Before the

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Review of: Unbundled Loop and Switching Rates; the Deaveraged Zone Rate Structure; and Unbundled Network Elements, Transport, and Termination (Recurring Costs)	**Docket No. UT-023003**

Direct Testimony

of

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on behalf of

AT&T Communications of the Pacific Northwest, Inc.

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INTRODUCTION

Qualifications

Q. Please state your name, position and business address.

A. My name is Lee L. Selwyn. I am President of Economics and Technology, Inc. ("ETI"), Two Center Plaza, Boston, Massachusetts 02108. Economics and Technology, Inc. is a research and consulting firm specializing in telecommunications economics, regulation, management and public policy.

Q. Please summarize your educational background and previous experience in the field of telecommunications regulation and policy.

A. I have prepared a Statement of Qualifications, which is attached hereto as Attachment 1.

Q. Dr. Selwyn, have you previously testified before the Washington Utilities and Transportation Commission ("WUTC" or "Commission")?

A. Yes. I have testified before the WUTC on a number of occasions dating back to the late 1970s. In April 1978, I submitted testimony on behalf of the Boeing Company and Sears, Roebuck and Company in Dockets U-77-50, U-77-51, and U-77-52. In November 1982, I submitted testimony before the Commission on behalf of the Tele-Communications Association ("TCA") in Docket U-82-19 concerning the transfer of Pacific Northwest Bell

assets and personnel to AT&T as part of the Plan of Reorganization arising out of the break-up of the former Bell System, and appropriate pricing of terminal equipment. In September 1988, I submitted two pieces of written testimony to the Commission in Docket U-88-2052-P regarding the competitive classification of certain of Pacific Northwest Bell's services. My testimony on behalf of Public Counsel in that case addressed competitive classification of Pacific Northwest Bell's intraLATA toll services, while my testimony on behalf of Telecommunications Ratepayers Association for Cost-based and Equitable Rates ("TRACER") and the State of Washington Department of Information Services addressed competitive classification of Pacific Northwest Bell's private line services. In January 1990, I submitted testimony on behalf of TRACER, Public Counsel, and the State of Washington Department of Information Services in Docket U-89-3031-P regarding GTE-Northwest's proposal for alternative regulation. I also submitted testimony on behalf of TRACER in June 1993, Dockets U-89-2698-F and U-89-3245-P proposing a "Modified Incentive Regulation Plan" for U S WEST Communications ("USWC"). On April 17, 1995, I submitted direct and supplemental testimony on behalf of the Staff of the Washington Utilities and Transportation Commission in Dockets UT-941464, UT-941465, UT-950-0146 and UT 950265, regarding the cost studies filed by U S WEST in support of its proposed local transport restructure and expanded interconnection tariffs. On August 11, 1995, I submitted testimony in Docket UT-950200 on behalf of the Staff of the Washington Utilities and Transportation Commission concerning U S WEST's request for an increase in its rates and charges. On October 31, 1997, I offered testimony in Docket UT-961638 on behalf of Public Counsel and TRACER in response to U S WEST's request to be relieved of its obligation to serve. On March 4 and June 28, 1999 I sponsored responsive and surrebuttal

testimony, respectively, in Docket UT-980948 on behalf of WUTC Staff regarding U S WEST's petition and accompanying testimony seeking to end the imputation of yellow pages directory advertising revenues to its Washington regulated telephone operations. My most recent appearances before the Commission were in May 2003 on behalf of AT&T in Docket No UT-020406, a complaint proceeding addressing the level of Verizon Northwest's intrastate switched access charges, and also in May 2003 on behalf of the WUTC Staff in Docket No. UT-021120, the application of Qwest Corporation regarding the sale and transfer of Qwest Dex to Dex Holdings, LLC. Together with Dr. William H. Lehr, I have submitted direct, reply and rebuttal testimony on behalf of AT&T on December 22, 2003, February 2, 2004 and February 20, 2004, respectively in Docket No. UT-033044, addressing Qwest's *Triennial Review* petition; however as of this date hearings in that proceeding have been suspended.

In addition to the aforementioned appearances, ETI has served as a consultant to the Commission and has submitted other filings and reports to the Commission, projects in which I had participated. In October 1984, ETI prepared a comprehensive evaluation of Local Measured Service ("LMS"), *A Multi-Part Study of Local Measured Service*, for the WUTC. In 1985, ETI authored Reply Comments of the U.S. Department of Energy, Richland Operations Office, regarding cost of service issues bearing on the regulation of telecommunications companies. These Reply Comments were submitted to the Commission in November of that year. In 1987, ETI was engaged by the Commission to undertake an examination of the outside plant construction and utilization practices of U S WEST Communications and to present recommendations based upon that investigation. The final

report arising from that assignment, *An Analysis of the Outside Plant Provisioning and Utilization Practices of US West Communications in the State of Washington*, was submitted to the Commission in March 1990.

Assignment

Q. What is the purpose of your testimony?

A. I have been asked by AT&T Communications of the Pacific Northwest, Inc. ("AT&T") to respond to the cost of capital testimony submitted by Verizon witness Dr. James Vander Weide, and to present the results of my analysis of the cost of capital specifically applicable to those UNEs that Verizon Northwest is required to provide pursuant to Sections 251/252 of the *Telecommunications Act of 1996*.

Summary of testimony

Q. Dr. Selwyn, please summarize the testimony you are presenting at this time.

A. My testimony examines the cost of capital as calculated by Verizon witness Dr. James Vander Weide and demonstrates that his recommendation is excessive, specifically with respect to its proposed use – i.e., to set Unbundled Network Element ("UNE") rates based upon TELRIC studies. A more appropriate measure of the current cost of money is that which would be sufficient to attract investment to the RBOCs' incumbent local exchange carrier (ILEC) entities specifically. Each of Dr. Vander Weide's cost of capital inputs; his

cost of debt (6.26%), his cost of equity (13.95%), his capital structure (25/75) and finally his "TELRIC-based" risk premium (3.95%), is overstated or, in the case of the "risk premium", is unnecessary. Dr. Vander Weide bases his proposed cost of capital upon a broad proxy of industrial firms that expressly *excludes* the *most comparable firms* – Verizon, BellSouth, and SBC! He has the temerity to recommend a cost of equity of 13.95% when his proxy openly excludes those three RBOCs (one of which, incredibly, is Verizon itself) precisely because their costs of equity fall in the lowest quartile of the proxy group and are thus characterized by Dr. Vander Weide as outliers, with costs of equity of 10.63% for Verizon, 10.29% for BellSouth, and 11.04% for SBC.[1] Dr. Vander Weide's results are also based upon outdated financial data and include an unjustified "risk premium." The risk premium alone raises his cost of capital estimate by a third, putting his recommended cost of capital well above all others in his proxy of competitive industrial companies.[2] As such, UNE prices that incorporate Dr. Vander Weide's recommended cost of capital of 15.98% would stifle UNE-based competition in Washington and would effectively force CLECs and their customers to subsidize Verizon's riskier ventures.

Verizon-specific factors must be the basis for identifying the appropriate risk-adjusted cost of capital applicable for the costing and pricing of UNEs that Verizon is required to provide

1. Indeed, these low costs of equity show that the cost of capital for ILECs are less than the average industrial firm. Verizon Response to AT&T/XO Data Request No. 4-001.

2. *In the Matter of the Review of unbundled Loop and Switching Rates; the Deaveraged Zone Rate Structure; and Unbundled Network Elements, Transport, and Termination*, WUTC Docket No. UT-023003, Direct Testimony of Dr. James Vander Weide on behalf of Verizon Northwest Inc., June 26, 2003 ("*Direct Testimony of Dr. James Vander Weide"*), at Exhibit JVH-2.

to CLECs *only in those instances where the CLEC's ability to compete would be impaired* – i.e., where alternatives to those UNEs are not, as a practical matter, available from any other competing source. Accordingly, the appropriate cost of debt is 4.98%, the appropriate cost of equity is 8.51%, and the appropriate debt/equity capital structure is 30/70. This determination of the cost of capital closely follows the FCC Wireline Competition Bureau's (WCB) application of TELRIC in the *Virginia Arbitration Order*.[3] In that ruling, the WCB found that the cost of debt should be based upon Verizon's average yield to maturity, that the cost of equity should be based upon the CAPM formula (and not on a DCF formula), and finally that the capital structure should be based upon market-based values for a proxy group of telecommunications companies. Applying these FCC-approved principles, the weighted average cost of capital (WACC) for Verizon UNEs is 7.45%.

A cost of capital of 7.45% more accurately reflects what other state commissions have recently decided as appropriate compensation for UNEs. In a recent UNE proceeding in New Hampshire, the New Hampshire Public Utilities Commission rejected all of Dr. Vander Weide's apocalyptic claims about the demise of the RBOCs in the local service industry and instead determined that the weighted average cost of capital for UNEs at 8.18% finding, among other things, that "current market conditions signal an unambiguously low oppor-

3. *In the Matter of Petition of Worldcom and AT&T for Preemption of the Jurisdiction of the Virginia Corporation Commission Regarding Interconnection Disputes With Verizon Virginia*, CC Docket Nos. 00-218 and 00-251, *Memorandum Opinion and Order*, 18 FCC Rcd 17722 (2003) ("*Virginia Arbitration Order*"), at paras. 58-104.

tunity cost of funds."[4] The analysis that follows will demonstrate that this is indeed the situation in Washington as the local service industry continues (and will continue) to confront significantly less risk than the overall capital market.

4. *Verizon New Hampshire Investigation into Cost of Capital, Order Establishing Cost of Capital*, New Hampshire Public Utilities Commission Docket No. DT 02-110, Order No. 24,265, January 16, 2004, slip. op. at 9.

COST OF CAPITAL APPLICABLE TO TELRIC

The cost of capital being recommended by Dr. Vander Weide overstates the return sufficient to attract capital to Verizon's incumbent local exchange carrier entities.

Q. What principles should be followed in determining the appropriate cost of capital for use in Total Element Long Run Incremental Cost ("TELRIC") studies undertaken for the purpose of setting UNE rates?

A. UNEs are, by their nature, *monopoly* services being offered on a noncompetitive basis by Verizon Northwest and by other incumbent local exchange carriers to competing non-dominant providers of local exchange services ("CLECs"). While the overall risk associated with investments in RBOCs such as Verizon has been increasing in recent years, the drivers of such elevated risk are primarily, if not exclusively, the RBOCs' pursuit of *nonregulated and competitive lines of business*, such as wireless, broadband, Internet access, and long distance services*, and not their core ILEC businesses*, such as the basic monopoly "Plain Old Telephone Services" ("POTS") and associated UNEs being furnished by Verizon Northwest.

As a general matter, Verizon and its witnesses Vander Weide and Shelanski argue that the *generally* increased level of competition in the telecommunications industry warrants the application of a "risk premium" when calculating the cost of capital applicable to UNEs. But to the extent that such increased risk is the result of nonregulated, competitive activities, the use of an overall average risk for the parent RBOC operates to shift the increased risk of

non-ILEC and other non-core business activities onto core ILEC service, effectively forcing the ILEC entity and its customers to cross-subsidize affiliate businesses in competitive industry segments and competitive services being furnished by the ILEC entity itself. Consequently, in order to establish fair, just and reasonable UNE rates and to avoid such cross-subsidization, it is necessary to determine the cost of capital specific to the ILEC entity only.

Cost of Debt

Dr. Vander Weide's calculation of the cost of debt is based upon a broad proxy of companies rather than the specifics of Verizon's actual cost of debt.

