COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

Investigation by the Department on its own Motion into the Appropriate Pricing, based upon Total Element Long-Run Incremental Costs, for Unbundled Network Elements and Combinations of Unbundled Network Elements, and the Appropriate Avoided Cost Discount for Verizon New England Inc. d/b/a Verizon Massachusetts' Resale Services.	**D.T.E. 01-20**

DIRECT TESTIMONY OF DR. JAMES H. VANDER WEIDE
ON BEHALF OF VERIZON NEW ENGLAND INC.
D/B/A VERIZON MASSACHUSETTS

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DIRECT TESTIMONY OF DR. JAMES H. VANDER WEIDE

I. INTRODUCTION

Q. What is 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 clients in the electric, gas, insurance, telecommunications, and water industries. My business address is 3606 Stoneybrook Drive, Durham, North Carolina.

Q. Would you please describe your educational background and prior academic experience?

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

I have conducted seminars and training sessions on financial analysis, financial strategy, cost of capital, cash management, depreciation policies, and short-run financial planning for a wide variety of U.S. and international companies, including ABB, Allstate, Ameritech, AT&T, Bell Atlantic, BellSouth, Carolina Power & Light, Contel, Fisons, Glaxo Wellcome, GTE, Lafarge, MidAmerican Energy, New Century Energies, Norfolk Southern, Pacific Bell Telephone, 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, and cash management. My articles have been published in *American Economic Review, Financial Management, International Journal of Industrial Organization, 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 some 300 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 39 states, and the insurance commissions of five states. With respect to implementation of the Telecommunications Act of 1996, I have testified in 26 states, including Massachusetts, on issues relating to the pricing of unbundled network elements and universal service cost studies, and have consulted with Bell Canada, Deutsche Telekom, and Telefónica on similar issues.

Q. What is the purpose of your testimony?

A. Verizon New England Inc., d/b/a Verizon Massachusetts ("Verizon MA") asked me to make an independent appraisal of the appropriate weighted average cost of capital to be used in Verizon MA's studies of the forward-looking cost of providing interconnection and unbundled network elements. On the basis of that appraisal, Verizon MA asked me to determine whether the 12.6 percent weighted average cost of capital Verizon MA used in its cost studies is "forward-looking" as required by the relevant FCC rules. I conclude that a 12.6 percent weighted average cost of capital is a conservative estimate of the forward-looking cost of capital required by the FCC's rules. This conclusion is based on my independent analysis of the forward-looking cost of capital, which yields a 12.95 percent weighted average cost.

Q. Please summarize the applicable FCC rules.

A. FCC Rule 51.505(b)(2) provides that a "forward-looking cost of capital shall be used in calculating the total element long-run incremental cost of an element." Forward-looking costs are the costs "that a carrier would incur in the future," and do not include embedded or historical costs. (First Report and Order, *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996* ("LCO"), at paras. 683, 704).

Q. Does your independent analysis reflect the FCC's rules?

A. As discussed in detail below, I calculated the forward-looking cost of capital using a forward-looking cost of debt, forward-looking cost of equity, and forward-looking capital structure. In doing so, I did <u>not</u> consider Verizon's embedded, historical or accounting costs, nor did I consider Verizon's embedded or "book" capital structure.

Please note that although my 12.95 percent weighted cost of capital is forward-looking, it does not reflect the forward-looking assumptions the FCC rules require when calculating other costs, such as the incremental cost of investments. Specifically, the FCC rules governing TELRIC studies assume that a carrier constructs a ubiquitous, efficient network based on the incumbent's existing wire center locations. (LCO at paras. 685, 690). In my opinion, the cost of capital for such a carrier would be significantly higher than the 12.95 percent cost of capital produced by my study. In contrast, my cost of capital reflects, in part, the forward-looking cost of established companies that operate in the real world.

II. FUNDAMENTAL ECONOMIC PRINCIPLES

Q. Has the FCC determined what economic principles should be used in setting rates for unbundled network elements?

A. Yes. The FCC determined the basic economic principles for setting rates for unbundled network elements in its *First Report and Order In the*

Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 (“LCO”).

Q. Are you familiar with the LCO?

A. Yes, I am.

Q. Does the LCO specify a cost standard for use in unbundled network element cost studies?

A. Yes. The FCC specifically states that unbundled network element cost studies should be based on forward-looking economic costs, not embedded or accounting costs.

Q. Why does the FCC specifically reject the use of embedded or accounting costs in unbundled network element cost studies?

A. The FCC rejects the use of embedded or accounting costs in unbundled network element cost studies because it believes that embedded or accounting costs are irrelevant to companies operating in competitive markets. In particular, embedded or accounting costs depend on accounting rules and conventions rather than economic criteria, are based on historical costs, and are inherently historically oriented rather than forward looking.

Q. Why does the FCC specify that studies of the cost of interconnection and unbundled network elements should be based on forward-looking economic costs?

A. The FCC specifies that studies of the cost of interconnection and unbundled network elements should be based on forward-looking economic costs because the FCC believes those are the relevant costs that guide decision makers in a competitive marketplace. At ¶ 679 of the LCO, the FCC states,

> Adopting a pricing methodology based on forward-looking, economic costs best replicates, to the extent possible, the conditions of a competitive market…*Because a pricing methodology based on forward-looking costs simulates the conditions in a competitive marketplace*, it allows the requesting carrier to produce efficiently and to compete effectively, which should drive retail prices to their competitive levels. [Emphasis added]

And at ¶ 738, the FCC states,

> In this proceeding, we are establishing pricing rules that should produce rates for monopoly elements and services *that approximate what the incumbent LEC would be able to charge if there were a competitive market for such offerings*. [Emphasis added.]

Q. Are you also familiar with the FCC's Order approving Verizon MA's application to offer long distance service in Massachusetts? (Memorandum, Opinion, and Order in CC Docket No. 01-9, FCC 01-130, adopted April 16, 2001 (the "271 Order"))?

A. Yes, I am.

Q. Does the FCC's 271 Order continue to support its opinion in the LCO that the use of forward-looking economic costs "simulates the conditions in a competitive marketplace"?

A. Yes. At ¶ 42 of its 271 Order, the Commission reiterates that it has:

> determined that new entrants "should make their decisions whether to purchase unbundled elements…based on the relative economic costs of these options," and that such competitors would not be able to make such decisions "efficiently" unless the BOC was offering UNEs based on forward-looking economic costs. The Commission equated "efficient entry" with the availability of UNEs at forward-looking economic costs, which "replicates…the conditions of a competitive market." "Efficient entry" simply means that competitors seeking entry will face the same sorts of costs they would face in a fully competitive market, that is, TELRIC-based UNE rates.

Q. Does the cost of capital play any role in the FCC's guidelines for forward-looking cost studies?

A. Yes. As noted above, the FCC requires that unbundled network element cost studies be based on the forward-looking economic cost of providing interconnection and unbundled network elements. The forward-looking economic cost of providing interconnection and unbundled network elements includes both capital costs and expenses. The capital costs, in turn, include three elements: the LEC's incremental investment in the telecommunications facilities required to provide interconnection or unbundled network elements; the economic depreciation on these facilities; and the required rate of return, or cost of capital, associated with these facilities.

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 the building of telecommunications network facilities?

