| Puget Energy | |
| SCANA | |
| Sempra Energy | |
| Sierra Pacific Resources | |
| TECO | |
| TXU Corp. | |
| Unisource Energy | |
| Westar Energy | |
| Wisconsin Energy | |
| Xcel Energy Inc. | |

**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**SCHEDULE JVW-3**
**DISCOUNTED CASH FLOW ANALYSIS FOR NATURAL GAS DISTRIBUTION COMPANIES**

| Company | Dividend | Price | Growth | Cost of Equity |
|---|---|---|---|---|
| AGL Resources | 0.280 | 28.842 | 4.71% | 8.9% |
| Atmos Energy | 0.305 | 24.723 | 5.67% | 11.0% |
| Energen Corp. | 0.185 | 40.275 | 7.00% | 9.0% |
| Equitable Resources | 0.300 | 42.262 | 9.75% | 12.4% |
| KeySpan Corp. | 0.445 | 35.670 | 5.86% | 11.4% |
| New Jersey Resources | 0.325 | 38.338 | 6.00% | 9.6% |
| NICOR Inc. | 0.465 | 33.453 | 3.83% | 9.8% |
| Northwest Nat. Gas | 0.325 | 30.413 | 4.17% | 8.7% |
| Peoples Energy | 0.530 | 41.175 | 5.00% | 10.6% |
| Southwest Gas | 0.205 | 22.805 | 5.33% | 9.2% |
| UGI Corp. | 0.285 | 32.552 | 6.33% | 10.2% |
| WGL Holdings Inc. | 0.320 | 27.565 | 3.86% | 8.8% |
| Market Weighted Average | | | | 10.4% |

Notes:

| | | |
|---|---|---|
| $d_1,d_2,d_3,d_4$ | = | 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 January 2004 per S&P Stock Guide. |
| g | = | I/B/E/S forecast of future earnings growth January 2004. |
| k | = | Cost of equity using the quarterly version of the DCF model. |

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

**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**SCHEDULE JVW-4**
**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

**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**SCHEDULE JVW-5**
**COMPARISON OF THE DCF EXPECTED RETURN ON AN INVESTMENT IN ELECTRIC ENERGY COMPANIES TO THE INTEREST RATE ON MOODY'S A-RATED UTILITY BONDS**

| Date | DCF | A-Rated Bond Yield | Risk Premium |
|---|---|---|---|
| Sep-99 | 0.11379 | 0.0793 | 0.0345 |
| Oct-99 | 0.11460 | 0.0806 | 0.0340 |
| Nov-99 | 0.1176 | 0.0794 | 0.0382 |
| Dec-99 | 0.1223 | 0.0814 | 0.0409 |
| Jan-00 | 0.1216 | 0.0835 | 0.0381 |
| Feb-00 | 0.1259 | 0.0825 | 0.0434 |
| Mar-00 | 0.1298 | 0.0828 | 0.0470 |
| Apr-00 | 0.1225 | 0.0829 | 0.0396 |
| May-00 | 0.1210 | 0.0870 | 0.0340 |
| Jun-00 | 0.1234 | 0.0836 | 0.0398 |
| Jul-00 | 0.1244 | 0.0825 | 0.0419 |
| Aug-00 | 0.1218 | 0.0813 | 0.0405 |
| Sep-00 | 0.1154 | 0.0823 | 0.0331 |
| Oct-00 | 0.1156 | 0.0814 | 0.0342 |
| Nov-00 | 0.1162 | 0.0811 | 0.0351 |
| Dec-00 | 0.1145 | 0.0784 | 0.0361 |
| Jan-01 | 0.1179 | 0.0780 | 0.0399 |
| Feb-01 | 0.1185 | 0.0774 | 0.0411 |
| Mar-01 | 0.1190 | 0.0768 | 0.0422 |
| Apr-01 | 0.1254 | 0.0794 | 0.0460 |
| May-01 | 0.1280 | 0.0799 | 0.0481 |
| Jun-01 | 0.1291 | 0.0785 | 0.0506 |
| Jul-01 | 0.1304 | 0.0778 | 0.0526 |
| Aug-01 | 0.1307 | 0.0759 | 0.0548 |
| Sep-01 | 0.1328 | 0.0775 | 0.0553 |
| Oct-01 | 0.1327 | 0.0763 | 0.0564 |
| Nov-01 | 0.1331 | 0.0757 | 0.0574 |
| Dec-01 | 0.1325 | 0.0783 | 0.0542 |
| Jan-02 | 0.1305 | 0.0766 | 0.0539 |
| Feb-02 | 0.1319 | 0.0754 | 0.0565 |
| Mar-02 | 0.1279 | 0.0776 | 0.0503 |
| Apr-02 | 0.1241 | 0.0757 | 0.0484 |
| May-02 | 0.1249 | 0.0752 | 0.0497 |
| Jun-02 | 0.1246 | 0.0741 | 0.0505 |
| Jul-02 | 0.1332 | 0.0731 | 0.0601 |
| Aug-02 | 0.1282 | 0.0717 | 0.0565 |
| Sep-02 | 0.1290 | 0.0708 | 0.0582 |
| Oct-02 | 0.1297 | 0.0723 | 0.0574 |
| Nov-02 | 0.1243 | 0.0714 | 0.0529 |
| Dec-02 | 0.1208 | 0.0707 | 0.0501 |