Q. What does Dr. Vander Weide propose for a cost of debt for Verizon Northwest's Washington operations?

A. Dr. Vander Weide proposes a cost of debt of 6.26%, based upon the "average yield to maturity on Moody's A-rated industrial bonds for April 2003."[5]

Q. Is it reasonable to use an interest rate averaged across all Moody's A-rated industrial bonds in determining the cost of debt applicable specifically to UNEs provided by Verizon?

A. No, it is not. While this measure is representative of the average industrial company, it is not necessarily representative of Verizon's cost of debt, and even less representative of the

5. *Direct Testimony of Dr. James Vander Weide*, at 45.

cost of debt that would confront an incumbent LEC that only furnished monopoly services. The use of a Moody average is also unnecessary, inasmuch as Verizon's cost of debt is not difficult to obtain, since it is presented and updated monthly in *Standard & Poor's Bond Guide*.

In the *Virginia Arbitration Order*, the WCB found that "the cost of capital calculation is intended to reflect the cost of a telecommunications carrier that operates in a market with facilities-based competition. ... Verizon has not demonstrated that debt costs faced by [industrial] companies generally are at all related to the costs telecommunication carriers would face in a market with facilities-based competition."[6] The current proceeding confronts exactly the same dispute – whether it is more appropriate to apply a cost of debt based upon a proxy of industrial companies or upon the current yields Verizon is using to attract purchasers of its own debt. Once again, Dr. Vander Weide has not presented any justification – nor could he – for his incredible proposition that the proxy, drawn from a broad composite of companies *and actually excluding Verizon and the other RBOCs,* is a better measure than Verizon's own rates.

Q. What is the proper measure for the cost of debt confronting Verizon Northwest?

A. The current yields to maturity of Verizon bonds (including those of its subsidiaries), which average 4.98% (see Attachment 2), should be used as an approximation for Verizon Northwest's cost of debt. Note, in particular, that the average yield to maturity on bonds

6. *Virginia Arbitration Order,* at paragraph 67.

issued by Verizon Northwest (formerly GTE Northwest) are very similar to those for the Verizon parent company overall – averaging 5.00% (see Attachment 2). It is, therefore, reasonable to impute the current costs of debt being experienced by Verizon as a whole for the Washington-specific operating company.

Q. Is your analysis consistent with the methodology adopted by the WCB in the *Virginia Arbitration Order*?

A. Yes. This is exactly how the WCB determined Verizon's cost of debt in the *Virginia Arbitration Order*.[7]

Bond rates have continued to fall since the date when the testimony underlying the *Virginia Arbitration Order* was originally filed on July 31, 2001, so a consistent application of the Virginia order would require that the determination of the cost of debt currently applicable to Verizon be based upon currently prevailing market conditions.

Q. The cost of debt that you have calculated – 4.98% – is less than the cost of debt of 7.86% as determined by the WCB for Verizon in Virginia as of June 30, 2000.[8] Given that you are utilizing the same methodology, what accounts for the difference?

7. *Virginia Arbitration Order*, at paras. 65-67.

8. *In the Matter of Petition of Worldcom and AT&T for Preemption of the Jurisdiction of the Virginia Corporation Commission Regarding Interconnection Disputes With Verizon Virginia*, CC Docket Nos. 00-218 and 00-251, *Direct Testimony of John I. Hirshleifer on behalf of AT&T and WorldCom, Inc.,* at 9.

A. From July 2001 to the present (April 2004), the federal funds rate, the cost to regional banks of borrowing immediately available funds from the Federal Reserve (primarily for one day), has dropped from 3.77% to 1.00%.[9] More importantly, though, is the larger trend in federal fund rates. After an extended period of relatively high federal fund rates from 1999 through 2000 (where the rates hovered between 5%-6%), rates dropped precipitously and have remained close to 1% for the last year (see Chart 1 below). Federal funds rates have a much larger effect than just impacting the cost of short-term capital for banks; they are representative of the Federal Reserve's short-term market expectations. The longer its rates remain at a particular level (low or high), the greater the impact upon the cost of medium and longer term rates experienced in the economy generally. Indeed, the return on long-term Treasury Bonds has also dropped precipitously since the original filing of the *Virginia Arbitration* testimony. The return on 20-year Treasury bonds has decreased from 6.26% (March 2001) to 4.67% (March 2004). These real changes in future expectations of the market have also impacted the cost of debt for Verizon as well – Verizon's average yield to maturity on debt has decreased from 7.86% (as of June 2000) to 4.98% (as of February 2004). Thus, the application here of the same methodology adopted in the *Virginia Arbitration Order* has produced a very different cost of debt for no other reason than that future expectations of the market have also declined.

9. http://www.federalreserve.gov/releases/h15/data/m/fedfund.txt, accessed 4/5/04.

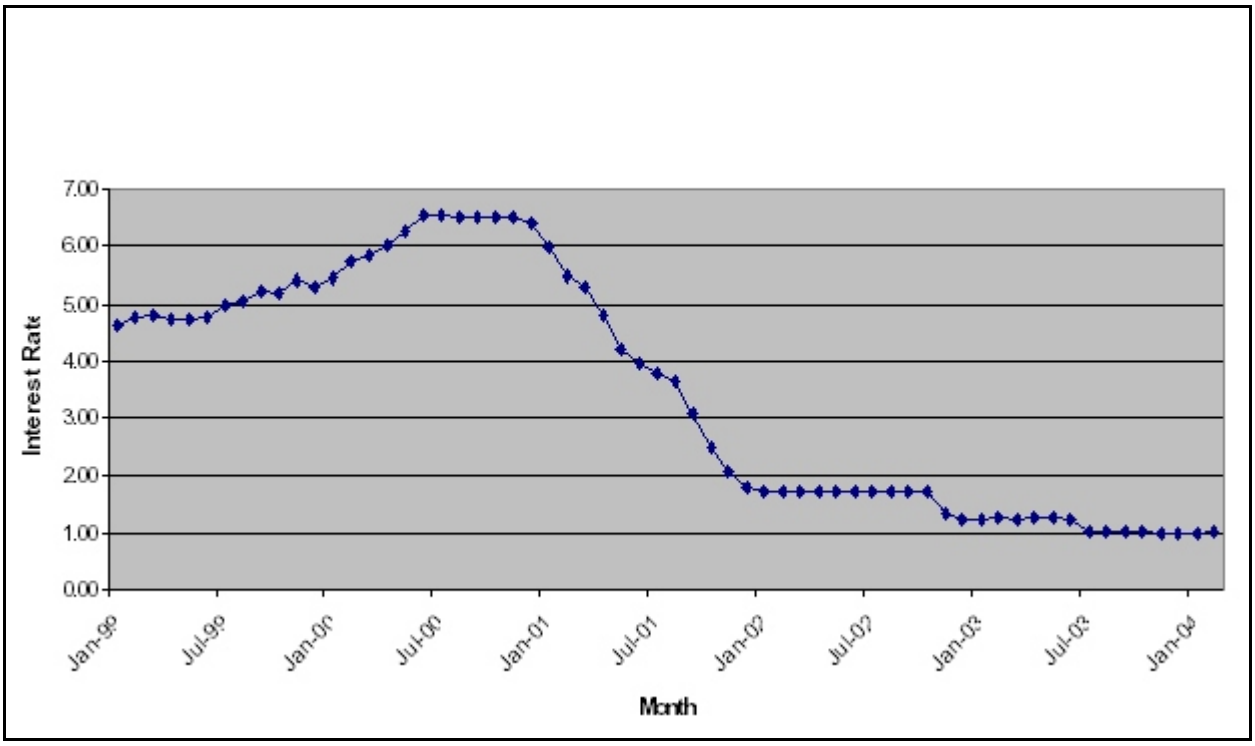

Figure 1. Federal Fund Rates January 2000 - February 2004

Cost of Equity

Dr. Vander Weide's use of a Discounted Cash Flow (DCF) methodology for determination of Verizon's cost of equity relies upon multiple – and unsupported – assumptions about dividend growth rates.

Q. How does Dr. Vander Weide calculate the cost of equity?

A. Dr. Vander Weide uses the discounted cash flow (DCF) model to calculate the cost of equity for a proxy of competitive industrial companies. He then excludes the lowest and highest quartiles, and averages the cost of equity for the remaining 2nd and 3rd quartile values for the industrial companies and imputes this value (13.95%) for Verizon Northwest. This technique raises many concerns, including (1) the model used, (2) the assumptions made about dividend growth rates, (3) the exclusion of all of the RBOCs either because their costs of equity happen to fall in the lowest quartile or, in the case of Qwest, because it does not pay any dividend, (4) the relevance of this proxy to the actual services being provided – local exchange service, and (5) the actual impact of competition on risk. I will discuss each of these concerns in greater detail below.

Q. How does the DCF model calculate the cost of equity?

A. The DCF model assumes that the current cost of equity is equal to the discounted cash flow of all future dividend payments. The model sometimes includes a terminal value to represent the sale price of the stock on the day it is sold, but the model works both ways – either the dividends are extended into perpetuity or the stock is sold at some fixed future

date. Either way, the discount rate of future dividend payments (r), by definition, is equal to the cost of equity capital and can be calculated as

$$P = D/(r-g)$$

$$\text{or} \quad r = (D/P) + g$$

where P = the original price of equity
D = the dividend payout (D)
g = the dividend growth rate[10]

From these equations, one can easily see that the cost of capital (r) is directly related to the dividend growth rate (g) imputed in the model. In fact, Dr. Vander Weide's use of the DCF model assumes that the dividend growth rate is applied in perpetuity, i.e., that dividends will continue to grow forever at the assumed rate.

Q. What growth rates did Dr. Vander Weide impute into his DCF model?

A. Dr. Vander Weide relies upon Institutional Brokers Estimate System ("I/B/E/S") dividend growth estimates, which average 11.9% per year for his proxy.

Q. Is that growth rate reasonable?

10. Ross, Stephen A., Westerfield, Randolph W., and Jaffe, Jeffrey. *Corporate Finance*, 5th Edition, Irwin McGraw-Hill, 1999, at 294, Footnote 2.

A. No, not as an assumption of perpetual growth. While it is possible that some companies' dividends may grow 11.9% (or higher) per year for a few years, it is not possible that the entire proxy of industrial companies will average 11.9% growth forever. Indeed, I/B/E/S reports that "analysts typically do not make forecasts for periods beyond the third fiscal year and fourth quarter."[11] Thus, Dr. Vander Weide's assumption that the I/B/E/S growth rates represent perpetual growth rates is a faulty assumption that artificially raises his cost of equity estimates to supernatural levels. In fact, long term views of the US economy, recently released in the 2004 *Economic Report of the President*, predict long-term annual growth rates in the range of 3.1%.[12] This is a more realistic expression of long-term perpetual growth and is indeed a far cry from Dr. Vander Weide's absurd assumption of 11.9% perpetual growth.

Q. Was this issue addressed by the WCB in the *Virginia Arbitration* case?

A. Yes, it was. In the *Virginia Arbitration Order*, the WCB recognized this same problem with both the DCF model generally and with Dr. Vander Weide's application of it in particular. The WCB thus recommended that, if regulators are to use the DCF model, then the dividend growth rates should be "roughly the same magnitude as the long-term growth rate of the economy."[13] The WCB went on to conclude that "[i]f the growth rate used in the model is

11. http://brunolib.cba.ua.edu/research/sumhisf002.doc, accessed on March 26, 2004.