A. Economists define the required rate of return on a particular investment as the return that investors forego by making that investment instead of an alternative investment of equal 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 or equal to 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. 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 expected rate of return on an investment in a company must exceed the cost of capital before investors will be willing to invest in that company.

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 weighted average cost of capital?

A. The overall or weighted 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 9 percent, the cost of equity is 15 percent, and the percentages of debt and equity in the firm's capital structure are 25 percent and 75 percent, respectively. Then the weighted average cost of capital is expressed by 0.25 times 9 percent plus 0.75 times 15 percent, or 13.5 percent.

Q. How do economists define the cost of debt component of the weighted average cost of capital?

A. Economists define the cost of debt as the market interest rate that a firm would have to pay on newly-issued debt obligations. In efficient markets, the market interest rate is also the best estimate of future interest rates. The correct economic definition of the cost of debt is thus forward looking and market oriented.

Q. How do economists define the cost of equity component of the weighted average cost of capital?

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. There is agreement, however, as I have already noted, 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. What approaches do economists employ to obtain numerical estimates of the cost of equity?

A. Economists generally use market models such as the Discounted Cash Flow ("DCF") Model to estimate a firm's cost of equity. The DCF Model is based on the assumption that the market price of a firm's stock is equal to the present value of the stream of cash flows that investors expect to receive from owning the stock. The cost of equity in the DCF Model is that discount rate that equates the firm's stock price to the present value of the future stream of cash flows investors expect from owning the stock.

Q. How do economists measure the percentages of debt and equity in a firm's capital structure?

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

Q. Why do economists measure a firm's capital structure in terms of the market values of its debt and equity?

A. Economists measure a firm's capital structure in terms of the market values of its debt and equity because that is the best measure of the amounts of debt and equity that investors have invested in the company on a going-forward basis. Furthermore, economists generally assume that the goal of management is to maximize the value of the firm, where the value of the firm is the sum of the market value of the firm's debt and equity. Only by measuring a firm's capital structure in terms of market values can its managers choose a financing strategy that maximizes the value of the firm.

Q. Is the economic definition of the cost of capital, which focuses on the market values of debt and equity, widely accepted by capital market participants?

A. Yes. Homeowners measure the value of their homes in terms of market values, not historical cost or book values. Investors measure the return and risk on their portfolios in terms of market values, not book values. Companies use a market value definition of the cost of capital to make entry, investment, and innovation decisions.

Q. How do investors measure the rate of return on their investment portfolios?

A. Investors, like economists, measure the rate of return on their investment portfolios in terms of the market values of the debt and equity in their portfolios. Suppose an investor has a portfolio that has a market value of $100,000 at the beginning of 2000. Further suppose that the value of the portfolio at the end of 2000 is $112,000, and that the investor earns interest and dividends of $3,000 during the course of 2000. Then the investor's rate of return in 2000 is 15 percent [(112 – 100)/100 + 3/100 =

15 percent]. In making this calculation, I assumed that dividends and interest were not reinvested in the portfolio during the year.

Q. Suppose the investor in your previous example purchased his portfolio in 1980 at a cost of $20,000. Does the historical cost of investment in 1980 have any effect on either the investor's earned or required rate of return in 2000?

A. No. The fact that the investor purchased the portfolio in 1980 for $20,000 has no bearing on either the investor's earned or required rate of return in 2000. Thus, the historical or embedded cost of the investment is irrelevant to the calculation of the rate of return. Investors calculate their rate of return based on market values, not book values.

Q. Your example clearly demonstrates that the investor's earned rate of return in 2000 depends on the $100,000 market value of the portfolio at the beginning of 2000, not on the $20,000 historical cost, or book value, of the portfolio in 1980. Do investors measure the *required* rate of return for 2001 in terms of the market value or the book value of their portfolio at the beginning of 2001?

A. Investors measure their required rate of return for 2001 in terms of market values, not book values. Suppose that the investor's required rate of return for 2001 is 15 percent. Since the value of the portfolio at the beginning of 2001 is $112,000, the investor will require a dollar return of

$16,800 in 2001 (15 percent x $112,000 = $16,800) including dividends, interest, and capital gains. If the investor expects a return less than $16,800, he should sell this portfolio and invest his capital in another portfolio that has an expected rate of return of at least 15 percent.

Q. If a group of investors were to construct a portfolio that consisted of all of a firm's debt and equity, how would they measure the required return on their investment?

A. These investors would measure their required return by calculating a weighted average of their required returns on the debt and equity portions of the portfolio, where the weights are measured in terms of market values, not book values. For example, if a firm's debt has a market value of $25 million, its equity has a market value of $75 million, the market interest rate on corporate debt of similar risk is 9 percent, and the market required return on equity of similar risk is 15 percent, then the required rate of return on a $100 million portfolio containing all of the firm's debt and equity securities would be 13.5 percent (.25 x 9 percent + .75 x 15 percent = 13.5 percent).

Thus, the investors' required rate of return from an investment in the company is the same as the company's weighted average cost of capital, where both the required rate of return and the weighted average cost of capital are measured in terms of market value weights.

Q. Is the economic definition of the average cost of capital consistent with the way competitive firms determine the required rate of return on investment decisions?

A. Yes. Managers also use a market value definition of the weighted average cost of capital in making investment decisions. From the manager's perspective, the firm's cost of capital is equal to the return investors can earn on the market value of other investments of the same risk. Rational managers, like rational investors, will not commit resources to investments in new markets or technologies unless the expected return on the market value of these investments in new markets or technologies is greater than or equal to the firm's cost of capital, measured on a market value basis, for projects with the same degree of risk.

Q. Does the economic logic behind the definition of the cost of capital have any implications for competitive entry in the local exchange market in Massachusetts?

A. Yes. If the Department wants to encourage facilities-based competitive entry in the market for local exchange services, the cost of capital input in Verizon MA's forward-looking cost studies must be at least as large as the return those potential facilities-based competitors can earn on other investments of the same risk. If potential competitors can lease local exchange facilities from Verizon MA at rates that include a ten percent rate of return on investment, for example, they will have no incentive to invest in their own facilities if they can earn returns greater than ten percent on other investments of comparable risk. In short, it would make more sense for those competitors to lease the undervalued unbundled network elements from Verizon MA than to build their own facilities. To provide correct incentives for entry into local exchange markets, the Department must measure Verizon MA's cost of capital in the same way that potential competitors measure their own costs of capital.

Q. Does the economic definition of the cost of capital have any implications for the policy goal of encouraging investment and innovation in telecommunications services?

A. Yes. The Department must likewise use a market definition of the cost of capital if it wishes to promote investment and innovation in telecommunications services. In competitive markets, the incumbent and its competitors can be encouraged to invest in new technologies, products, and services only if the rate of return they can earn on the market value of their investments exceeds the rate of return they could earn on the market value of other investments of the same risk.

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. Do investors also use market value weights to measure the risk of their investment portfolios?

A. Yes. One measure of investment risk is a company's beta, which measures the company's stock price volatility relative to the volatility of the market. Using the previous example, where the firm's debt has a market value of $25 million and its equity a market value of $75 million, if the firm's debt has a beta of .5 and its equity a beta of 1.2, then the beta on a $100 million portfolio containing all of the firm's debt and equity would be 1.025 (.25 x .5 + .75 x 1.2 = 1.025).