| Date | DCF | A-Rated Bond Yield | Risk Premium |
|---|---|---|---|
| Jan-03 | 0.1168 | 0.0706 | 0.0462 |
| Feb-03 | 0.1208 | 0.0693 | 0.0515 |
| Mar-03 | 0.1160 | 0.0679 | 0.0481 |
| Apr-03 | 0.1121 | 0.0664 | 0.0457 |
| May-03 | 0.1060 | 0.0636 | 0.0424 |
| Jun-03 | 0.1015 | 0.0621 | 0.0394 |
| Jul-03 | 0.1023 | 0.0667 | 0.0356 |
| Aug-03 | 0.1024 | 0.0679 | 0.0345 |
| Sep-03 | 0.0993 | 0.0656 | 0.0337 |
| Oct-03 | 0.0977 | 0.0643 | 0.0334 |
| Nov-03 | 0.0962 | 0.0636 | 0.0326 |
| Dec-03 | 0.0934 | 0.0627 | 0.0307 |
| Jan-04 | 0.0905 | 0.0616 | 0.0289 |
| Average | 0.1195 | 0.0751 | 0.0445 |

Notes: Utility bond yield information from *Mergent Bond Record* (formerly Moody's). 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 S&P Stock Guide
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.

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

**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**SCHEDULE JVW-6**
**COMPARISON OF THE DCF EXPECTED RETURN**
**ON AN INVESTMENT IN NATURAL GAS DISTRIBUTION COMPANIES TO THE INTEREST RATE ON MOODY'S A-RATED UTILITY BONDS**