12. *Economic Report of the President*, United States Government Printing Office, Transmitted to the Congress February 2004, at 98.

13. *Virginia Arbitration Order,* at paragraph 73.

substantially inconsistent with this assumption [that the dividend growth rate should equal the long-term growth rate of the economy] ... the model is unlikely to produce an accurate cost of equity capital estimate."[14]

Indeed, financial institutions that use the DCF, such as Mellon Capital Management, to calculate their long-term expected return (read: cost of capital) on investments, adjust growth rates downward to reflect the long-term growth rate of the economy. A Mellon Capital Management brochure, "Domestic Tactical Asset Allocation," describes its "Investment Process" using I/B/E/S dividend growth estimates, explaining that it

> ... evaluate[s] forecasts of company earnings and dividends using analyst earnings and payout ratios provided by Institutional Brokers Estimates System (I/B/E/S). Dividend streams are projected using analyst estimates in the near-term and, over the long-term, incorporate reversion of earnings growth to the expected long-term growth rate of the economy.[15]

Clearly, Dr. Vander Weide's growth estimates are inconsistent with this assumption by Mellon and with the specific conclusion reached by the WCB. As such, Dr. Vander Weide's calculations unquestionably inflate the cost of equity.

Q. If you were to impute the proper economy wide growth rate as you have suggested, what would be the average cost of equity for Dr. Vander Weide's proxy of competitive companies?

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14. *Id.*, at paragraph 73.

15. www.mcm.com/public/assets/strategy_pieces/dtaa_brochure.pdf, accessed March 29, 2004.

A. We can answer that by examining the impact of decreasing dividend growth rates for one stock in Dr. Vander Weide's proxy whose cost of equity is similar to that for the average industrial company in Dr. Vander Weide's truncated sample (13.95%). 3M, for example, has a cost of equity (according to Dr. Vander Weide) of 13.91%. This estimate is based upon a stock price of $129.67, an annual dividend of $2.64, and a growth rate of 11.5%. Let's assume that 3M will maintain that growth rate for 10 years (an unrealistic/optimistic assumption) after which growth will decline linearly over the next twenty years until it reaches the growth rate of the economy (3.1%). These assumption alone decrease the DCF-calculated cost of equity for 3M from 13.91% to 8.6%. It is not unreasonable to assume that most stocks would encounter similar decreases (relative to Dr. Vander Weide's calculations) if the growth rates were adjusted to reflect more realistic assumptions.

The CAPM is more widely accepted, easier to apply, and more commonly used than the DCF model in estimating cost of equity.

Q. Are there other techniques for calculating the cost of equity that can be used as alternatives to the DCF model?

A. Yes. In fact, the Capital Asset Pricing Model (CAPM) is the most commonly used technique to calculate the cost of equity.[16] The CAPM assumes that investors assess risk and

16. A recent Northwestern University study reported that "current textbooks used in all major MBA courses advise financial managers to calculate the cost of capital based on the Capital Asset Pricing Model (CAPM)." Indeed, "a recent survey by Graham and Harvey (2001) finds that three out of four CFOs use the CAPM as the primary tool to assess cost of capital." (Ravi Jagannathan and Ellen McGrattan, "The CAPM Debate," Federal Reserve Bank of

(continued...)

demand returns based upon a stock's variability vis-a-vis the market as a whole (often measured by the S&P 500). Thus, the more a stock's variability differs from the overall market variability, the riskier it is. The model implies a linear relationship between the cost of capital and a stock's exposure to systematic risk (risks that impact all companies simultaneously and thus cause the entire market to react).[17] Systematic risk is measured by a company's "beta" values and the linear relationship is often represented by a graphical line known as the Security Market Line (or SML).[18] By definition, the model also assumes that investors are not concerned with company-specific risks (risks that impact only a few firms) because (1) these risks are diversifiable and (2) the overall market is not going to react to these changes. Thus the beta value, the systematic risk, is the sole risk factor affecting the cost of capital.

Mathematically, the cost of equity (r) can be expressed as

$$r = (\beta * P) + R_f$$

where β = the beta value
P = the average stock market risk premium above the average risk free rate
R_f = the risk-free rate

16. (...continued)
Minneapolis Quarterly Review, Fall 1995, at 5 &13.)

17. Ross, Stephen A., Westerfield, Randolph W., and Jaffe, Jeffrey. *Corporate Finance*, 5th Edition, Irwin McGraw-Hill, 1999, at 259-260.

18. The SML is defined as "A straight line that shows the equilibrium relationship between systematic risk and expected rates of return for individual scenarios. According to the SML, the excess return on a risky asset is equal tot eh excess return on the market portfolio multiplied by the beta coefficient." (Ross, Stephen A., Westerfield, Randolph W., and Jaffe, Jeffrey. *Corporate Finance*, 5th Edition, Irwin McGraw-Hill, 1999, at 865.)

This concept, which has become the foundation of asset pricing, was originally developed by William Sharpe (1964).[19] Years after developing the model, Dr. Sharpe went on to win the Nobel Prize in Economics (1990) specifically for "his contributions to the theory of price formation for financial assets, the so-called Capital Asset Pricing Model (CAPM)." In his December 7, 1990 Nobel acceptance speech, Dr. Sharpe reaffirmed his original thesis, stating that the CAPM "shows that expected returns will be linearly related to *market risk* [i.e., systematic risk], but not, as often believed, to *total risk* [i.e., company-specific risk]."[20]

In the CAPM, the beta value of equity measures the systematic risk of a particular company. "Beta" is a widely-recognized index of *systematic* risk applied in the Capital Asset Pricing Model (CAPM). Firms whose earnings are thus less volatile than the S&P 500 companies overall will have a beta value of less than 1.0; those exhibiting greater variability will have a beta value in excess of 1.0. World Bank economist Sergio Hinojosa has described beta as "an elasticity measure that determines how changes in the economy [such as inflation, interest rates, GDP, etc.] affect the profitability of the project."[21] In the *Virginia Arbitration Order*, the WCB agreed with this assessment, describing beta as an index that "measures the

19. William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," *Journal of Finance*, September 1964, at 425-442.

20. William F. Sharpe, "Capital Asset Prices With and Without Negative Holdings," *Journal of Economic Sciences*, January 1991, at 319.

21. Hinojosa, Sergio A, *New issues in Natural Monopoly Regulation: The Financial Side in Infrastructure Projects Through Public Private Ownership*, The World Bank, at pages 11-12.

degree to which a company's stock price varies relative to the market as a whole, i.e. it represents the systematic or non-diversifiable risk of the stock."[22]

Q. Hasn't the CAPM, as an economic model, also be subject to some criticism regarding its power of prediction with respect to stock returns?

A. Yes. After many years of praise and development from economists such as Lintner (1965), Black (1972), Fama (1973) and Ross (1976), the CAPM came under criticism from a few economists – notably Banz (1981) and Fama and French (1992). Banz and subsequently Fama and French (F&F) criticized the CAPM's predictive powers because their empirical analyses (for smaller firms in the case of Banz and for stocks over the period 1963-1990 in the case of F&F) did not support the expected relationship between return and systematic risk measured by beta.[23] These results, particularly by F&F, have in turn also been criticized. Notably, Black (1993) responded to F&F's analysis, saying that "[a]nnouncements of the 'death' of beta seem premature."[24] Black described the work of F&F as "data-mining"[25] and urged investors to "continue to use the CAPM and beta to value investments and to

22. *In the Matter of Petition of Worldcom and AT&T for Preemption of the Jurisdiction of the Virginia Corporation FCC Regarding Interconnection Disputes With Verizon Virginia*, CC Docket Nos. 00-218 and 00-251, *Memorandum Opinion and Order*, 18 FCC Rcd 17722 (2003) ("*Virginia Arbitration Order*"), at para. 93; *TELRIC NPRM*, at para. 87.

23. Ravi Jagannathan and Iwan Meier, "Do We Need CAPM for Capital Budgeting," Financial Management, Winter 2002, at 17.

24. Fisher Black, "Beta and Return," *The Journal of Portfolio Management*, Fall 1993, at 8.

25. *Id.* at 10.

choose portfolio strategy."[26] Other economists have also reaffirmed the relevance of the CAPM and criticized the work of Fama and French. Amihud, Christensen and Mendelson (1992) found that the data used by F&F were too noisy and "that when a more efficient statistical method is used, the estimated relationship between average return and beta is positive and significant."[27]

Q. Did the WCB address the choice of a cost of equity model between the DCF and the CAPM in its *Virginia Arbitration Order*?

A. Yes. The Bureau expressed a clear preference for the CAPM approach.[28]

Q. What rationale did the WCB advance for its support of CAPM over DCF in the Virginia Arbitration case??

A. In the *Virginia Arbitration Order*, the Wireline Competition Bureau concluded that "the CAPM is the better mechanism for estimating the cost of equity."[29] It reasoned that "the CAPM does not rely on assumptions concerning dividend growth rates, and therefore the cost of capital estimates derived from the CAPM are no better or worse for companies that

26. *Id.,* at 17.

27. Ravi Jagannathan and Ellen McGrattan, "The CAPM Debate," Federal Reserve Bank of Minneapolis Quarterly Review, Fall 1995, at 13.

28. *Virginia Arbitration Order*, at para. 71.

29. *Id.,* at para. 71.

are growing rapidly than for those growing slowly."[30] Indeed, this notion that the CAPM is a better model than the DCF is widely held. In Ross, Westerfield, and Jaffe's popular text-book, *Corporate Finance*, they write that "[t]he dividend-valuation model [i.e., DCF model] is generally considered both less theoretically sound and more difficult to apply practically than the SML [i.e., CAPM]."[31]

Q. Which model do you use in your analysis?

A. I use the CAPM to calculate the cost of capital for UNEs because (as explained above) it is both easier to apply and more theoretically sound. While the DCF can be used to produce a sensible result if proper growth rates are imputed, the CAPM presents fewer opportunities for error. My complete CAPM cost of equity calculation is presented below.

Q. What values do you use for the inputs in the CAPM, namely the risk-free rate (R_f), the market risk premium (P), and the beta value (β)?

A. Generally, the risk-free rate is calculated using the return on the 30-day U.S. Treasury Bill (T-Bill) because it is assumed in the financial community that there is almost no chance of the government defaulting on the loan and thus it is risk-free.[32] The Wireline Competition

30. *Id.,* at para. 71.

31. Ross, Stephen A., Westerfield, Randolph W., and Jaffe, Jeffrey. *Corporate Finance*, 5th Edition, Irwin McGraw-Hill, 1999, at 294, Footnote 2.

32. Ross, Stephen A., Westerfield, Randolph W., and Jaffe, Jeffrey. *Corporate Finance*, 5th (continued...)

Bureau echoed this remark in the *Virginia Arbitration Order* when it concluded that the "30-day Treasury Bill has almost no default risk and little interest rate risk. It therefore is the closest proxy for a risk-free rate."[33] However, because there can be major fluctuations in the 30-day rate over a short period of time (and that can then lead to large fluctuations in the calculated cost of equity), some economists prefer to use a longer term government bond rate. Rather than choose one technique over the other, the Wireline Competition Bureau opted to average the two (a short term T-Bill and a longer term Treasury Bond) to determine the risk-free rate in the *Virginia Arbitration Order*. Specifically, the Bureau averaged the return on a 30-day T-Bill and a 20-year Treasury Bond. This approach is reasonable and thus I have applied it in my analysis, averaging 0.94% (the return on a 30-day T-Bill) and 4.67% (the return on a 20-year Treasury Bond) both as of March 15, 2004, to calculate a risk free rate of 2.81%.