Q. Why do investors measure the risk and return on their investment portfolios using market value weights rather than book value weights?

A. Investors measure the risk and return on their investment portfolios using market value weights because market value weights are the best measure of the amounts the investors currently have invested in each security in the portfolio. From the investor's point of view, the historical cost or book value of his investment is entirely irrelevant to the current risk and return on his portfolio. Thus, the return, and the risk or uncertainty of the return, can be measured only in terms of market values.

Q. Is the economic definition of the average cost of capital consistent with regulators' traditional definition of the average cost of capital?

A. No. As noted above, the economic definition of the average cost of capital is based on the market costs of debt and equity, the market value percentages of debt and equity in a company's capital structure, and the future expected risk of investing in the company. Regulators, in contrast, have traditionally defined the average cost of capital using the embedded cost of debt, the book values of debt and equity in a company's capital structure, and the risk of investing in a franchised provider of telecommunications services.

Q. What is the difference between the market cost of debt and a company's embedded cost of debt?

A. The market cost of debt is the rate of interest a company would have to pay if it issued debt under today's market conditions. The embedded cost of debt is the company's total interest expense divided by the total book value of its debt. Thus, the embedded cost of debt is an average of the interest rates the company has paid in the past to issue debt securities. This calculation of the embedded cost of debt, however, provides no basis for measuring the market cost of debt.

Q. What is the difference between the market value and the book value of a company's debt?

A. The market value of a company's debt represents the current price in the capital markets of the company's debt obligations. The book value of a company's debt is the historical face value of its debt adjusted for the accounting amortization of premiums and discounts. The market value of a company's debt is approximately equal to the book value of its debt when market interest rates are approximately equal to the average interest rate of the company's previous debt issuances.

Q. What is the difference between the market value and the book value of a company's equity?

A. The market value of a company's equity is simply the market price of the company's stock times the number of shares outstanding. The book value of equity is more complex; it represents the sum of paid-in capital and retained earnings, where paid-in capital represents the amount of capital a firm has historically obtained from stock issuances, and retained earnings represent the cumulative earnings over the life of the company that have not been paid out as dividends. In addition, the book value of a company's equity is adjusted periodically for accounting events such as changes in accounting rules and regulations, write-offs, and extraordinary events.

Q. Does the book value of a company's equity reflect the historical cost of its assets?

A. Yes. The book value of a company's equity is defined as the book value of a company's assets minus the book value of the company's debt:

Book Value of Equity = Book Value of Assets - Book Value of Debt

Since the book value of a company's assets, in turn, is equal to the historical cost of a company's assets minus accumulated depreciation, the book value of a company's equity can also be stated as the historical cost of a company's assets, minus the accumulated book depreciation on these assets, minus the book value of a company's debt:

Book Value of Equity = Historical Cost of Assets – Accumulated Book Depreciation – Book Value of Debt

Thus, the book value of a company's equity reflects the historical cost of the company's assets.

Q. Why have state and federal regulators defined the average cost of capital in terms of embedded costs and book values rather than forward-looking costs and market values?

A. State and federal regulators traditionally have defined a company's average cost of capital in terms of embedded costs and book values because these concepts were consistent with the regulators' accounting model of the firm. Economists, in contrast, generally employ an economic model of the firm in which forward-looking costs and market values are the relevant standards.

Q. Is the traditional state and federal regulatory definition of the average cost of capital consistent with the economic principles underlying a forward-looking cost study?

A. No. As I have already noted, the economic principles underlying a forward-looking economic cost study require that the average cost of capital be calculated using a market interest rate, a market value capital structure, and a cost of equity that measures the return investors require in competitive markets on other investments of the same risk. In contrast, the regulatory definition of the weighted average cost of capital is based on an embedded interest rate, a book value capital structure, and a cost of equity that measures the return investors require in markets that are at least partially protected from competition. The regulatory definition of the weighted average cost of capital is inconsistent with the economic principle that economic costs are forward looking and market based, not backward looking and accounting based.

Q. In its 271 Order, the FCC expressed a concern that in setting UNE rates, the Massachusetts Department used a cost of capital that was higher than it used in setting local rates. The FCC called that 12.16 percent cost of capital "relatively high," and questioned whether it was justified. [271 Order at ¶ 38.] Is it reasonable for the cost of capital input in Verizon MA's UNE cost studies to exceed the last authorized rate of return for Verizon MA's regulated operations?

A. Yes. Recall that Verizon MA's retail rates under rate of return regulation were based on historical cost, rather than forward-looking economic cost. Thus, the cost of capital input under traditional rate of return regulation was based on a book value capital structure that reflected the historical cost of Verizon MA's assets, an embedded cost of debt, and a cost of equity appropriate to a regulated company serving a franchised area prior to the passage of the Telecommunications Act of 1996.

In contrast, the FCC has clearly stated that the cost of capital input in UNE cost studies must be based on the principle of forward-looking economic costs because forward-looking economic costs replicate conditions in a competitive marketplace. Unlike the historically-oriented cost of capital used in traditional rate of return regulation, the forward-looking economic cost of capital must necessarily be based on the market values of debt and equity in the company's capital structure, the market cost of debt, and the cost of equity for a company operating in a competitive marketplace.

Given the significant differences between historical-cost ratemaking principles and forward-looking economic cost ratemaking principles, it is not surprising that the forward-looking economic cost of capital can be significantly higher than the traditional regulated rate of return cost of capital. Indeed, the appropriate cost of capital input in Verizon MA's previous UNE cost studies exceeded the last authorized rate of return because: (1) Verizon's market value capital structure contained less debt and more equity than the historical cost, book value capital structure used under rate of return regulation; (2) the market cost of debt exceeded the embedded cost of debt used in the last rate of return proceeding; and (3) the cost of equity for a company operating in a competitive marketplace exceeded the cost of equity for a company operating in a franchised marketplace.

Q. In the 271 Order, the FCC also notes that "AT&T questions whether there is any reason to believe that offering UNEs on a wholesale basis, where Verizon faces no competition, is riskier than offering retail service, where it now has competition." [271 Order at ¶ 38.] Is there any basis for AT&T's argument that the cost of capital used in setting UNE rates should be lower than the cost of capital used in setting retail rates on the theory that the risk is lower in providing unbundled network elements?

Q. No. First, AT&T's argument is based on a false premise. As I explain in Section III, the risk of providing unbundled network elements is greater than the risk of providing local exchange service.

Second, and more importantly, AT&T's argument is intellectually dishonest. The Department is trying to determine the cost of capital to be used in forward-looking cost studies that, according to the FCC, will produce UNE rates that replicate the costs competitors would face "in a fully competitive market." [271 Order at ¶ 42.] It is wrong, therefore, to suggest that capital costs should reflect a market where, in AT&T's words, "Verizon faces no competition." There is simply no basis for AT&T's attempt to pick and choose which forward-looking costs should reflect a competitive market and which should not. To be consistent in determining the inputs to the forward-looking cost studies, the cost of capital **must** also reflect a fully competitive market.

Q. In sum, then, what is the proper definition of the average cost of capital for use in the Verizon MA's forward-looking cost studies?