| Date | DCF | A-Rated Bond Yield | Risk Premium |
|---|---|---|---|
| June-98 | 0.1081 | 0.0703 | 0.0378 |
| July-98 | 0.1105 | 0.0703 | 0.0402 |
| August-98 | 0.1176 | 0.0700 | 0.0476 |
| September-98 | 0.1229 | 0.0693 | 0.0536 |
| October-98 | 0.1229 | 0.0696 | 0.0533 |
| November-98 | 0.1171 | 0.0703 | 0.0468 |
| December-98 | 0.1133 | 0.0691 | 0.0442 |
| January-99 | 0.1148 | 0.0697 | 0.0451 |
| February-99 | 0.1189 | 0.0709 | 0.0480 |
| March-99 | 0.1215 | 0.0726 | 0.0489 |
| April-99 | 0.1221 | 0.0722 | 0.0499 |
| May-99 | 0.1193 | 0.0747 | 0.0446 |
| June-99 | 0.1185 | 0.0774 | 0.0411 |
| July-99 | 0.1197 | 0.0771 | 0.0426 |
| August-99 | 0.1194 | 0.0791 | 0.0403 |
| September-99 | 0.1200 | 0.0793 | 0.0407 |
| October-99 | 0.1213 | 0.0806 | 0.0407 |
| November-99 | 0.1229 | 0.0794 | 0.0435 |
| December-99 | 0.1269 | 0.0814 | 0.0455 |
| January-00 | 0.1291 | 0.0835 | 0.0456 |
| February-00 | 0.1335 | 0.0825 | 0.0510 |
| March-00 | 0.1321 | 0.0828 | 0.0493 |
| April-00 | 0.1298 | 0.0829 | 0.0469 |
| May-00 | 0.1269 | 0.0870 | 0.0399 |
| June-00 | 0.1268 | 0.0836 | 0.0432 |
| July-00 | 0.1293 | 0.0825 | 0.0468 |
| August-00 | 0.1268 | 0.0813 | 0.0455 |
| September-00 | 0.1240 | 0.0823 | 0.0417 |
| October-00 | 0.1244 | 0.0814 | 0.0430 |
| November-00 | 0.1220 | 0.0811 | 0.0409 |
| December-00 | 0.1202 | 0.0784 | 0.0418 |
| January-01 | 0.1224 | 0.0780 | 0.0444 |
| February-01 | 0.1233 | 0.0774 | 0.0459 |
| March-01 | 0.1246 | 0.0768 | 0.0478 |
| April-01 | 0.1218 | 0.0794 | 0.0424 |
| May-01 | 0.1285 | 0.0799 | 0.0486 |
| June-01 | 0.1290 | 0.0785 | 0.0505 |
| July-01 | 0.1313 | 0.0778 | 0.0535 |
| August-01 | 0.1314 | 0.0759 | 0.0555 |
| September-01 | 0.1218 | 0.0775 | 0.0443 |
| October-01 | 0.1230 | 0.0763 | 0.0467 |

| Date | DCF | A-Rated Bond Yield | Risk Premium |
|---|---|---|---|
| November-01 | 0.1237 | 0.0757 | 0.0480 |
| December-01 | 0.1218 | 0.0783 | 0.0435 |
| January-02 | 0.1196 | 0.0766 | 0.0430 |
| February-02 | 0.1202 | 0.0754 | 0.0448 |
| March-02 | 0.1140 | 0.0776 | 0.0364 |
| April-02 | 0.1106 | 0.0757 | 0.0349 |
| May-02 | 0.1105 | 0.0752 | 0.0353 |
| June-02 | 0.1113 | 0.0741 | 0.0372 |
| July-02 | 0.1189 | 0.0731 | 0.0458 |
| August-02 | 0.1178 | 0.0717 | 0.0461 |
| September-02 | 0.1216 | 0.0708 | 0.0508 |
| October-02 | 0.1199 | 0.0723 | 0.0476 |
| November-02 | 0.1166 | 0.0714 | 0.0452 |
| December-02 | 0.1163 | 0.0707 | 0.0456 |
| January-03 | 0.1167 | 0.0706 | 0.0461 |
| February-03 | 0.1182 | 0.0693 | 0.0489 |
| March-03 | 0.1155 | 0.0679 | 0.0476 |
| April-03 | 0.1130 | 0.0664 | 0.0466 |
| May-03 | 0.1085 | 0.0636 | 0.0449 |
| June-03 | 0.1076 | 0.0621 | 0.0455 |
| July-03 | 0.1077 | 0.0667 | 0.0410 |
| August-03 | 0.1086 | 0.0679 | 0.0407 |
| September-03 | 0.1072 | 0.0656 | 0.0416 |
| October-03 | 0.1069 | 0.0643 | 0.0426 |
| November-03 | 0.1035 | 0.0636 | 0.0399 |
| December-03 | 0.1016 | 0.0627 | 0.0389 |
| January-04 | 0.1009 | 0.0616 | 0.0393 |
| Average | 0.1191 | 0.0744 | 0.0447 |

Notes: Utility bond yield information from *Mergent Bond Record* (formerly Moody's). 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 *S&P Stock Guide*
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.