The market risk premium (P) is closely related to the risk-free rate (R_f) because the market risk premium equals the average return for large stocks in the stock market (M_r) minus the average return based upon the risk-free rate (whether it is based upon either short-term T-Bills or long-term Treasury Bonds); $P = M_r - R_f$.[34] As with the current risk-free rate, there remains considerable debate over the best historical risk-free rate. The WCB opted once

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32. (...continued)
Edition, Irwin McGraw-Hill, 1999, at 219.

33. *Virginia Arbitration Order*, at paragraph 78.

34. The average stock market returns for large stocks, as average returns for government T-Bills and for Treasury Bonds, are all calculated using Ibbotson Associates' SBBI Yearbook. The returns for each category are averaged over the period, 1926 - 2003.

again to average the two; the average return on short-term T-Bills and the average return on long-term Treasury bonds. This is reasonable, and I have applied it here as well. According to Ibbotson Associates' 2004 SBBI Yearbook, the average return on large company stocks is 12.41%, the average return on government T-Bills is 3.80%, and the average return on government Treasury bonds is 5.80%.[35] Therefore, the average market risk premium is calculated as: 12.41% - ((3.80% + 5.80%)/2) = 7.61%.[36]

Q. What beta value did you use in the CAPM?

A. In the *Virginia Arbitration Order*, the Bureau concluded that "[a]bsent evidence of any unique risks associated with the telecommunications industry, *or a particular segment of the industry*, we would be uncomfortable prescribing a cost of equity capital for UNEs that is based on a beta significantly higher or lower than the average beta for companies that face competition."[37] My analysis demonstrates that there *are* "unique risks" associated with particular industry segments, and provides precisely the type of evidence to which the

35. See Attachment 3. Ibbotson Associates, Stocks, Bonds, Bills, and Inflation 2004 Yearbook: Market Results for 1926 - 2003.

36. Recently, there has been significant debate among economists about how best to calculate the equity risk premium. While economists traditionally have used historical equity risk premiums to calculate an average historical premium and apply it to current matters, there is a growing body of literature that suggests that this historical premium may be too high. Finance heavyweights such as Roger Ibbotson of Yale and John W. Campbell of Harvard have expressed opinions that forward-looking equity risk premiums more closely resemble 1%-4% above the return on risk-free government bonds (TIAA-CREF Investment Forum: Idea Exchange, June 2002, available at kuznets.fas.harvard.edu/~campbell/papers/tiaacref.pdf (accessed 4/16/04). The 7.61% risk premium that I have calculated is, if anything, excessive.

37. *Virginia Arbitration Order*, at para 90, emphasis supplied.

Bureau had referred. The analysis that I will describe below provides a basis to *disaggregate* the parent company beta into its component parts based upon their respective industry segments, and concludes that the beta applicable to the RBOCs' ILEC entities is well below that applicable for the parent corporation.

Q. Are you making a distinction between the RBOC overall – e.g., Verizon Communications, Inc. – and a "pure ILEC"?

A. Yes. Each of the four remaining RBOCs – Verizon, SBC, BellSouth, and Qwest – is a conglomerate of separate companies whose respective portfolios include, in varying proportions, pure ILECs, wireless carriers, long distance resellers, Internet service providers, directory publishers, and a variety of offshore ventures. UNEs are provided solely by the pure ILEC entities – e.g., Verizon Northwest in this instance – and so it is necessary, when determining the cost of equity applicable to the provision of UNEs – that the risk confronting the pure ILEC entity be isolated from the remainder of the parent corporation's portfolio and that it be estimated specifically with respect to the pure ILEC entity.

Q. Why is that?

A. Verizon Northwest does not share in any of the profits earned by such other Verizon affiliates as Verizon Online, Verizon Wireless, or Verizon Long Distance; indeed, the flow of benefits arising from the corporate affiliation of Verizon Northwest with these other parts of the Verizon family is decidedly unidirectional – i.e., flowing to the affiliates by virtue of

their unique access to the ILEC entity's resources and near-ubiquitous customer base. Accordingly, there is simply no justification for spreading the obviously elevated risk confronting the entities that furnish competitive and discretionary services over to Verizon Northwest. *Yet that is exactly what Dr. Vander Weide does when he attempts to ascribe the Verizon RBOC beta and resulting cost of capital to its ILEC entities specifically.* The risk premium and the cost of capital applicable to Verizon Northwest should reflect the risks and costs that Verizon Northwest actually confronts or that it *would confront* if it were to operate and raise capital on a purely stand-alone basis, and not on the average risk and average cost of capital for Verizon as a whole or, even worse, for a composite of competitive industrial companies that does not even include Verizon!

Q. Have you undertaken an analysis to do that here?

A. Yes. My analysis, presented below, shows that the systematic levels of risk confronting the *non-ILEC* entities within the overall RBOC portfolio are significantly greater than for the pure ILEC entities. With respect to the pure ILEC entities, my analysis demonstrates that the minimal level of competition that has emerged in the local exchange market has had no consequential impact upon the beta of the pure ILEC entities. RBOC betas have increased in recent years, but this can be traced directly to their diversification into riskier ventures. I extract the beta for a pure ILEC, which I have determined to be 0.75, and apply it to my CAPM cost of equity calculation.

Q. What is the cost of equity confronted by a pure ILEC?

A. The cost of equity for a pure ILEC is equal to the product of the beta (0.75) and the market risk premium (7.61), plus the risk free rate (2.81%), or (0.75*7.61) + 2.81. The CAPM cost of equity is thus calculated as 8.51%.

Dr. Vander Weide's cost of equity analysis fails to address the bifurcated test established by the WCB in the *Virginia Arbitration Order,* and thus his analysis focuses too heavily upon the impact of competition and disregards the lack of risks associated with the core ILEC local service business.

Q. What guidance has the FCC provided to state commissions when applying TELRIC pricing to UNEs?

A. In the *Virginia Arbitration Order*, the Wireline Competition Bureau reasserted the FCC's findings in the original *First Interconnection Order* (CC Docket 96-98), stating that "the cost of capital calculation is intended to reflect the cost of [1] a telecommunications carrier that operates in a market with [2] facilities-based competition."[38] This bifurcated test best summarizes the guidance that the FCC has provided to state commissions. Essentially, state commissions must determine a cost of capital that reflects both the risks associated with (1) the actual service being provided under (2) facilities-based competition.

Q. Does Dr. Vander Weide's cost of equity analysis address both prongs of the FCC's bifurcated test?

38. *Virginia Arbitration Order*, at paragraph 67.

A. No. Dr. Vander Weide assumes, without empirical support, that the impact of competition on the local service industry will be so drastic that the cost of equity capital is best represented by averaging the costs of equity for a proxy group of competitive industrial companies that have no relationship to the local wireline telephone service business. Incredibly, Dr. Vander Weide actually *excludes* all telecommunication carriers *including and especially the four RBOCs* precisely because their costs of equity were too low (Verizon at 10.63%, BellSouth at 10.29%, SBC at 11.04%, Sprint at 9.28%, and ALLTEL at 11.32%)[39] and thus fell in the lowest quartile of industrial company cost of equities. This deliberate exclusion of the *most relevant and comparable companies*, together with other actions taken by Dr. Vander Weide, all directly ignore the two-pronged test established by the FCC.

Q. Is the methodology that Dr. Vander Weide has employed in this case for determining the cost of equity similar to the approach he had adopted in the Virginia Arbitration case and which the WCB has rejected?

A. Yes. Dr. Vander Weide presented the same analysis in the Virginia Arbitration case, and the WCB there concluded that the "businesses of most of Verizon's S&P proxy group of companies have no obvious similarities to the provision of local exchange services ... *Consequently, there is no basis on which to conclude that this proxy group best represents the risks that Verizon would face if it faced facilities-based competition.*"[40]

39. Verizon Response to AT&T/XO Data Request No. 4-001.

40. *Virginia Arbitration Order*, at para. 90, emphasis supplied.

Q. What justification does Dr. Vander Weide provide for ignoring the specific risks and subsequent cost of capital associated with the local service industry?

A. Dr. Vander Weide apparently concludes that TELRIC implies that the cost of capital must reflect the costs faced by a "UNE-only" carrier. No basis for that apparent conclusion is offered and, in fact, it makes no sense. In its *Triennial Review Order*, the FCC has determined that ILECs are required to provide UNEs only in those cases where the CLECs' ability to compete would be "impaired" if the UNE were not available.[41] With respect to mass market voice-grade loops, the *TRO* all but states that loops remain a natural monopoly:

> Constructing loop plant is both costly and time consuming, regardless of the type of loop being deployed. Notably, both the Supreme Court and the D.C. Circuit recognized that incumbent LECs may be required to unbundle loop facilities because they are "very expensive to duplicate." Because the distribution portion of the loop serves a specific location, and installing and rewiring that loop is very expensive, most of the costs of constructing loops are sunk costs.[42]

Facilities-based competition for mass market loops is thus not realistic in view of the economics of loop deployment (particularly with respect to distribution cable). As such, CLECs would not be expected to overbuild existing ILEC subscriber distribution plant simply because CLECs could not possibly hope to achieve the economies of scale that are *uniquely available to the dominant incumbent LEC*. Dr. Vander Weide's hypothetical "UNE-only" carrier would thus necessarily be supplying network access *not just to CLECs*,

41. TRO, at para. 7.

42. *Id.*, at para. 205, footnotes omitted.

but also to the ILEC itself, because a "UNE-only" company whose network was only being used by non-affiliated CLECs would not achieve the economies of scale that forms the basis for the Sec. 251/252 unbundling requirement in the first place. Moreover, *by definition*, those UNEs that ILECs will continue to be required to provide – i.e., those that satisfy the "impairment" standard as set forth in the Commission's *Triennial Review Order* ("TRO")[43] – do not confront facilities-based competition, since if they did the "impairment" standard would not be satisfied and the ILEC would not be required to offer such elements as UNEs. Finally, a "UNE-only" company that also provided wholesale network access to its own ILEC affiliate (or to a divested dominant LEC) would exist under conditions of structural separation that the RBOCs have consistently and strenuously opposed and that has been rejected by the FCC and by state commissions.[44] Indeed, the FCC seems to be moving in precisely the opposite direction, as demonstrated by the decision announced on March 11, 2004, in WC Docket No. 03-228, under which the FCC will now permit Verizon ILECs and Verizon's Sec. 272(a) long distance affiliate to integrate their Operations Installation and

43. *Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers* (CC Docket No. 01-338); *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996* (CC Docket No. 96-989); *Deployment of Wireline Services Offering Advanced Telecommunications Capability* (CC Docket No. 98-147), FCC No. 03-36, rel. Aug. 21, 2003 ("*Triennial Review Order*" or "*TRO*").

44. *See*, e.g., Pennsylvania PUC Docket No. —00001353, *Re: Structural Separation of Bell Atlantic-Pennsylvania, Inc. Retail and Wholesale Operations*, Direct Testimony of Dr. Kenneth Gordon on behalf of Bell Atlantic-Pennsylvania, June 26, 2000, at 9-27.