A. The Telecommunications Act of 1996 removes all barriers to entry in the local exchange market and opens the market to full competition. In a competitive market for local exchange service, forward-looking economic cost is the appropriate cost benchmark for forward-looking cost studies. Furthermore, the forward-looking economic cost of capital is based on market values rather than book values. Thus, for use in Verizon MA's forward-looking economic cost studies, the average cost of capital should be defined in terms of market interest rates, the market values of debt and equity in a company's capital structure, and investors' expectations regarding the future risk of investing in the company in a competitive environment. This is the only definition of the average cost of capital that is consistent with the underlying assumptions of Verizon MA's forward-looking cost studies.

III. RISK

Q. You have stated that the cost of capital depends on investment risk. Have you studied the risk of investing in the facilities required to provide local exchange service in Massachusetts?

A. Yes, I have.

Q. What are the major factors that affect the risk of investing in the facilities required to provide local exchange service in Massachusetts?

A. The risk of investing in the facilities required to provide local exchange service in Massachusetts depends on operating leverage, the level of competition, rapidly changing technology, and the regulatory environment.

Q. What is operating leverage?

A. Operating leverage refers to the relationship between the company's revenues, on the one hand, and the company's fixed and variable costs on the other. The provision of facilities-based telecommunications services is a business that requires a large commitment to fixed costs in relation to variable costs, a situation called high operating leverage. The relatively high degree of fixed costs in the provision of facilities-based telecommunications service exists because of the average LEC's large investment in fixed assets such as central office, transport, and loop facilities. High operating leverage causes Verizon MA's net income to be highly sensitive to fluctuations in revenues. There is a positive correlation between operating leverage and risk: as operating leverage rises, so does the risk of operation.

Q. What is the current status of local exchange competition in Massachusetts?

A. Local exchange competition is extensive throughout Massachusetts. In its 271 filing before the FCC, as presented in the Declaration of Dr. William E. Taylor, Verizon MA presented evidence that:

- Over 200 CLECs are authorized to provide local exchange service.
- Verizon MA has signed, and the Department has approved, 70 interconnection agreements with facilities-based CLECs since 1996.
- Competitors have deployed over 2,175 route miles of fiber and at least 22 local switches in Verizon MA's service territory in Massachusetts.

- Competitors have obtained at least 1,600 collocation arrangements throughout the state.
- Competitors have access to 95 percent of the access lines served by Verizon MA in Massachusetts.
- Verizon MA has provided 1,400 NXX codes representing 14,000,000 numbers to 38 different competitors.
- Competitors serve at least 676,000 lines in Massachusetts—418,000 lines over their own facilities, 11,800 through unbundled network elements, and 246,00 through resale.

Verizon MA's 271 filing was based on data collected in July 2000. Since that time, the level of local competition in Massachusetts has continued to grow.

Q. Who are Verizon MA's major local exchange competitors in Massachusetts?

A. Among the competitors with the facilities required to offer local exchange service in Massachusetts are AT&T, WorldCom, Sprint, RCN, Allegiance Communications, Network Plus Corp, ChoiceOne Communications, Global Crossing, PaeTec Communications, Inc., Teligent, Winstar, and XO Massachusetts.

Q. What are AT&T's current strategies for providing local exchange service in Massachusetts?

A. AT&T has at least five current strategies for providing local exchange service in Massachusetts. First, AT&T currently provides local exchange service through its own wireline local exchange facilities. (Many of these facilities were acquired through AT&T's purchase of TCG, which had previously acquired Massachusetts facilities-based competitor ACC.) In Massachusetts, AT&T currently operates a local exchange network with four local exchange switches and more than 450 route miles of fiber connected to over 211 buildings.

Second, AT&T either provides or intends to provide local exchange service over its own cable networks and the cable networks of other companies with whom it has agreements. AT&T currently has an ownership interest in cable systems that serve 2.1 million subscribers in the greater Boston area, and pass more than 80 percent of all Massachusetts households.

Third, AT&T provides or intends to provide local exchange service over its fixed and mobile wireless facilities in Massachusetts. With regard to mobile wireless services, AT&T offers its Digital One Rate, which, by eliminating all roaming and long distance charges, makes AT&T's mobile wireless services competitive with landline service for many customers.

Fourth, AT&T provides local exchange service through its own long distance facilities in Massachusetts. Its Digital Link service connects customers to AT&T's toll switches via high capacity trunks.

Both inbound and outbound local calling are part of the Digital Link service.

Finally, AT&T can provide local exchange service to residential and other customers either by reselling Verizon MA's local exchange service or by leasing Verizon MA's unbundled network elements. In this way, AT&T can provide local exchange service without investing the large amount of capital required to provide service.

Q. Does AT&T have any advantages in offering local exchange services in Massachusetts?

A. Yes. AT&T has several major advantages in offering local exchange services in Massachusetts compared to Verizon MA. First, AT&T is the leading provider of long distance service in both Massachusetts and the nation. Since most customers spend more on long distance than on local exchange service, they may prefer to shift their local services to their long distance provider than to shift their long distance service to their local provider.

Second, AT&T has the most highly recognized national brand name in the industry. Thus, Verizon MA's customers already recognize AT&T as a highly capable provider of telecommunications services.

Third, AT&T can provide a complete bundle of local, long distance, wireless, video, Internet, and data services, while Verizon MA cannot provide video services at this time and must provide data services through a separate subsidiary. AT&T's ability to provide a complete bundle of these services gives it the opportunity to offer package discounts that competitors will find difficult to match.

Fourth, many Massachusetts business customers prefer to obtain their telecommunications services from a company that can provide service to all their business locations worldwide. AT&T is one of only two companies (the other being WorldCom) that can cover the full national and international telecommunications needs of business customers.

Fifth, since AT&T does not have to provide universal service, it can target only the most profitable customers, while Verizon MA must serve all customers, even those whose rates fail to cover the cost of providing service.

Sixth, AT&T is not required to share its network with competitors, whereas Verizon MA is compelled to share its network with competitors.

Q. What steps has AT&T taken to strengthen its position in the local exchange market in recent years?

A. AT&T has embarked on an aggressive acquisition program to strengthen its position in local exchange markets across the country. Within the last several years, AT&T has: (1) purchased Teleport Communications Group, the largest competitive local exchange carrier in the industry, for

$12 billion; (2) purchased TCI, Inc., the second-largest multiple systems cable operator in the country, for $53 billion; (3) agreed to purchase MediaOne, the third largest multiple systems cable operator in the country, for $58 billion; (4) purchased IBM Global Services for $9 billion; (5) agreed to form a $10 billion global joint venture with British Telecom to provide global telecommunications services; and (6) agreed, along with British Telecom, to purchase 30 percent of Japan Telecom for $1.8 billion. These actions will give AT&T a tremendous boost in its efforts to provide a complete package of long distance, wireless, Internet access, data, and local exchange services to business and residential customers throughout the country, and, indeed, throughout the world.

Q. What are WorldCom's strategies for providing local exchange service in Massachusetts?

A. WorldCom has at least three strategies for providing local exchange service in Massachusetts. First, like AT&T, WorldCom currently provides local exchange service through its own wireline local exchange facilities. In Massachusetts, WorldCom currently operates a local exchange network with seven local exchange switches and at least 400 route miles of fiber connected to some 150 buildings.

Second, WorldCom is able to offer local exchange service throughout Massachusetts either by reselling Verizon MA's local exchange service or by leasing Verizon MA's unbundled network elements.