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

**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**SCHEDULE JVW-7**
**COMPARATIVE RETURNS ON S&P 500 STOCK INDEX**
**AND MOODY'S A-RATED BONDS 1937—2003**

| Line No. | Year | Stock Price | Stock Dividend Yield | Stock Return | Bond Price | Bond Return |
|---|---|---|---|---|---|---|
| 1 | 2003 | 895.84 | | | 62.26 | |
| 2 | 2002 | 1,140.21 | 0.0180 | -20.05% | 57.44 | 15.35% |
| 3 | 2001 | 1,335.63 | 0.0116 | -13.47% | 56.40 | 8.93% |
| 4 | 2000 | 1,425.59 | 0.0118 | -5.13% | 52.60 | 14.82% |
| 5 | 1999 | 1,248.77 | 0.0130 | 15.45% | 63.03 | -10.20% |
| 6 | 1998 | 963.35 | 0.0162 | 31.25% | 62.43 | 7.38% |
| 7 | 1997 | 766.22 | 0.0195 | 27.68% | 56.62 | 17.32% |
| 8 | 1996 | 614.42 | 0.0231 | 27.02% | 60.91 | -0.48% |
| 9 | 1995 | 465.25 | 0.0287 | 34.93% | 50.22 | 29.26% |
| 10 | 1994 | 472.99 | 0.0269 | 1.05% | 60.01 | -9.65% |
| 11 | 1993 | 435.23 | 0.0288 | 11.56% | 53.13 | 20.48% |
| 12 | 1992 | 416.08 | 0.0290 | 7.50% | 49.56 | 15.27% |
| 13 | 1991 | 325.49 | 0.0382 | 31.65% | 44.84 | 19.44% |
| 14 | 1990 | 339.97 | 0.0341 | -0.85% | 45.60 | 7.11% |
| 15 | 1989 | 285.41 | 0.0364 | 22.76% | 43.06 | 15.18% |
| 16 | 1988 | 250.48 | 0.0366 | 17.61% | 40.10 | 17.36% |
| 17 | 1987 | 264.51 | 0.0317 | -2.13% | 48.92 | -9.84% |
| 18 | 1986 | 208.19 | 0.0390 | 30.95% | 39.98 | 32.36% |
| 19 | 1985 | 171.61 | 0.0451 | 25.83% | 32.57 | 35.05% |
| 20 | 1984 | 166.39 | 0.0427 | 7.41% | 31.49 | 16.12% |
| 21 | 1983 | 144.27 | 0.0479 | 20.12% | 29.41 | 20.65% |
| 22 | 1982 | 117.28 | 0.0595 | 28.96% | 24.48 | 36.48% |
| 23 | 1981 | 132.97 | 0.0480 | -7.00% | 29.37 | -3.01% |
| 24 | 1980 | 110.87 | 0.0541 | 25.34% | 34.69 | -3.81% |
| 25 | 1979 | 99.71 | 0.0533 | 16.52% | 43.91 | -11.89% |
| 26 | 1978 | 90.25 | 0.0532 | 15.80% | 49.09 | -2.40% |
| 27 | 1977 | 103.80 | 0.0399 | -9.06% | 50.95 | 4.20% |
| 28 | 1976 | 96.86 | 0.0380 | 10.96% | 43.91 | 25.13% |
| 29 | 1975 | 72.56 | 0.0507 | 38.56% | 41.76 | 14.75% |
| 30 | 1974 | 96.11 | 0.0364 | -20.86% | 52.54 | -12.91% |
| 31 | 1973 | 118.40 | 0.0269 | -16.14% | 58.51 | -3.37% |
| 32 | 1972 | 103.30 | 0.0296 | 17.58% | 56.47 | 10.69% |
| 33 | 1971 | 93.49 | 0.0332 | 13.81% | 53.93 | 12.13% |
| 34 | 1970 | 90.31 | 0.0356 | 7.08% | 50.46 | 14.81% |
| 35 | 1969 | 102.00 | 0.0306 | -8.40% | 62.43 | -12.76% |
| 36 | 1968 | 95.04 | 0.0313 | 10.45% | 66.97 | -0.81% |
| 37 | 1967 | 84.45 | 0.0351 | 16.05% | 78.69 | -9.81% |
| 38 | 1966 | 93.32 | 0.0302 | -6.48% | 86.57 | -4.48% |
| 39 | 1965 | 86.12 | 0.0299 | 11.35% | 91.40 | -0.91% |
| 40 | 1964 | 76.45 | 0.0305 | 15.70% | 92.01 | 3.68% |
| 41 | 1963 | 65.06 | 0.0331 | 20.82% | 93.56 | 2.61% |
| 42 | 1962 | 69.07 | 0.0297 | -2.84% | 89.60 | 8.89% |
| 43 | 1961 | 59.72 | 0.0328 | 18.94% | 89.74 | 4.29% |
| 44 | 1960 | 58.03 | 0.0327 | 6.18% | 84.36 | 11.13% |
| 45 | 1959 | 55.62 | 0.0324 | 7.57% | 91.55 | -3.49% |