Maintenance (OI&M) activities, thus pushing the notion of a "UNE-only" provider even further from reality.[45]

Dr. Vander Weide's rationale for ignoring the current costs of equity specifically confronting the RBOCs stems from his dissociation of the actual risks being faced by the existing ILECs from the entirely hypothetical risks that he contends would be faced by his self-created hypothetical "UNE-only" provider. Dr. Vander Weide concedes that "there are no publicly-traded companies that have built telecommunications networks solely for the purpose of providing unbundled network elements in a competitive environment" and from this utterly unremarkable observation leaps to his utterly unsupported *and unsupportable* conclusion that "the S&P Industrials are the best proxy for determining the cost of capital component of UNE cost studies."[46] Dr. Vander Weide thus attempts to draw a distinction between the risks of being a retail local service provider and the risks of being an entirely hypothetical and patently nonexistent UNE-only provider. Of course, not only are there"no publicly-traded companies that have built telecommunications networks solely for the

45. Section 272(b)(1)'s "Operate Independently" Requirement for Section 272 Affiliates, WC Docket 03-228, Petition of SBC for Forbearance from the Prohibition of Sharing Operations, Installation, and Maintenance Functions under Sections 53 203(a)(2) and 53 203(a)(3) of the Commission's Rules and Modification of Operations, Installation, and Maintenance Conditions Contained in the SBC/Ameritech Merger Order, CC Docket Nos. 96-149, 98-141, Petition of BellSouth Corporations for Forbearance from the Prohibition of Sharing Operating, Installation, and Maintenance Functions Under Section 53.203(a)(2)-(3) of the Commission's Rules, CC Docket No. 96-149, Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services, CC Docket No. 01-337, Report and Order in WC Docket No. 03-228, Memorandum Opinion and Order in CC Docket Nos. 96-149, 98-141, 01-337, FCC 04-54, March 17, 2004.

46. *Direct Testimony of Dr. James H. Vander Weide*, at 46.

purpose of providing unbundled network elements in a competitive environment," there are – nor are there likely ever to be – *any* "companies that have built telecommunications networks solely for the purpose of providing unbundled network elements in a competitive environment."

Q. Is it reasonable for Dr. Vander Weide to measure risk under TELRIC in terms of the risks associated with a UNE-only carrier?

A. No. The notion of a "UNE-only carrier" makes no sense when considered in the overall context of the *1996 Act*. In enacting Sections 251 and 252, Congress understood that *incumbent* LECs possessed unique resources that entrants could not be expected to replicate without expending considerable amounts of time and economic resources. The UNE requirement was imposed precisely because ILECs possessed legacy infrastructures that, by virtue of the ILECs' traditional status as regulated public utilities, were deployed ubiquitously throughout each ILEC's operating territory. When provided, UNEs utilize a small portion of those common resources, and benefit specifically from the scale and scope economies of the ILEC network.

The "T" in TELRIC refers not to the total quantity of UNEs, but to the total quantity of network elements deployed by the ILEC for its use in providing retail services as well as for providing UNEs. Indeed, several state commissions (including those in Pennsylvania, Florida and California) had considered the concept of creating a "UNE-only" carrier through structural separation of the incumbent LEC's network and retail operations. Under this

concept, the ILEC's retail entity would have purchased UNEs from the network entity on exactly the same basis and under exactly the same terms and conditions as any other CLEC. In such "structural separation" proceedings, the ILEC strenuously opposed any form of structural separation, arguing that, among other things, the physical separation of the network and retail functions would be extremely inefficient and costly. It is, to say the least, highly disingenuous for the ILECs to now posit the fiction of a UNE-only carrier as the construct to be utilized in evaluating the "risks" inherent in providing UNEs to CLECs, when they themselves (including Verizon) had so strenuously argued that the very notion of a "UNE-only" wholesale network entity would be so terribly inefficient.

Q. What is the effect of assuming a hypothetical UNE-only provider upon Dr. Vander Weide's approach to determining the cost of capital?

A. Dr. Vander Weide relies upon this nonexistent "UNE-only" entity as the rationale for ignoring the fact – as demonstrated in his own cost of equity analysis – that the cost of equity confronting the *diversified* RBOCs – including their *non-ILEC* operations – is less than that for the average industrial company, and on that basis posit the absurd claim that his hypothetical "UNE-only" company would confront the same level of systematic risk as the average (*sans* "outliers") of all industrials. It also allows Dr. Vander Weide to ignore the fact that the RBOCs compete in multiple communications markets (ILEC services, wireless, broadband, Internet access, directory publishing, and offshore ventures) each of which confront different levels of systematic risk. And finally, it allows Dr. Vander Weide to gloss over the enormous economies of scale and scope that the RBOCs currently possess and will

continue to possess in any realistic competitive landscape in the future. By ostensibly basing his findings upon an entirely nonexistent "UNE-only" company, Dr. Vander Weide conveniently delinks and unhooks his "analysis" from any reality, thereby making whatever specific figure he advances entirely arbitrary.

Competitive companies do not all confront the same degree of systematic risk and thus do not all have the same beta value.

Q. What affects a firm's beta value – the sole risk factor in the CAPM?

A. Beta values are influenced by a number of factors. Firms and industries that confront highly stable demand – demand that does not vary significantly across a business cycle – tend to exhibit low systematic risk. For example, the demand for and supply of water is minimally impacted by macroeconomic factors; not surprisingly, water utilities such as American States Water and California Water have beta values in the 0.60 to 0.65 range.[47] Basic local telephone service is viewed by most consumers and businesses as essential, and like water the demand for POTS will similarly be only minimally affected by macroeconomic factors. Firms in markets that are heavily impacted by business cycle or other exogenous effects (like changes in GDP) – such as firms that produce capital equipment used in the production of other goods and services or firms that produce highly discretionary consumer products or services – generally exhibit relatively high betas.[48] For example, when a recession occurs,

47. *Value Line Investment Survey*, October 31, 2003, at 1421-1422.

48. For example, the semiconductor industry has an average company beta of 1.49. Value (continued...)

certain more discretionary and durable goods tend to feel this impact more quickly and more profoundly than, for example, necessities such as food and basic local telephone service. People take less lavish vacations, buy new cars and new computers less often, and defer other less necessary purchases. The responsiveness of income on consumption of a good is known as its income elasticity. Core basic local telephone service is generally viewed as a necessity and thus exhibits very low income elasticity.[49]

Q. Do all competitive industries confront the same level of systematic risk?

A. No. In fact, many competitive markets have average company betas different than the 1.00 average for the entire market. Table 1 presents a series of average beta values for a number of key industries, measured as the market cap-weighted average of the individual company betas. Highly competitive industries such as Soft Drinks and Restaurants have industry betas of 0.67 and 0.87, respectively, well below the S&P 500 market-wide average.[50] Publicly traded firms in these sectors (which, in the case of Restaurants are predominated by low-end fast-food and "family restaurant" chains such as McDonald's, Applebee's, Wendy's and Yum! Brands (which owns KFC, Pizza Hut, and Taco Bell) likely confront very low

48. (...continued)
Line Investment Survey, October 17, 2003, at 1052-1090.

49. According to one study, the income elasticity of local telephone service is 0.1224. M. Ishaq Nadiri and Banani Nandi, "The Changing Structure of Cost and Demand for the U.S. Telecommunications Industry," National Bureau of Economic Research, Working Paper 5820, released November 1996, at 30.

50. *Value Line Investment Survey*, September-November, 2003. See Table 3.

income elasticities, which is also the case with local telephone service. These firms, like "pure" ILECs, tend to exhibit relatively less earnings variability than the market as a whole. On the other hand, Semiconductors also encounter fierce competition and yet have an industry beta of 1.5, perhaps because the demand for the end products in which they are utilized (e.g., personal computers) is itself heavily impacted by macroeconomic conditions. Systematic risk is thus subject to wide variations across different industries, influenced primarily by the varying effects of factors such as interest rates, GDP, consumer income levels and aggregate consumer demand. As these figures demonstrate, there is no particular relationship between "competition" and "systematic risk." So although the WCB has held that "the cost of capital calculation is intended to reflect the cost of a telecommunications carrier that operates in a market with facilities-based competition," there is no basis upon which to conclude that the systematic risks associated with "a [local telecommunications] market with facilities-based competition" are any greater than for such a market operating as a pure monopoly.

Table 1

Average Company Beta Value By Industry
Fall 2003

Industry[1]	Number of Competitors	Weighted Average Beta
Soft Drink	8	0.67
Petroleum	21	0.79
Restaurant	29	0.87
Automobile	9	0.92
Paper Products	16	1.01
Insurance	25	1.07
Home Appliances	6	1.16
Computers	29	1.31
Semiconductors	37	1.49

Notes: (1) Each industry includes all of the companies listed by Value Line as competitors in that industry.
(2) The weighted average is weighted by the market capitalization presented in Value Line.

Source: Value Line Investment Survey, 2003

Q. How do these differences in beta values across industries impact Dr. Vander Weide's cost of equity analysis?

A. Since competitive industries do not all have a beta of 1.00, a thorough analysis of the cost of equity for UNEs must address the inherent systematic risks in the local service industry. As I explained earlier in my testimony, the FCC has recognized this and has thus devised a bifurcated test whereby the cost of capital must represent (1) a telecommunication provider (2) facing facilities-based competition. Dr. Vander Weide's analysis fails to do this and instead presents an overly simplistic model of a competitive market in which the cost of

equity is calculated based upon grossly unrealistic dividend growth rates. Therefore, his analysis and recommendations should be rejected by the Commission.

Both theoretically and empirically, increased competition does not increase a company's exposure to systematic risk and, as such, the cost of capital applicable to TELRIC-based UNE prices must reflect the inherent systematic risks specific to the local wireline telephone service business.

Q. You have just explained how systematic risks can vary across different industries. Can systematic risks vary across companies within the same industry?

A. Yes. While systematic risks (changes in GDP, inflation, national security, etc.) impact industries differently according to the goods and services produced, individual companies within the same industry can behave in ways that expose them to varying levels of systematic risk. For example, it is commonly believed that firms that take on high levels of debt expose themselves to greater levels of systematic risk (e.g. Qwest's very high beta is largely related to its high debt-to-equity ratio – see Table 5). Richard A. Brealey and Stewart C. Myers write that "as the firm increases its leverage, the expected equity return goes up in lockstep with beta of the equity."[51] Diversification can also change a firm's exposure to systematic risk. According to Stephen Ross, *et al.* "[t]he beta of a firm is likely to change if the firm changes its industry."[52] Thus, if a firm moves a large portion of its investments into riskier industries, it will increase its exposure to systematic risks. The

51. Richard A. Brealey and Stewart C. Myers, *Principles of Corporate Finance*, Fourth Edition, 1991, at p. 415.

52. Ross, Westerfield, and Jaffe, *op. cit.*, at 298.

WCB summarized this notion in the *Virginia Arbitration Order*, concluding that "betas may be thought of as a weighted average of the betas for each line of business in which they operate."[53]

Q. Would the competitiveness of an industry affect an individual firm's exposure to systematic risk?

A. No. The "competitiveness" of a particular industry or market, as it turns out, appears to have far less impact upon systematic risk than do other factors because such risk is *diversifiable* – an investor can acquire equity positions in several competing firms in the same industry, thereby diversifying away any impact of inter-firm rivalry. The potential for minor decreases in overall consumption are possible, of course, but in general the "loss" of business to a competitor cannot itself be traced to conditions affecting systematic risk. Recall Dr. Sharpe's finding – the CAPM "shows that expected returns will be linearly related to *market risk*, but not, as often believed, to *total risk*."[54] Indeed, I conducted an empirical analysis that supports this very notion – that competition in the local service industry has not impacted the RBOC beta values.

Q. Please describe the empirical analysis you have undertaken to examine the effects of competition upon RBOC beta values.