Third, WorldCom is able to offer local exchange service through its fixed wireless technologies. WorldCom, through its acquisition of CAI Wireless and its 38 percent stake in Metricom Inc., currently has licenses to provide MMDS service in Boston.

Q. Does WorldCom have any advantages in offering local exchange service in Massachusetts?

A. Yes. WorldCom has almost all the advantages of AT&T, including: (1) an established brand name; (2) a national and international network of telecommunications facilities; and (3) an ability to handle all of a customer's telecommunications services at every location worldwide. Many financial analysts consider WorldCom to be one of the best-positioned global telecommunications services providers because its ownership of extensive international telecommunications facilities allows it to offer global telecommunications services at lower cost.

Q. What steps has WorldCom taken to strengthen its position in the local exchange market?

A. Like AT&T, WorldCom has used an aggressive series of acquisitions to strengthen its position in the local exchange market. Within the last several years, WorldCom has: (1) purchased MFS Communications, a leading facilities-based CLEC, and UUNET Technologies, the leading worldwide provider of Internet access, for $12 billion; (2) purchased MCI Communications, the second leading U.S. supplier of long distance services, for $40 billion; (3) purchased Brooks Fiber Properties, another leading CLEC, for $17 billion; and (4) purchased CAI Wireless for $482.8 million in cash. As a result of these acquisitions, WorldCom is now able to offer a package of local, long distance, data, and Internet access services to customers throughout the U.S. and Europe.

Q. Does Verizon MA face competition from other incumbent local exchange companies?

A. Yes. SBC has purchased Southern New England Telephone, which provides service in a neighboring state. SBC could easily expand its local service from Connecticut to Massachusetts. In addition, SBC has announced with respect to its merger with Ameritech that it would deliver fully competitive local exchange service in 30 new major metropolitan markets throughout the country, including the Boston metro area currently served by Verizon MA.

Q. Are investors primarily concerned with current or expected future competition when they assess the investment risk of Verizon MA?

A. Investors are primarily interested in expected future competition when they assess the current investment risk of Verizon MA because expected future competition is a primary determinant of volatility in the expected returns on their investment.

Q. Can Verizon MA's investment risk be measured by Verizon MA's current share of the local exchange market?

A. No. Remarkable as the growth of CLEC revenues and market share may be, current market share statistics are nonetheless a poor indicator of competitive risks in the local exchange market. An incumbent's current market share reflects its historical position as the franchised provider of local exchange services in its service territory. The privileged position of the incumbent as the franchised provider has been eliminated. Investors' perception of risk depends on expected future competition, not current competition as reflected in market share.

Q. You noted previously that the cost of capital to be used in Verizon MA's cost studies must be based on the principle of forward-looking economic cost. Is the forward-looking economic cost principle consistent with the use of Verizon MA's current market share as an indicator of investment risk?

A. No. First, the forward-looking economic cost principle is economically relevant only in a competitive market for telecommunications services. Thus, the forward-looking economic cost principle, at its heart, is based on the assumption that the market for local exchange services is fully competitive.

Second, the forward-looking economic cost principle requires a consideration of the level of competition and investment risk over the entire future life of Verizon MA's investment in network facilities. Given the rapid changes in the telecommunications industry and the certainty that competition will increase, Verizon MA's current market share is a poor indicator of future competition and risk.

Q. Is Verizon MA able to compete on equal terms with competitors in the local exchange?

A. No. Verizon MA faces a number of disadvantages in its efforts to compete in a fully competitive local exchange market. First, as the current incumbent LEC, Verizon MA has the unique obligation to provide telecommunications services to all customers, even those whose rates fail to cover the cost of providing service. Telecommunications prices have historically been set to provide subsidies to high-cost customers in low-density geographic areas. Such subsidies are inconsistent with the competitive framework of the Act. Although the Act provides for the FCC and the States to implement mechanisms that eliminate the implicit subsidies that have previously financed the provision of basic local telecommunications service, the Act fails to identify how such subsidies can be replaced. In truly competitive markets, there are no sources to subsidize prices that are lower than cost. Investors are concerned that the universal service support mechanisms that will be put in place may not be sufficient to balance the incumbent LEC's obligation to continue to provide service in high-cost areas, while competitors are free to serve only the most profitable markets.

Second, Verizon MA has the unique obligation to make significant investments in the technology and software needed to provide unbundled network elements to competitors. Verizon MA's competitors, however, have announced their intention to develop their own facilities for providing local exchange service. Thus, Verizon MA faces the considerable risk that its investments in the technology and software needed to provide unbundled network elements to competitors will not be recovered. Thus, Verizon MA is at a cost disadvantage relative to its competitors.

Third, Verizon MA has the unique obligation to share the benefits of network investments with competitors. When Verizon MA invests to upgrade the technology in its network, Verizon MA must share the benefits of this investment with competitors through the leasing of unbundled network elements. However, when Verizon MA's competitors invest to upgrade the technology in their networks, Verizon MA receives no benefit from the CLECs' investments because Verizon MA's competitors are not required to unbundle their networks. For example, if AT&T is able to provide a complete package of video, Internet, and voice services from its investments in TCI and MediaOne, AT&T will have a significant competitive advantage compared to Verizon MA, who is unable to offer such bundled services. However, when Verizon MA enhances the local portion of its service offerings through upgrades of its network, it is required to share these benefits with all competitors, including AT&T.

Q. What is the impact of rapidly changing technology on telecommunications competition?

A. Rapid advances in telecommunications technology are a major driver behind the increasing risk of investing in the LECs' local exchange operations. Advances in semiconductor technology have both increased the capability and shortened the economic life of telecommunications equipment, so other firms can compete more easily with local exchange companies. Breakthroughs are also occurring in fiber optic, data communications, and wireless technologies. The capacity of fiber optic networks is increasing significantly, thus allowing fiber-based competitive access providers to offer more services. Recent advances in data communications and Internet protocol technologies, especially technologies for transporting voice signals over data communications networks, offer yet another opportunity for bypassing the local loop. Sprint has announced plans to offer local exchange services over a new nationwide packet-switched data network. New data networking and Internet protocol technologies are also the major factors reducing the cost of providing local exchange services over cable networks. AT&T has announced its intention to rely on these technologies in its upgrade of the TCI network. Wireless technology is also changing rapidly. Analysts anticipate that customers will soon be able to use their mobile wireless phones to receive a complete suite of voice, video, data, and Internet services. Fixed wireless technology also allows competitors to completely bypass the local loop. In sum, technological developments have substantially eroded the competitive advantage once enjoyed by incumbent local exchange companies.

Q. How does rapidly changing technology affect the risk of investing in incumbent local exchange companies such as Verizon MA?

A. Rapidly changing technology increases Verizon MA's risk in two ways. First, it threatens Verizon MA's ability to recover the investment cost of its new telecommunications plant. Second, it reduces the cost of entry for competitors. Rapid advances in fiber optics, wireless, and multimedia transmission technologies, for example, have shortened the economic lives of the incumbent LECs' current investments in copper-based facilities and allowed cable TV, interexchange, and wireless companies to compete efficiently to offer local exchange service. Advances in these technologies further threaten the incumbent LECs' heavy investment in landline telecommunications service.