| Line No. | Year | Stock Price | Stock Dividend Yield | Stock Return | Bond Price | Bond Return |
|---|---|---|---|---|---|---|
| 46 | 1958 | 41.12 | 0.0448 | 39.74% | 101.22 | -5.60% |
| 47 | 1957 | 45.43 | 0.0431 | -5.18% | 100.70 | 4.49% |
| 48 | 1956 | 44.15 | 0.0424 | 7.14% | 113.00 | -7.35% |
| 49 | 1955 | 35.60 | 0.0438 | 28.40% | 116.77 | 0.20% |
| 50 | 1954 | 25.46 | 0.0569 | 45.52% | 112.79 | 7.07% |
| 51 | 1953 | 26.18 | 0.0545 | 2.70% | 114.24 | 2.24% |
| 52 | 1952 | 24.19 | 0.0582 | 14.05% | 113.41 | 4.26% |
| 53 | 1951 | 21.21 | 0.0634 | 20.39% | 123.44 | -4.89% |
| 54 | 1950 | 16.88 | 0.0665 | 32.30% | 125.08 | 1.89% |
| 55 | 1949 | 15.36 | 0.0620 | 16.10% | 119.82 | 7.72% |
| 56 | 1948 | 14.83 | 0.0571 | 9.28% | 118.50 | 4.49% |
| 57 | 1947 | 15.21 | 0.0449 | 1.99% | 126.02 | -2.79% |
| 58 | 1946 | 18.02 | 0.0356 | -12.03% | 126.74 | 2.59% |
| 59 | 1945 | 13.49 | 0.0460 | 38.18% | 119.82 | 9.11% |
| 60 | 1944 | 11.85 | 0.0495 | 18.79% | 119.82 | 3.34% |
| 61 | 1943 | 10.09 | 0.0554 | 22.98% | 118.50 | 4.49% |
| 62 | 1942 | 8.93 | 0.0788 | 20.87% | 117.63 | 4.14% |
| 63 | 1941 | 10.55 | 0.0638 | -8.98% | 116.34 | 4.55% |
| 64 | 1940 | 12.30 | 0.0458 | -9.65% | 112.39 | 7.08% |
| 65 | 1939 | 12.50 | 0.0349 | 1.89% | 105.75 | 10.05% |
| 66 | 1938 | 11.31 | 0.0784 | 18.36% | 99.83 | 9.94% |
| 67 | 1937 | 17.59 | 0.0434 | -31.36% | 103.18 | 0.63% |
| 68 | Return | | | 11.42% | | 6.19% |
| 69 | Risk Premium | | | 5.22% | | |

Note: See Appendix 2 for an explanation of how stock and bond returns are derived and the source of the data presented.

**THE EMPIRE DISTRICT ELECTRIC COMPANY**
**SCHEDULE JVW-8**
**COMPARATIVE RETURNS ON S&P UTILITY STOCK INDEX**
**AND MOODY'S A-RATED BONDS 1937—2003**