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53. *Virginia Arbitration Order*, at paragraph 93.

54. William F. Sharpe, "Capital Asset Prices With and Without Negative Holdings," *Journal of Economic Sciences*, January 1991, at 319.

A. I designed a regression model to better understand the causal relationship between competition and systematic risk in the telecommunications services industry. The model examined the relationship between RBOC beta values (the dependent variable) presented in the Value-Line Investment Survey and several possible explanatory variables in order to understand the differences in the beta values confronted by the RBOCs over the past few years. The explanatory variables presented in the model include the percent of non-ILEC assets held by the RBOC (a measure of diversification),[55] the CLEC facilities-based market share in each RBOC region (a measure of facilities-based competition), and the RBOCs' debt/equity ratio (a measure of their financial leverage).[56] Since the data are both cross-sectional and time-series in nature, dummy variables were included for each company and each time period.

Q. What were the results of your regression analysis?

A. The regression model shows that diversification by the RBOCs into new industries increases exposure to systematic risks and leads to increased beta values, while changes in company-specific variables like competition do not impact systematic risk. As the regression results demonstrate, Percent Non-ILEC (with a coefficient of 1.34 and a *t*-statistic of 5.71) and Leverage (with a coefficient of 0.80 and *t*-statistic of 2.58) had the largest impact upon the

55. Assets are the best measure of diversification because they represent the past investment decisions of the company and quantify the value of the existing equipment necessary and ready for non-LEC ventures.

56. The availability of public data concerning competition limited the time frame of my analysis to the last four years. The data was available in the FCC's semiannual *Local Telephone Competition* reports. They are available online at http://www.fcc.gov/wcb/iatd/comp.html.

beta values, while the extent of Facilities-based Competition (with a coefficient of -10.68 and a *t*-statistic of –1.88) proved not to be significant and if anything decreased an RBOC's exposure to systematic risk.[57] Table 2 presents these results and Attachment 4 to my testimony presents a more detailed explanation and supporting work papers for this analysis.

Table 2

Regression Results 7 Period Semi-annual Data
1H00 - 1H03

Variable	**Coefficient**	***t*-Statistic**
Constant	**0.58**	3.59
Facilities-based Comp	-10.68	-1.88
Percent Non-ILEC	**1.34**	5.71
Leverage	**0.80**	2.58
SBC Dummy	-0.26	-3.03
Adjusted R^2	0.915	
Durbin-Watson	2.01	

Notes: (1) With 9 degrees of freedom, the *t*-statistic must be greater than 2.26 for a two-tailed test and 1.83 for a one-tailed test to be significant at the 95% level. Bolded numbers are significant (based on a two-tailed test).
(2) All other dummy variables for the companies and time periods were not significant and thus were not included in the table.

57. Since the hypothesis being tested, i.e., that there is a positive correlation between the amount of facilities-based competition and the level of systematic risk (beta), requires the use of a one-tail *t*-test, a value of *t* below *positive* 1.83 in this case (for 9 degrees of freedom at the 95% confidence level), which necessarily includes all negative values of *t*, fails the test of statistical significance at the 95% confidence limit.

Q. What are the implications of your analysis?

A. My analysis has two very important implications. First, since competition, which Dr. Vander Weide currently qualifies as "significant" in Washington,[58] has not increased the exposure to systematic risk for the RBOCs, there is no reason to infer that it will do so anytime in the future. Thus, Dr. Vander Weide's methodology – whereby he averages the cost of equity for a proxy of competitive companies – is unwarranted. Rather, the proper method must focus specifically upon the inherent risks unique to the local service market.

Second, the model demonstrates that the increase in the RBOCs' overall cost of capital is most directly attributable to diversification into numerous *nonregulated*, *nonmonopoly* lines of business. Thus, the results show that diversification into wireless and broadband has increased the systematic risk of the RBOCs; therefore, the beta value for a pure-ILEC would be less than the current levels exhibited by the RBOCs with respect to their overall conglomerate business portfolio.

Q. Did you run any other regression models?

A. Yes. Two additional models were run. First, the original analysis was altered to include a total competition variable to account for the effect of all forms of competition (Resale, UNEs, and Facilities-based) on systematic risk. Second, to further test the hypothesis that diversification has been the leading source of increased RBOC betas, the original analysis

58. *Direct Testimony Dr. James Vander Weide*, at p. 28.

was extended back to the end of 1996, the year that the *Telecommunications Act* became law. Inasmuch as competition was determined to have no effect upon systematic risk, competition was excluded as an explanatory variable from this second model.[59] Not surprisingly, the results in both models (presented in Tables 3 and 4) were very similar. Both models show that diversification was the leading source of increased beta values.

Table 3

Alternate Regression Model 1 Including Total Competition 7 Period Semi-annual Data 1H00 - 1H03

Variable	**Coefficient**	***t*-Statistic**
Constant	0.610	3.12
Total Competition	-3.99	-1.52
Percent Non-ILEC	**1.33**	5.27
Leverage	0.53	2.00
SBC Dummy	-0.25	-2.73
Adjusted R^2	0.906	
Durbin-Watson	1.89	

Notes: (1) With 9 degrees of freedom, the *t*-statistic must be greater than 2.26 for a two-tailed test and 1.83 for a one-tailed test to be significant at the 95% level. Bolded numbers are significant (based on a two-tailed test).
(2) All other dummy variables for the companies and time periods were not significant and thus were not included in the table.

59. The original analysis was limited to the 1H00 - 1H03 time period because the WCB didn't begin providing competition data by state until end-of-year 1999.

Table 4

Alternative Regression Model 2 Excluding FB Competition Annual Data 1997-2003

Variable	Coefficient	*t*-Statistic
Constant	0.11	0.89
Percent Non-LEC	**1.18**	7.78
Leverage	**0.79**	2.74
1997 Dummy	**0.14**	2.42
1998 Dummy	**0.16**	2.86
Qwest Dummy	**0.31**	3.26
Verizon Dummy	**0.22**	2.32
Adjusted R^2	0.830	
Durbin-Watson	1.68	

Notes: (1) With 16 degrees of freedom, the *t*-statistic must be greater than 2.12 for a two-tailed test and 1.75 for a one-tailed test to be significant at the 95% level. Bolded numbers are significant (based on a two-tailed test).
(2) All other dummy variables for the companies and time periods were not significant and thus were not included in the table.

Q. What conclusions do you draw from the three models?

A. These three models, separately and collectively, provide empirical support for the CAPM-driven conclusion that RBOC diversification, and *not* facilities-based competition for basic local telephone service, is the principal source of elevated risk (as reflected in elevated beta values) currently being experienced by the RBOCs.

This result make intuitive sense. The introduction of competition into a traditionally monopolized or highly concentrated market will not materially impact systematic risk – beta – if the competition entails only the substitution of one provider's service for that of another provider. The nature of aggregate market demand will not be affected, and investors may diversify their risk by investing in a portfolio of stocks of the competing firms. On the other hand, diversification into new industries such as wireless and broadband, which confront significantly higher levels of churn and income elasticity, has exposed the RBOCs to greater systematic risks and raised their overall beta values.

Q. How do you know that both wireless and broadband are riskier industries than the local service industry?

A. First, my empirical analysis shows that diversification increased the beta values of the RBOCs – thereby implying that the new industries must be riskier than the traditional LEC services. Second, the beta values of independent wireless and broadband carriers far exceed the beta values of the diversified RBOCs. For example, the three largest independent non-diversified cellular carriers (AT&T Wireless, Nextel, and Sprint PCS) have a weighted average beta of 1.65 (See Table 5),[60] and the two largest independent non-diversified Internet Service Providers (EarthLink and United Online) have a weighted average beta of 1.19.[61] It is entirely reasonable to assume that the RBOCs' wireless and broadband affiliates confront

60. *Value Line Investment Survey*, AT&T Wireless, Nextel, Sprint PCS, January 2, 2004.

61. United Online owns three ISPs including NetZero, Juno, and BlueLight, which each provide both "dial-up" and "high speed" Internet service. *Value Line Investment Survey*, EarthLink, United Online, February 27, 2004.

roughly the same levels of systematic risks as these independent entities. Thus, since "betas may be thought of as a weighted average of the betas for each line of business in which they operate,"[62] the beta values for the traditional ILEC services components of Verizon, SBC and BellSouth will *necessarily* be less than the average overall beta of 1.01 for the three RBOCs' stocks.

Q. Are independent non-diversified wireless and broadband carriers still riskier than the RBOCs when you consider the different financial leverage inherent in the companies?

A. Yes. It is relatively easy to extract the risk associated with a firm's financial leverage and doing so reveals the same trend – wireless and broadband are exposed to greater levels of systematic risk than local service. One can "unlever" the beta of a company given its debt-to-equity ratio (D/E) and its income tax rate (t). It is commonly held that

$$\beta_u = \beta/(1+(1-t)*(D/E))^{63}$$

where β_u = Unlevered Beta
β = Levered Beta
t = Average tax rate in the industry
D = Total value of debt
E = Total market value of equity

62. *Virginia Arbitration Order*, at paragraph 93.

63. Robert H. Smith School of Business at University of Maryland, *Financial Management: Weighted Average Cost of Capital*, available (accessed 04/07/2004) at www.rhsmith.umd.edu/finance/gphillips/courses/Bmgt640/Notes%2010%20wacc.pdf,

The unlevered betas calculated below in Table 5 present a better means of comparison across industries, and still depict exactly the same pattern as the levered betas expressed above. Independent wireless and broadband companies confront greater levels of systematic risk and thus "are riskier" than a diversified RBOCs and significantly riskier than a pure-ILEC.

Table 5

Levered and Unlevered Beta Values as of January 2, 2004

Company	Levered Beta	Market Capitalization	Total Debt	Debt to Equity Ratio	Income Tax Rate	Unlevered Beta
Diversified RBOCs		---------($Billions)---------				
Verizon	1.00	101.9	45.5	1 : 2.2	32.0%	**0.77**
SBC	1.05	81.5	18.3	1 : 4.5	33.0%	**0.91**
BellSouth	0.95	50.6	15.0	1 : 3.4	35.0%	**0.79**
Qwest	1.75	7.5	21.3	2.8 : 1	na	**0.60**
Average RBOC	1.01	60.4	25.0	1 : 2.4	33.0%	**0.81**
Independent Wireless						
AT&T Wireless	1.45	36.9	10.6	1 : 3.5	38.5%	**1.22**
Nextel	1.80	26.6	12.4	1 : 2.1	36.0%	**1.38**
Sprint PCS	1.65	9.9	16.3	1.6 : 1	15.0%	**0.79**
Average Wireless	1.65	24.5	13.1	1 : 1.9	34.4%	**1.19**
Independent ISPs						
EarthLink	1.15	1.5	0.0	1 : 150	25.0%	**1.14**
United Online	1.25	1.1	0.0	na	40.0%	**1.25**
Average Ind. ISP	1.19	1.3	0.0	1 : 260	31.3%	**1.19**
Independent IXCs						
Sprint	1.05	17.2	2.8	1 : 6.1	37.0%	**0.95**
Average Ind. IXC	1.05	17.2	2.8	1 : 6.1	37.0%	**0.95**
International Telecom						
Telecom N. Zealand	0.60	6.4	2.3	1 : 2.8	32.0%	**0.47**
Telecom Chile	0.90	3.0	1.6	1 : 1.9	20.0%	**0.65**
Telefonica, S.A.	1.05	72.2	30.0	1 : 2.4	25.0%	**0.80**
Telefonos de Mex.	0.80	19.8	6.2	1 : 3.2	28.0%	**0.65**
Average Int.	0.97	25.4	10.0	1 : 2.5	25.9%	**0.75**

Notes: Market capitalization values as of 4/1/04.
United Online owns three Internet Service Providers: Juno, NetZero, and BlueLight.