Q. How does regulation affect the risk of Verizon MA?

A. Since regulation constrains Verizon MA's activities more than those of its competitors, and, thus impairs Verizon MA's ability to compete on the same terms as its competitors, regulation increases the risk of investing in Verizon MA.

Q. This proceeding is concerned with rates for unbundled network elements rather than rates for local exchange service. How do the facilities required to provide unbundled network elements compare to the facilities required to provide local exchange service?

A. Since the network components and functionalities comprising the Department's list of unbundled network elements represent virtually the entirety of Verizon MA's network, the facilities required to provide unbundled network elements are identical to the facilities required to provide Verizon MA's local exchange services.

Q. How does the risk of providing unbundled network elements compare to the risk of providing local exchange service in Massachusetts?

A. The risk of providing unbundled network elements is greater than the risk of providing local exchange service in the current regulatory environment.

Q. Why is the risk of providing unbundled network elements greater than the risk of providing local exchange service in the current regulatory environment?

A. In their eagerness to promote competition for local exchange service at the residential level, regulators have generally set rates for unbundled network elements based on forward-looking economic cost studies that include: (1) aggressive assumptions about the expenses and amount of investment required to build a new telecommunications network using the most efficient technology currently available; and (2) conservative estimates of the appropriate rate of depreciation and cost of capital for that forward-looking network. As a result of these contradictory approaches to estimating these four components of the forward-looking economic cost of providing unbundled network elements (that is, expenses, investment, cost of capital, and depreciation), local exchange carriers such as Verizon MA have been required to lease unbundled network elements at rates that are below the cost of providing these elements in a competitive environment. Thus, the risk of providing unbundled network elements has exceeded the risk of providing local exchange service.

Q. Have you considered the potential impact of long-term commitments to take and pay for unbundled network elements on the risk of investing in the facilities required to provide unbundled network elements?

A. Yes. Long-term commitments to take and pay for unbundled network elements, in theory, could minimize the risk of Verizon MA's forward-looking investment in facilities to provide unbundled network elements. However, the key rates to be established in this proceeding are quoted at a price per month, or per minute of use. A competing carrier may choose not to use Verizon MA's facilities, or it may choose to use these facilities for one month at a time. Furthermore, a competing carrier may chose to take the unbundled network elements at the contract rate or the tariff rate, whichever is lower. Thus, while Verizon MA is required to provide other carriers with unbundled network elements, competitors are under no obligation to either use Verizon MA's elements for any specific period of time or pay the contract rate. In short, there are no long-term commitments to take and pay for unbundled network elements that might reduce the risk of Verizon MA's investment in the facilities and software to provide interconnection and unbundled network elements.

Q. How does the forward-looking risk of investing in Verizon MA's local exchange business in Massachusetts compare to the forward-looking risk of investing in Verizon MA's parent company?

A. The forward-looking risk of investing in Verizon MA's local exchange business in Massachusetts is greater than the forward-looking risk of investing in Verizon MA's parent company because Verizon MA's local exchange business in Massachusetts has less geographic diversity, less diversity of products and services, less ability to realize economies of scale and scope, and less access to the capital markets.

Q. How does the forward-looking risk of investing in the facilities required to provide unbundled network elements compare to the forward-looking risk of investing in the S&P Industrials?

A. The forward-looking risk of investing in the facilities required to provide unbundled network elements in Massachusetts is at least as great as the forward-looking risk of investing in the S&P Industrials.

Q. Why do you believe that the risk of investing in the facilities required to provide unbundled network elements in Massachusetts is at least as great as the forward-looking risk of investing in the S&P Industrials?

A. As I noted above, the risk of investing in the facilities to provide unbundled network elements depends on operating leverage, the degree of competition, rapidly changing technology, and the regulatory environment. The degree of operating leverage required to provide facilities-based telecommunications services far exceeds the average degree of operating leverage required to provide the goods and services offered by companies in the S&P Industrials. Telecommunications is also a high technology business that is particularly sensitive to the risks of rapidly changing technology. Furthermore, the regulatory environment has placed restrictions on incumbents in their ability to compete on equal terms with their competitors. These three factors—high operating leverage, rapidly changing technology, and the regulatory environment—tend to make the risk of investing in the facilities required to provide unbundled network elements greater than the risk of investing in the S&P Industrials.

The only factor that might reduce the risk of investing in the facilities required to provide unbundled network elements is the level of competition. However, the FCC's cost study principles require that cost studies "replicate…the conditions of a competitive market" for unbundled network elements. In addition, the level of competition for unbundled network elements is increasing rapidly. Taken as a whole, my analysis of the factors affecting the risk of investing in the facilities required to provide unbundled network elements causes me to believe that this risk is at least as great as the risk of investing in the S&P Industrials.

IV. ESTIMATE OF THE WEIGHTED AVERAGE COST OF CAPITAL FOR USE IN VERIZON MA'S FORWARD-LOOKING COST STUDIES

Q. How did you calculate the weighted average cost of capital that you recommend for use in Verizon MA's forward-looking cost studies?

A. I calculated the weighted average cost of capital to be used in Verizon MA's forward-looking cost studies by analyzing the market-based percentages of debt and equity in the capital structures of competitive firms, the market cost of debt, and the market required rate of return on an equity investment in competitive firms of comparable risk.

A. TARGET CAPITAL STRUCTURE

Q. How did you determine an appropriate target capital structure for use in Verizon MA's forward-looking cost studies?

A. To determine an appropriate target capital structure for use in Verizon MA's forward-looking cost studies, I examined capital structure data for both my proxy group of S&P Industrials and a group of telecommunications companies with incumbent local exchange operations. I examined the most current available data for these companies, and I also reviewed data for the past five years. In all periods, the average market value capital structure for these companies contains no more than 25 percent debt, and no less than 75 percent equity.

Q. What are the average market value capital structures of the S&P Industrials and the telecommunications companies?

A. Table 1 below shows the average year-end market value capital structures of the S&P Industrials and the telecommunications companies for the five-year period 1996 through 2000. These data show that both groups, on average, have at least 75 percent equity (and generally have more than 75 percent equity) in their capital structures.

Table 1

Capital Structure of the S&P Industrials
and Telecommunications Companies at Year End
($ in Millions)

	S&P Industrials			Telecom Companies		
	Market Value	Total Debt	Percent Equity	Market Value	Total Debt	Percent Equity
1996	1,700,587	285,381	85.6%	107,320	28,004	79.3%
1997	2,289,166	323.858	87.6%	204,385	50,221	80.3%
1998	2,863,543	353,205	89.0%	308,876	53,124	85.3%
1999	3,052,212	405,374	88.3%	381,874	68,495	84.8%
2000	3,041,722	469,285	86.6%	398,381	111,479	78.1%
Total	10,798,3168	1,553,260	87.4%	1,400,837	311,324	81.8%

Q. Based on your review of these data, what is your recommended target market value capital structure for use in Verizon MA's forward-looking cost studies?

A. Based on my examination of these data, I recommend that a target market value capital structure containing 25 percent debt and 75 percent equity be used to calculate Verizon MA's weighted average cost of capital.

Q. How does your recommended capital structure compare to the capital structure the Department used for Verizon MA in its prior UNE proceeding?

A. In its prior Order, the Department used a market value capital structure containing 23.51 percent debt and 76.49 percent equity. (See pages 52--53 of the Phase 4 Order in D.P.U. 96-73/74, 96-75, 96-80/81, 96-83, 96-94.)