| Line No. | Year | Stock Price | Stock Dividend Yield | Stock Return | Bond Price | Bond Return |
|---|---|---|---|---|---|---|
| 1 | 2003 | 160.67 | | | 62.26 | |
| 2 | 2002 | 142.14 | 0.0475 | 17.79% | | |
| 3 | 2002 | 243.79 | | | 57.44 | 15.35% |
| 4 | 2001 | 307.70 | 0.0287 | -17.90% | 56.40 | 8.93% |
| 5 | 2000 | 239.17 | 0.0413 | 32.78% | 52.60 | 14.82% |
| 6 | 1999 | 253.52 | 0.0394 | -1.72% | 63.03 | -10.20% |
| 7 | 1998 | 228.61 | 0.0457 | 15.47% | 62.43 | 7.38% |
| 8 | 1997 | 201.14 | 0.0492 | 18.58% | 56.62 | 17.32% |
| 9 | 1996 | 202.57 | 0.0454 | 3.83% | 60.91 | -0.48% |
| 10 | 1995 | 153.87 | 0.0584 | 37.49% | 50.22 | 29.26% |
| 11 | 1994 | 168.70 | 0.0496 | -3.83% | 60.01 | -9.65% |
| 12 | 1993 | 159.79 | 0.0537 | 10.95% | 53.13 | 20.48% |
| 13 | 1992 | 149.70 | 0.0572 | 12.46% | 49.56 | 15.27% |
| 14 | 1991 | 138.38 | 0.0607 | 14.25% | 44.84 | 19.44% |
| 15 | 1990 | 146.04 | 0.0558 | 0.33% | 45.60 | 7.11% |
| 16 | 1989 | 114.37 | 0.0699 | 34.68% | 43.06 | 15.18% |
| 17 | 1988 | 106.13 | 0.0704 | 14.80% | 40.10 | 17.36% |
| 18 | 1987 | 120.09 | 0.0588 | -5.74% | 48.92 | -9.84% |
| 19 | 1986 | 92.06 | 0.0742 | 37.87% | 39.98 | 32.36% |
| 20 | 1985 | 75.83 | 0.086 | 30.00% | 32.57 | 35.05% |
| 21 | 1984 | 68.50 | 0.0925 | 19.95% | 31.49 | 16.12% |
| 22 | 1983 | 61.89 | 0.0948 | 20.16% | 29.41 | 20.65% |
| 23 | 1982 | 51.81 | 0.1074 | 30.20% | 24.48 | 36.48% |
| 24 | 1981 | 52.01 | 0.0978 | 9.40% | 29.37 | -3.01% |
| 25 | 1980 | 50.26 | 0.0953 | 13.01% | 34.69 | -3.81% |
| 26 | 1979 | 50.33 | 0.0893 | 8.79% | 43.91 | -11.89% |
| 27 | 1978 | 52.40 | 0.0791 | 3.96% | 49.09 | -2.40% |
| 28 | 1977 | 54.01 | 0.0714 | 4.16% | 50.95 | 4.20% |
| 29 | 1976 | 46.99 | 0.0776 | 22.70% | 43.91 | 25.13% |
| 30 | 1975 | 38.19 | 0.092 | 32.24% | 41.76 | 14.75% |
| 31 | 1974 | 48.60 | 0.0713 | -14.29% | 52.54 | -12.91% |
| 32 | 1973 | 60.01 | 0.0556 | -13.45% | 58.51 | -3.37% |
| 33 | 1972 | 60.19 | 0.0542 | 5.12% | 56.47 | 10.69% |
| 34 | 1971 | 63.43 | 0.0504 | -0.07% | 53.93 | 12.13% |
| 35 | 1970 | 55.72 | 0.0561 | 19.45% | 50.46 | 14.81% |
| 36 | 1969 | 68.65 | 0.0445 | -14.38% | 62.43 | -12.76% |
| 37 | 1968 | 68.02 | 0.0435 | 5.28% | 66.97 | -0.81% |
| 38 | 1967 | 70.63 | 0.0392 | 0.22% | 78.69 | -9.81% |
| 39 | 1966 | 74.50 | 0.0347 | -1.72% | 86.57 | -4.48% |
| 40 | 1965 | 75.87 | 0.0315 | 1.34% | 91.40 | -0.91% |
| 41 | 1964 | 67.26 | 0.0331 | 16.11% | 92.01 | 3.68% |
| 42 | 1963 | 63.35 | 0.033 | 9.47% | 93.56 | 2.61% |
| 43 | 1962 | 62.69 | 0.032 | 4.25% | 89.60 | 8.89% |
| 44 | 1961 | 52.73 | 0.0358 | 22.47% | 89.74 | 4.29% |
| 45 | 1960 | 44.50 | 0.0403 | 22.52% | 84.36 | 11.13% |