Sources: Value Line Investment Survey, January 2, 2004.
www.bloomberg.com, accessed 4/2/04.

The systematic risk of a "pure ILEC" is the proper measure of risk to be used in UNE cost of capital proceedings, since the elevated risk associated with a diversified RBOC would force CLECs and other monopoly retail service customers effectively to cross-subsidize riskier RBOC ventures.

Q. What does your empirical analysis suggest about the beta that should be used in a CAPM cost of equity calculation under TELRIC?

A. These models show that the current systematic risk faced by the RBOCs reflects the diversified state of the parent companies. For UNEs – which are the necessary elements to provide local service – and TELRIC pricing associated with them, the cost of capital should be based solely upon the systematic risk of providing local service. RBOCs, however, are involved in multiple non-ILEC industries such as wireless and broadband. Thus, only the beta of a "pure ILEC" would accurately reflect the risk of providing service in the local market. My model also demonstrates that the level of competition present in the local service industry does not significantly impact the systematic risk of an RBOC and thus may be ignored altogether when determining the beta value in a CAPM cost of equity.

Q. What beta value best represents the systematic risk faced by a pure ILEC confronting facilities-based competition?

A. Given both the extensive diversification being pursued by the RBOCs and competition's negligible impact upon systematic risk, I undertook two separate analyses to identify the systematic risk being faced by a pure ILEC, a company that engages only in the regulated side of the local service industry. Both analyses led to the same conclusion – that a beta

value of 0.75 best represents the systematic risk being faced by a pure ILEC subject to facilities based competition.

Q. Please describe the analyses that you conducted.

A. First, I separated out the current conglomerate RBOC betas into a weighted average of the unlevered betas for each of the various industries within which they compete (see Table 6 below). It is necessary to conduct this analysis using unlevered betas so that the comparison is a meaningful one – unlevered betas serve as a "common denominator" for beta values by eliminating the effects of differing debt/equity ratios. Unlevered beta values for independent wireless carriers, independent ISPs, and for a collection of international telecoms (all presented in Table 5) were imputed into the model and applied to the RBOCs. The RBOC betas were then weighted based upon their asset distributions among the various industry components of their respective portfolios.[64] This technique produced pure ILEC unlevered betas in the range of 0.22 to 0.76.[65] Notably, Verizon's pure LEC unlevered beta is 0.51 and the average RBOC unlevered beta is 0.56. These unlevered betas can be re-levered (using

64. Since the RBOCs do not separate out the assets associated with broadband from traditional wireline local telephone service, the domestic telecom assets were separated into pure-ILEC assets and broadband assets based upon the ratio of revenues generated by the two lines of business.

65. Even though all of the RBOCs currently compete in the long distance market, only Qwest owns interexchange facilities. Since the analysis presented here is based upon the relative asset mix, the Verizon, SBC and BellSouth long distance affiliates are not considered. Since these components likely have beta values that are higher than those for the pure ILEC components (if, for no other reason, the fact that long distance service is characterized by a higher income elasticity than local service), their inclusion would, if anything, result in *lower* pure ILEC betas.

the same equation expressed above) and produce levered betas in the range of 0.66 (for Verizon alone) to 0.71 (for the average RBOC). From this range, the average RBOC beta for a pure-ILEC of 0.71 best represents the systematic risk of an ILEC in both today's competitive climate (which, as I have previously noted, Dr. Vander Weide characterizes as "significant" in Washington)[66] but also in a TELRIC-based competitive environment as I have previously explained.

66. *Direct Testimony of Dr. James Vander Weide*, at p. 29.

Table 6

Extracting A Pure Unlevered ILEC Beta From a Diversified RBOC
January 2, 2004

	Total Company		Wireless Segment		Broadband Segment		Long Distance		International Segment		Pure ILEC Segment	
	Assets	β	Assets	β	Assets	β	Assets	β	Assets	β	Assets	β
Verizon	137,093	0.77	35,291	1.19	12,590	1.19	0	0.95	11,872	0.75	77,340	**0.51**
SBC	115,482	0.91	15,316	1.19	25,543	1.19	0	0.95	8,550	0.75	66,073	**0.76**
BellSouth	49,702	0.79	10,210	1.19	10,651	1.19	0	0.95	3,895	0.75	24,946	**0.46**
Qwest	26,216	0.60	0	1.19	6,955	1.19	4,383	0.95	81	0.75	18,089	**0.22**
Ave. BOC	82,123	0.80	15,477	1.19	13,935	1.19	1,096	0.95	6,100	0.75	46,612	**0.55**

Conclusion: An average RBOC unlevered beta of 0.55 with a 1:2.33 debt-to-equity ratio (as expressed below as our target capital structure) and an average tax rate of 33.0% (as expressed in Table 5), produces an average levered beta of **0.71**.

Notes: (1) All betas are unlevered betas.
(2) Only 55% of Verizon Wireless' assets were included in the analysis because Vodafone owns 45% of Verizon Wireless.
(3) Assets are in millions of dollars.
(4) Average BOC is a weighted average of all three RBOCs.
(5) Domestic LEC service include long-distance portion of RBOCs.

Sources: Value Line Investment Survey, January 2, 2004.
Verizon, SBC, BellSouth, and Qwest, 2003 10-K Reports filed with the US Securities and Exchange Commission, 2004.

Second, to cross check my original analysis, I looked to prior examples of a pure ILEC. In 1997, US West spun off its cable television business ("Media Group") and became, for all practical purposes, the only pure ILEC since the passage of TA96. US West remained in roughly that same "pure ILEC" state – where non-ILEC assets represented only about 5% of the Company's overall asset base – until its acquisition by Qwest in 2000. Over that three year period, US West's stock steadily maintained a beta between 0.70 and 0.75 for eleven straight quarters. Following the Qwest acquisition/merger, the now-former-US West beta

shot up to 1.40. There is thus no basis to conclude or to assume that the beta value applicable to the "pure ILEC" US West has changed since the late 1990s, especially given the pure-ILEC beta extraction exercise described above and presented in Table 6. Therefore, I conclude that 0.75 provides a useful – and a conservative (given the results in Table 5) – benchmark upon which to measure the systematic risk of a pure ILEC.

The appropriate cost of equity for use in Verizon Northwest UNE TELRIC studies is 8.51%.

Q. What cost of equity should the Commission adopt for use in TELRIC studies undertaken for the purpose of setting UNE prices?

A. As I have previously indicated, the Commission should adopt a cost of equity of 8.51% for use in Verizon's TELRIC studies. This recommendation is based upon a pure ILEC beta of 0.75, a risk-free rate of 2.81%, and a market risk premium of 7.61%. Thus, the CAPM cost of equity equals 8.51%. It is worth noting that this analysis closely follows the approach adopted by the WCB in the *Virginia Arbitration Order,* and more closely resembles what other states have recently found in UNE arbitration proceedings than the 15.98% cost of equity being advocated by Dr. Vander Weide.

Q. If your cost of equity analysis closely follows the WCB's ruling in *Virginia*, why is your cost of equity so much lower than the WCB's?

A. Table 7 below summarizes and compares the WCB's calculations with the approach that I have used here. The method I used to determine the appropriate ILEC cost of equity was essentially the same as that used by the Bureau. There are three distinct reasons why my analysis produces a cost of equity significantly below the WCB's finding in the *Virginia Arbitration Order*.

- First, and most important, both the short term interest rates on US T-Bills and the long term interest rates on 20 year Treasury Bonds have fallen drastically since 1999 – the time when both AT&T and Verizon submitted their testimony in the *Virginia Arbitration* proceeding – going from 4.93% to 0.94% on 30-day T-Bills and from 6.26% to 4.67% on 20-year Treasury Bonds. This alone accounts for more than 300 basis points of decrease in the cost of equity.

- Second, the market risk premium (even though it represents an average of more than 50 years) has fallen due to the drop in the stock market and to decreasing interest rates.

- Finally, based upon my analysis indicating that the extent of competition does not materially impact a firm's systematic risk, my cost of equity analysis uses the ILEC-specific beta value (0.75) rather than the average S&P 500 beta value (1.00) that was used by the Bureau in *Virginia*..[67]

67. Since the *Virginia Arbitration Order* was governed by "baseball arbitration" rules, there was little discussion in the *Order* that actually addressed the specific effects of competition on risk. See *Virginia Arbitration Order,* at paras. 87-91.

Table 7 also demonstrates that the methodology that I have used to calculate the overall cost of capital is the same as that used by the WCB in the *Virginia* order.

Table 7

Updating the WCB's Cost of Capital Analysis
For WUTC Docket No. UT-023003

	Cost of Capital Inputs	WCB Model *Virginia Arbitration Order 2Q 2000 Data*			Update of WCB Model *Docket UT-023003 EOY 2003 Data*		
		Values		Source	Values		Source
L1	**Cost of Debt**		**7.86%**	S&P Bond Guide, June 30, 2000.		**4.98%**	S&P Bond Guide, February 27, 2004.
	Cost of Equity						
L2	30-Day Treasury Bill	4.93%		As of 6/30/00	0.94%		As of 3/15/04
L3	20-Year Treas. Bond	6.26%		As of 6/30/00	4.67%		As of 3/15/04
L4	**Ave. Risk Free Rate**		5.60%	(L2+L3)/2		2.81%	(L2+L3)/2
L5	Premium above a 30-Day T-Bill	9.45%		Ibbotson Assoc., SBBI Yearbook 2001.	8.61%		Ibbotson Assoc., SBBI Yearbook 2004.
L6	Premium above a 20-Year Treas. Bond	8.10%		Ibbotson Assoc., SBBI Yearbook 2001.	6.61%		Ibbotson Assoc., SBBI Yearbook 2004.
L7	**Ave. Mkt Risk Prem.**		8.78%	(L5+L6)/2		7.61%	(L5+L6)/2
L8	**Beta Value**		1.00	Ave. S&P Beta		0.75	Pure ILEC Beta
L9	**Cost of Equity**		14.4%	L4 + (L7*L8)		**8.51%**	L4 + (L7*L8)
L10	**Capital Structure**		**20/80**	Proxy of Telecoms as of 6/30/00		**30/70**	Proxy of Telecoms as of 12/31/03
L11	**Cost of Capital**		**13.1%**	(0.2*L1)+(0.8*L9)		**7.45%**	(0.3*L1)+(0.7*L9)

Sources: *Virginia Arbitration Order*, at paras . 65-104.
Standard & Poor's, S&P Bond Guide, February 2004.
U.S. Treasury, Daily Treasury Yield Curve available at http://ustreas.gv/offices/domestic-finance/debt-management/interest-rate/yield-hist.html, accessed March 17, 2004.
Ibbotson Associates, Stocks, Bonds, Bills, and Inflation (SBBI) 2004 Yearbook.
Value Line Investment Survey (Capital Structure Information), Jan. 1999 - Jan. 2004.

Capital Structure

Dr. Vander Weide's proposed capital structure contains an unidentified proxy of telecommunication carriers and in so doing misrepresents the target capital structure of the RBOCs.