Q. Did the Department recognize the requirement to use a market value capital structure in determining the cost of capital input in forward-looking cost studies?

A. Yes. The Department noted on page 53 of its Order, "We agree with Dr. Vander Weide that it would be inconsistent to use forward-looking competitive assumptions in the investment and expense components of a TELRIC study, but historical accounting-based capital structures in the cost of capital component."

B. COST OF DEBT

Q. How did you measure the market cost of debt investments?

A. I used the 7.55 percent average yield to maturity on Moody's A-rated industrial bonds for March 2001, as reported by Moody's Investors Service. This estimate is conservative because it does not include the flotation costs that must be paid to issue the debt securities required to finance the building of local exchange facilities on a forward-looking basis.

C. COST OF EQUITY

Q. How did you measure the market cost of an equity investment in Verizon MA?

A. I applied the DCF Model to the S&P Industrials.

Q. Why did you apply the DCF Model to the S&P industrials?

A. A proper definition of the cost of capital for use in Verizon MA's forward-looking cost studies is based on the assumption that the market for local exchange services is competitive. As AT&T Witness John Mayo stated in a Pennsylvania proceeding, "Simply put, the Commission must prescribe a set of permanent prices for unbundled network elements that as accurately as possible mirror the prices which would be observed if those elements were supplied by sellers in a competitive market."[1] However, at the present time, there are no publicly-traded companies that have built telecommunications networks solely for the purpose of providing local exchange services in a competitive market. Since the S&P Industrials are a well-known sample of publicly-traded competitive companies whose risk, on average, approximates the risk of providing

[1] Testimony of John Mayo, Page 11, line 18, Docket No. A-310325F0002, November 13, 1997, Before the Pennsylvania Public Utility Commission.

telecommunications services in a competitive market, I believe the S&P Industrial group is a good proxy for the risks of investing in the facilities required to provide local exchange services on a forward-looking basis.

Q. Is your use of the S&P Industrial group consistent with the Department's prior practice in the previous UNE proceeding?

A. Yes. In the prior UNE proceeding, the Department used data for the S&P Industrials in establishing an appropriate cost of equity. In choosing the S&P Industrials as a proxy for the risk of supplying unbundled network elements, the Department stated,

> There is not yet a competitive market for unbundled network services, but there will be one shortly. We need a surrogate to describe the risks of that to-be-developed market, and we choose to rely on one of the most liquid and well publicized markets, the stock market, whose performance is often measured by the S&P 400. It is a diverse market representing a portfolio of companies and their incumbent risk. As such, we find that it presents a composite view of the risks of competitive organizations, against which it is reasonable to compare the likely risk of building and leasing unbundled network elements.
>
> We recognize that our approach here is quite different from that employed by us in determining the rate of return for NYNEX and other companies in our jurisdiction, but, as we have stated, our task is different. We seek to estimate the cost of equity for a service offering that does not yet exist in a marketplace that is about to come into existence. We recognize that our finding must be inherently qualitative, and we are aware of the possibility that the S&P 400 might be less risky or more risky than a company selling unbundled network elements. We have already acknowledged that, based on this record, we cannot precisely determine the degree of risk associated with offering unbundled network elements. We know it is more risky than the provision of monopoly services. We know it is less risky than speculative real

> estate or power plant projects. It has some characteristics of the two, in that, for common carriers who lack the capital or the ability to build facilities, it does provide an essential service. For other carriers, however, it offers a no-obligation option to use and later abandon, perhaps to preserve capital in the short run and then to spend it on those facilities that have a high financial priority.
>
> In total, we see no systemic reason that the level of risk represented by the S&P 400 as a group should be biased either above or below that of an ILEC providing unbundled network elements. Accordingly, we find that the comparison group employed by Dr. Vander Weide is of value in determining the appropriate cost of equity in the TELRIC studies. [D.P.U. Order at pp. 49—51.]

Q. What DCF result did you obtain from your application of the DCF Model to the S&P industrials?

A. As shown in the Schedule JVW-1, I obtained a market-weighted average DCF cost of equity of 14.75 percent for the S&P Industrials.

D. WEIGHTED AVERAGE COST OF CAPITAL

Q. What is your estimate of Verizon MA's overall weighted average cost of capital?

A. I estimate Verizon MA's overall weighted average cost of capital to be 12.95 percent. This estimate is based on a 7.55 percent market cost of debt, a target market value capital structure containing 25 percent debt and 75 percent equity, and a cost of equity of 14.75 percent (see Table 2).

Table 2

Weighted Average Cost of Capital Using 25/75 Capital Structure

Source of Capital	Cost Rate	Percent	Weighted Cost
Debt	7.55%	25.00%	1.89%
Equity	14.75%	75.00%	11.06%
WACC			12.95%

Q. On the basis of your cost of capital studies, what is your conclusion regarding the reasonableness of the 12.6 percent weighted average cost of capital Verizon MA used in its forward-looking cost studies?

A. I conclude that 12.6 percent is a conservative estimate of the weighted average cost of capital that should be used in Verizon MA's forward-looking studies of the cost of providing unbundled network elements and interconnection.

Q. Does this conclude your testimony?

A. Yes, it does.

Company	Average Price	Annual Dividend	I/B/E/S Mean Growth	Cost Of Equity
Albertsons Inc	29.63	0.760	11.4%	14.44%
Abbott Laboratories	46.12	0.760	12.4%	14.36%
Archer-Daniels-Midland Co	14.03	0.200	11.8%	13.49%
Automatic Data Processing	54.14	0.410	15.1%	16.02%
Aetna Inc	35.56	0.800	12.7%	15.39%
American Home Products Corp	57.40	0.920	13.5%	15.43%
American Greetings	12.53	0.400	9.5%	13.23%
Air Products & Chemicals Inc	39.93	0.760	11.1%	13.34%
Allegheny Technologies Inc	17.80	0.800	10.6%	15.93%
Avon Products	40.70	0.740	12.4%	14.57%
Avery Dennison Corp	52.78	1.200	12.8%	15.52%
Baxter International Inc	90.11	1.164	13.5%	15.05%
Brunswick Corp	21.06	0.500	12.8%	15.65%
Bard (C.R.) Inc	43.53	0.840	12.2%	14.50%
Black & Decker Corp	40.14	0.480	14.5%	15.95%
Becton Dickinson & Co	33.73	0.380	12.2%	13.54%
BellSouth Corp	39.48	0.760	11.9%	14.18%
Biomet Inc	39.38	0.107	15.0%	15.33%
Bemis Co	33.67	0.960	11.4%	14.78%
Bristol Myers Squibb	57.65	0.980	12.5%	14.53%
Computer Associates Intl Inc	27.64	0.080	15.7%	16.05%
Conagra Foods Inc	18.75	0.900	9.8%	15.46%
Caterpillar Inc	44.08	1.360	9.8%	13.41%
Cooper Industries Inc	39.23	1.400	10.3%	14.50%
Carnival Corp	28.50	0.420	14.0%	15.78%
Cigna Corp	107.60	1.240	13.2%	14.58%
Colgate-Palmolive Co	54.40	0.630	12.5%	13.88%
Clorox Co/De	33.05	0.840	11.9%	14.92%
Cooper Tire & Rubber	12.80	0.420	10.3%	14.16%
CenturyTel Inc	27.68	0.190	13.6%	14.42%
Centex Corp	40.48	0.160	13.0%	13.47%
Disney (Walt) Company	28.53	0.210	14.6%	15.49%
Dow Jones & Co Inc	56.20	1.000	11.1%	13.20%
Deluxe Corp	23.24	1.480	6.7%	14.04%
Donnelley (R R) & Sons Co	27.52	0.920	11.6%	15.58%
Darden Restaurants Inc	22.83	0.080	14.9%	15.32%
Engelhard Corp	25.18	0.400	12.6%	14.50%
Ecolab Inc	40.98	0.520	14.0%	15.53%
Eastman Kodak Co	42.72	1.760	8.5%	13.28%
Emerson Electric Co	64.48	1.530	12.6%	15.44%
EOG Resources Inc	45.00	0.140	14.4%	14.78%
Eaton Corp	69.89	1.760	10.5%	13.46%
First Data Corp	58.90	0.080	14.5%	14.66%
Fortune Brands Inc	32.63	0.960	11.6%	15.10%
Sprint FON Group	21.77	0.500	12.3%	15.04%
Gillette Co	31.71	0.650	11.6%	14.03%
Gannett Co	60.68	0.880	12.0%	13.72%
General Mills Inc	43.55	1.100	10.7%	13.67%
Genuine Parts Co	25.84	1.140	8.2%	13.31%
Goodrich (B F) Co	38.40	1.100	12.1%	15.52%
Goodyear Tire & Rubber Co	25.10	1.200	9.6%	15.22%