| Line No. | Year | Stock Price | Stock Dividend Yield | Stock Return | Bond Price | Bond Return |
|---|---|---|---|---|---|---|
| 46 | 1959 | 43.96 | 0.0377 | 5.00% | 91.55 | -3.49% |
| 47 | 1958 | 33.30 | 0.0487 | 36.88% | 101.22 | -5.60% |
| 48 | 1957 | 32.32 | 0.0487 | 7.90% | 100.70 | 4.49% |
| 49 | 1956 | 31.55 | 0.0472 | 7.16% | 113.00 | -7.35% |
| 50 | 1955 | 29.89 | 0.0461 | 10.16% | 116.77 | 0.20% |
| 51 | 1954 | 25.51 | 0.052 | 22.37% | 112.79 | 7.07% |
| 52 | 1953 | 24.41 | 0.0511 | 9.62% | 114.24 | 2.24% |
| 53 | 1952 | 22.22 | 0.055 | 15.36% | 113.41 | 4.26% |
| 54 | 1951 | 20.01 | 0.0606 | 17.10% | 123.44 | -4.89% |
| 55 | 1950 | 20.20 | 0.0554 | 4.60% | 125.08 | 1.89% |
| 56 | 1949 | 16.54 | 0.057 | 27.83% | 119.82 | 7.72% |
| 57 | 1948 | 16.53 | 0.0535 | 5.41% | 118.50 | 4.49% |
| 58 | 1947 | 19.21 | 0.0354 | -10.41% | 126.02 | -2.79% |
| 59 | 1946 | 21.34 | 0.0298 | -7.00% | 126.74 | 2.59% |
| 60 | 1945 | 13.91 | 0.0448 | 57.89% | 119.82 | 9.11% |
| 61 | 1944 | 12.10 | 0.0569 | 20.65% | 119.82 | 3.34% |
| 62 | 1943 | 9.22 | 0.0621 | 37.45% | 118.50 | 4.49% |
| 63 | 1942 | 8.54 | 0.094 | 17.36% | 117.63 | 4.14% |
| 64 | 1941 | 13.25 | 0.0717 | -28.38% | 116.34 | 4.55% |
| 65 | 1940 | 16.97 | 0.054 | -16.52% | 112.39 | 7.08% |
| 66 | 1939 | 16.05 | 0.0553 | 11.26% | 105.75 | 10.05% |
| 67 | 1938 | 14.30 | 0.073 | 19.54% | 99.83 | 9.94% |
| 68 | 1937 | 24.34 | 0.0432 | -36.93% | 103.18 | 0.63% |
| 69 | Return | | | 10.81% | | 6.19% |
| 70 | Risk Premium | | | 4.61% | | |

Note: See Appendix 2 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.

# THE 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, $3 \times 2$, $3 \times 2^2$, $3 \times 2^3$, 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 $a \div (1-r)$. 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

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

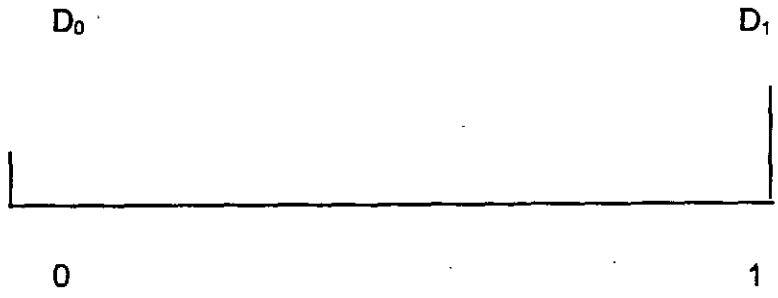
as we suggested earlier.

## Quarterly DCF Model

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

Figure 1

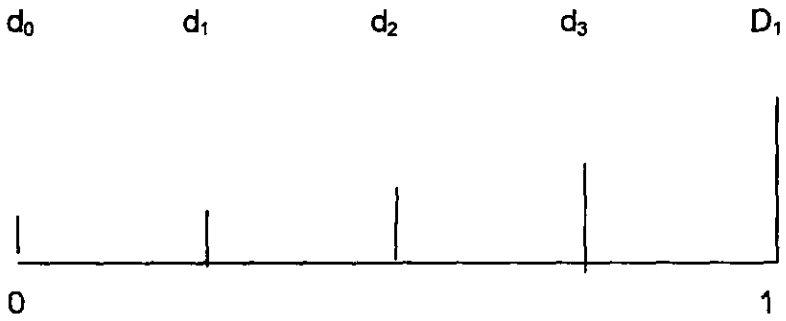
Annual DCF Model




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

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 $k > g$, 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

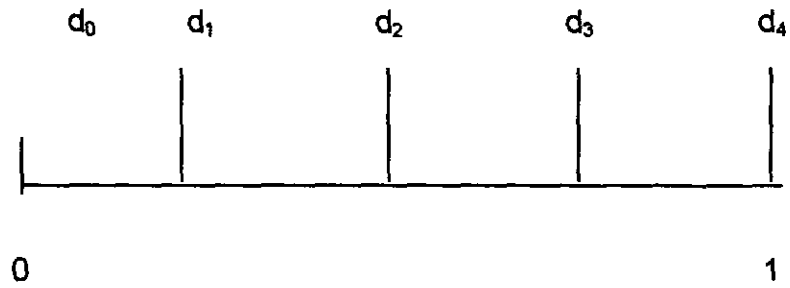
Although the constant growth Quarterly DCF Model [equation (8)] allows for the quarterly timing of dividend payments, it does require the assumption that the firm increases its dividend payments each quarter. Since this assumption is difficult for some analysts to accept, we now discuss a second Quarterly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

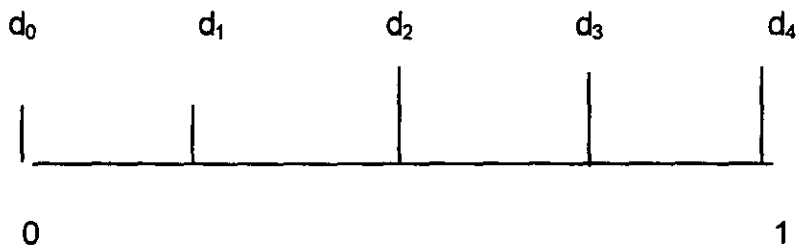
## Quarterly DCF Model (Constant Dividend Version)

### Case 1




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

### Case 2

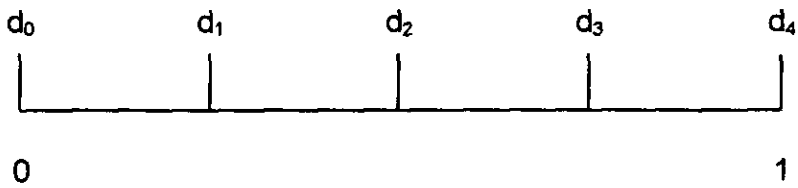



$$d_1 = d_0$$

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

**Figure 3 (continued)**

**Case 3**

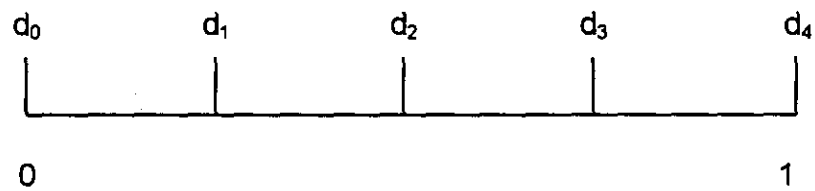



Year

$d_1 = {}_{d2} = d_0$

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

**Case 4**




Year

$d_1 = d_2 = d_3 = d_0$

$d_4 = d_0(1+g)$

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

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

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

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

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.

# THE EMPIRE DISTRICT ELECTRIC COMPANY
# APPENDIX 2
# RISK PREMIUM METHOD

**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 Schedule JVW-7 and Schedule JVW-8 are the January values of the respective indices.

**Calculation of Stock and Bond Returns**

Sample calculation of "Stock Return" column:

$$\text{Stock Return (2000)} = \left[\frac{\text{Stock Price (2001)} - \text{Stock Price (2000)} + \text{Dividend (2000)}}{\text{Stock Price (2000)}}\right]$$

where Dividend (2000) = Stock Price (2000) x Stock Div. Yield (2000)

Sample calculation of "Bond Return" column:

$$\text{Bond Return (2000)} = \left[\frac{\text{Bond Price (2001)} - \text{Bond Price (2000)} + \text{Interest (2000)}}{\text{Bond Price (2000)}}\right]$$

where Interest = $4.00.