Company	Average Price	Annual Dividend	I/B/E/S Mean Growth	Cost Of Equity
Grainger (W W) Inc	33.51	0.680	12.3%	14.72%
Harcourt General Inc	55.85	0.840	14.3%	16.12%
HCA-Healthcare Co	37.15	0.080	14.9%	15.16%
Hilton Hotels Corp	10.90	0.080	12.5%	13.37%
Heinz (H J) Co	40.29	1.570	9.2%	13.75%
Honeywell International Inc	40.99	0.750	13.9%	16.11%
Hewlett-Packard Co	30.30	0.320	14.3%	15.58%
Intl Business Machines Corp	98.03	0.520	13.2%	13.83%
ITT Industries Inc	39.61	0.600	13.9%	15.73%
Illinois Tool Works	61.15	0.800	12.9%	14.46%
Johnson Controls Inc	64.59	1.240	13.6%	15.91%
Johnson & Johnson	90.18	1.280	12.9%	14.60%
Nordstrom Inc	17.03	0.360	13.0%	15.54%
Kimberly-Clark Corp	68.11	1.080	11.3%	13.17%
Kerr-McGee Corp	66.75	1.800	11.8%	15.01%
Coca-Cola Co	48.83	0.680	13.0%	14.67%
Leggett & Platt Inc	19.65	0.440	12.7%	15.38%
Liz Claiborne Inc	46.86	0.450	12.3%	13.44%
Lilly (Eli) & Co	75.20	1.120	13.2%	14.99%
Lockheed Martin Corp	35.55	0.440	11.9%	13.37%
May Department Stores Co	37.83	0.930	10.6%	13.49%
McGraw-Hill Companies	57.65	0.940	13.1%	15.05%
Minnesota Mining & Mfg Co	109.13	2.320	11.4%	13.91%
Molex Inc	37.25	0.100	14.9%	15.23%
Merck & Co	73.52	1.360	11.9%	14.10%
USX-Marathon Group	27.92	0.920	10.1%	13.97%
Maytag Corp	34.00	0.720	13.3%	15.85%
Nucor Corp	43.58	0.600	14.3%	15.97%
New York Times Co	42.20	0.460	12.5%	13.80%
Pitney Bowes Inc	34.70	1.160	11.9%	15.89%
Pepsico Inc	43.68	0.560	13.3%	14.84%
Procter & Gamble Co	65.33	1.400	11.4%	13.93%
Parker-Hannifin Corp	41.81	0.720	11.6%	13.64%
Rohm & Haas Co	34.24	0.800	11.6%	14.37%
Rockwell Intl Corp	42.38	1.020	11.0%	13.84%
Raytheon Co -Cl B	29.02	0.800	10.8%	14.05%
Sears Roebuck & Co	36.88	0.920	10.3%	13.22%
SBC Communications Inc	43.88	1.015	13.3%	16.08%
Schering-Plough	36.98	0.560	13.7%	15.52%
Sherwin-Williams Co	25.49	0.540	11.0%	13.50%
Snap-On Inc	29.28	0.960	10.1%	13.95%
Supervalu Inc	13.38	0.550	11.0%	15.88%
Stanley Works	34.62	0.920	11.7%	14.86%
Target Corp	36.08	0.220	15.1%	15.84%
Tosco Corp	42.02	0.320	12.7%	13.61%
Tribune Co	39.17	0.440	13.1%	14.44%
TRW Inc	36.90	1.400	9.6%	14.04%
Tupperware Corp	23.95	0.880	11.8%	16.19%
Texaco Inc	66.94	1.800	10.7%	13.87%
Textron Inc	55.62	1.300	13.1%	15.91%
United Technologies Corp	73.70	0.900	13.8%	15.27%

Company	Average Price	Annual Dividend	I/B/E/S Mean Growth	Cost Of Equity
VF Corp	34.96	0.920	11.2%	14.31%
Verizon Communications	47.15	1.540	11.6%	15.49%
Wendy's International Inc	22.78	0.240	14.1%	15.37%
Whirlpool Corp	52.44	1.360	11.4%	14.47%
Waste Management Inc	25.70	0.010	14.2%	14.25%
Wal-Mart Stores	48.55	0.240	14.5%	15.10%
USX-U S Steel Group	15.68	1.000	8.1%	15.54%
Market Weighted Average				14.75%

Source: Standard & Poor's Compustat Database April 2001. Price is average of March 2001 high and low prices. Quarterly dividend obtained from the annual dividend rate as reported by Compustat, divided by 4. I/B/E/S growth rate is the April mean estimate of the long-term growth rate as reported by Compustat.

Notes: In applying the DCF Model to the S&P Industrials, I included in the DCF analysis only those companies in the S&P Industrial group which have a reported stock price, pay a dividend, have a positive growth rate, have at least 3 analysts' long-term growth estimates, and have at least one common share outstanding. To be conservative, I also eliminated those 25 percent of companies with the highest and lowest DCF results, those companies with cost of equity results equal to or below the March 2001 average yield on Moody's A-rated industrial bonds or equal to or above 20 percent. The weighted average DCF result for all four quartiles of the S&P Industrials was 15.01 percent, while the weighted average DCF result for 2nd and 3rd quartiles shown here on Schedule JVW-1 is 14.75 percent. Elimination of the 1st and 4th quartiles of the S&P Industrials had a negligible effect on the market value capital structure.

Notation:

d_0	=	Quarterly Dividend (indicated annual dividend divided by 4).
P_0	=	Average of the monthly high and low stock prices March 2001.
FC	=	Flotation costs expressed as a percent of gross proceeds (5 percent).
g	=	I/B/E/S mean forecast of future earnings growth March 2001.
k	=	Cost of equity using the quarterly version of the DCF Model as shown by the formula below:

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