Q. How does Dr. Vander Weide calculate his capital structure?

A. Dr. Vander Weide calculates his capital structure based upon the market values for a proxy of telecom companies. From this proxy (the components of which he has never identified), Dr. Vander Weide concludes that "a reasonable target market value capital structure for Verizon NW contains 25% debt and 75% equity."[68]

Q. Is his method consistent with the method adopted by the WCB in the *Virginia Arbitration Order*?

A. Yes, his method is consistent, but Dr. Vander Weide's application of that method in this case is not. In *Virginia*, the Bureau adopted a capital structure based upon market values for a proxy of telecommunication carriers over the past five years.[69] Dr. Vander Weide has done this, but has not used the most currently available data and appears not to have included all of the RBOCs in his proxy group.

68. *Direct Testimony of Dr. James Vander Weide*, at 45.

69. *Virginia Arbitration Order*, at para. 103.

Q. Should the Commission adopt Dr. Vander Weide's proposed 25/75 debt/equity capital structure?

A. No. Since Dr. Vander Weide's analysis only goes through 2002, I undertook to replicate and to update his figures through end-of-year 2003 using data from all of the RBOCs including pre-merger GTE. When updated to include the most recent five years and all of the RBOCs (including pre-merger GTE), the data support a debt/equity ratio of 30/70, rather than the 25/75 to which Dr. Vander Weide has testified. Table 8 provides the results of my analysis.

Table 8

Combined Capital Structure of the RBOCs
End-of-year 1999-2003

Year End	Market Value of Equity ($Billion)	Total Value of Debt ($Billion)	Percent Equity	Percent Debt
1999	$456.3	$94.5	82.84%	17.16%
2000	$437.5	$116.1	79.03%	20.97%
2001	$354.2	$134.2	72.52%	27.48%
2002	$257.9	$125.4	67.28%	32.72%
2003	$236.4	$100.1	70.25%	29.75%

Note: Data include Bellsouth, Qwest, SBC, Verizon. The 1999 figures also include their predecessors.

Source: Value Line Investment Survey, Jan. 1999 - Jan. 2004.

Q. What do you recommend the Commission adopt as a capital structure for Verizon NW?

A. Using the WCB's *Virginia* methodology but based upon current data, it would appear that the correct debt/equity ratio for Verizon NW is 30/70. I would note, however, that the Bureau's methodology looks to the entirety of the RBOCs, rather than being limited solely to their respective ILEC entities. ILECs standing alone have historically had capital structures consisting of something more than 30% debt such that, all else being equal, the ILECs' cost of capital would be less than that for the parent conglomerate. As with risk, the use of parent company-level capital costs overstates those applicable to the stand-alone ILEC, and if imputed to the ILEC (as the WCB did in *Virginia* and as Dr. Vander Weide does here) has the effect of creating a cross-subsidy flowing from the ILEC and its customers (including purchasers of UNEs) to nonregulated RBOC business units. On that basis, the use of a 30% debt ratio is likely to be highly conservative.

The Notion of a "TELRIC-based risk adjustment"

Dr. Vander Weide's TELRIC-based risk adjustment lacks theoretical support, inasmuch as there is no basis to conclude that the risks of CLEC "cancellation" of UNEs are any greater than the risks, already included in the ILEC's cost of capital, associated with "cancellation" of its existing retail services.

Q. What is your understanding of Dr. Vander Weide's TELRIC-based risk adjustment?

A. Since Dr. Vander Weide does not utilize CAPM to calculate the cost of equity, he does not adopt or apply any specific beta value. However, he does propose the inclusion of a "TELRIC-based risk adjustment" ostensibly to account for the "cancelable" nature of the typical monthly UNE lease contract.

Dr. Vander Weide explains this adjustment, asserting that "[t]o reflect the additional risk of making long-term fixed investments in a telecommunications network, while offering its customers an ongoing option to either build their own facilities or renew their lease at lower rates, the weighted average cost of capital for use in UNE cost studies must be greater than the weighted average cost of capital for my proxy group of industrial companies."[70]

Q. What basis does Dr. Vander Weide advance for this risk premium adjustment?

A. The calculation of this risk premium is based upon a 1982 paper by Thomas E. Copeland and J. Fred Weston, "A Note on the Evaluation of Cancelable Operating Leases."[71] Dr. Vander Weide uses the analysis in this paper along with several of his own parameters (including Washington-specific investment figures and operating expenses, expected asset lives, a risk-free rate, and an annual asset pricing volatility) to calculate the cost of capital necessary to cover the initial investment and continued operating expenses as if (1) Verizon was a UNE-only company unable to sell its own service to end users, and (2) the lessee has the "real option" to cancel its lease. Without regard to the financial benefits that this network would provide to Verizon Northwest, Dr. Vander Weide put the after-tax cost of capital at 15.43%, which he claims would be necessary to cover the real option of competitors to cancel the leasing agreement. From this overall cost of capital, Dr. Vander Weide "backs out" the value of his risk premium by subtracting his after-tax DCF-based cost of capital of 11.48% (previously presented as a before-tax cost of capital of 12.03%) from

70. *Direct Testimony of Dr. James Vander Weide*, at 8.

71. *Direct Testimony of Dr. James Vander Weide*, Exhibit JHV-3.

the Copeland and Weston-based after-tax cost of capital (15.43%), to calculate a risk premium of 3.95% (15.43% - 11.48%). In many ways, however, this Copeland and Weston model that contains questionable parameters (which I will discuss in greater detail) is the sole basis of Dr. Vander Weide's final cost of capital recommendation as his DCF model only quantifies the value of the premium.

Q. Is such a risk premium necessary or appropriate?

A. No. As a threshold matter, whatever actual "risks" may be driven by the presence of "cancelable leases," these would presumably have already been fully captured in the risk premium that investors ascribe to the ILEC's equities, i.e., its beta. On its face, then, the suggestion that the nature of the ILEC's operation requires a risk premium greater than that which investors already assign makes no sense since, presumably, investors and analysts are sufficiently knowledgeable and sophisticated as to take the effects, if any, of cancelable UNE (and other) leases into account when evaluating the risk associated with the RBOCs' shares.

That said, there are serious flaws in Dr. Vander Weide's theory and analysis. In advancing the "cancelable lease" argument, Dr. Vander Weide is implicitly suggesting that the risk that a CLEC will "cancel a UNE" is materially greater than the risk that an end user ILEC retail customer will discontinue her retail service – a risk that is already factored into the ILEC's cost of capital. Dr. Vander Weide offers *no evidence whatsoever* that the potential for "cancellation" of a UNE by a CLEC is greater than the potential for cancellation of a retail

service by an end user customer.[72] Nor could he, since *if anything* precisely the opposite is likely the case. Moreover, whatever that potential "risk" may be, it must be analyzed separately for each item that is available as a UNE. Dr. Vander Weide has not done that either.

While the ILECs may confront a "risk of cancellation" of UNE-switch services in the event that a CLEC elects (or is forced) to utilize its own switch, the potential risk to the ILEC in such an event is minimal and, to a very large extent, is of the ILEC's own making. It is the ILECs, after all, that are aggressively pushing for "no impairment" findings with respect to UNE-switching and UNE-P. Where the ILECs are successful, CLECs will be forced to migrate customers off of ILEC switches and onto switches owned by those CLECs. The suggestion that this source of "additional risk" should be compensated by allowing the ILECs to incorporate a "risk-adjusted" cost of capital into the UNE prices is like the child who, after murdering his parents, pleads for mercy on the grounds that he is now an orphan.

That aside, there is in any event very little "risk" associated with the "cancellation" of switch UNEs. First, switch capacity can be and regularly is augmented in very small increments. In general, the "cancellation" of a switch UNE would free up capacity that could be shifted to other customers and other uses, thus allowing the ILEC to defer, for a time, the next

72. Even under the utterly fictitious "UNE-only carrier" construct, a decision by a CLEC to "cancel" a UNE lease would not resulted in stranded plant. If the retail customer (or a subsequent retail customer at the same premises) were to take service from a different CLEC *or from the retail services affiliate of the "UNE-only" carrier*, the UNE would immediately be placed back in revenue-producing service.

scheduled switch capacity addition. Moreover, end office switching typically represents only about 18% of total ILEC plant in service.[73] Thus, even if ILECs were to lose, for example, as much as 10% of their end user customers to non-cable CLEC-owned switching *and* assuming for the sake of discussion that the ILECs had no other use – immediate or eventual – for the freed-up switch capacity, that would still "strand" *at the very most* only about 1.8% of total ILEC investment. And even this absolutely "worst case scenario" – which is highly unlikely in the extreme – could not possibly justify the 3.95% increment to the ILECs' cost of capital (based upon Washington figures) that Dr. Vander Weide characterizes as the "risk of cancelable leases."[74]

Q. Notwithstanding your view that the Copeland and Weston "cancelable lease" analysis is not applicable to UNEs, what basis do they advance in support of their risk premium theory?

A. In their paper, Copeland and Weston distinguish between the risks associated with operating leases and pure financial leases[75] in two ways. They state that operating leases "may be cancelled at the option of the lessee."[76] But also that "operating leases enable the lessor to

73. ARMIS Report 43-03 for 2002 gives total BOC plant in service as $364.1-billion (row 2210) and BOC Central Office Switching (row 2001) at $65.2-billion, i.e., just under 18%.

74. *Direct Testimony of Dr. James Vander Weide*, at pp. 55-56.

75. A "pure financial lease" is similar to an installment loan, in that the lessee is obligated to make payments sufficient to fully recover the original cost of the leased property plus interest. As with installment loans, the lesser still bears the risk of default on the part of the lessee.

76. *Direct Testimony of Dr. James Vander Weide,* Exhibit JHV-3 at 61.

capture the salvage value of the asset."[77] The two concepts expressed by Copeland and Weston work together. Intuitively, the cost of cancellation is greater when the lessor doesn't know how much he will be able to charge for the same lease one year hence. Therefore, under certain conditions, "the lessee can improve his position by cancelling the lease, returning the leased asset, and leasing a more efficient replacement to do the same job at a lower cost."[78] On the other hand, if prices of the asset are relatively stable or are increasing, then the additional cost of the cancelable operating lease decreases significantly or may be largely eliminated altogether. Indeed – and not surprisingly – the model presented in Copeland and Weston's paper is quite sensitive to this variable – the annual asset price variability. As the price volatility drops, so too does the necessary cost of capital to recover the investment (see Table 9 below).

77. *Id.* at 61.

78. *Id.* at 63.

Table 9

Sensitivity Analysis of Copeland and Weston Model

Annual Pricing Volatility (σ)	Cost of Capital
40%	13.8%
35%	12.4%
30%	10.9%
25%	9.4%
20%	7.9%
15%	6.4%
10%	6.0%
0%	6.0%

Note: In this model, after the annual pricing volatility dropped below 14% the cost of capital reflects one associated with a pure financial lease, assumed to be 6.0%.

Source: Copeland and Weston, "A Note on the valuation of Cancelable Leases," Direct Testimony of Dr. James Vander Weide, Exhibit JHV-3.

Q. What value does Dr. Vander Weide use in his model for annual price volatility?

A. Dr. Vander Weide's analysis includes an annual asset pricing volatility of 36%.[79]

Q. What rationale does Dr. Vander Weide advance to justify his use of 36% as the annual asset pricing volatility?

79. Verizon Response to AT&T/XO Data Request No. 4-001.

A. Dr, Vander Weide states that the "value was estimated using the Black Scholes option pricing formula and observed market values for stock prices and put option prices in May 2003."[80] However, he fails to explain how this value, which is derived from the RBOC's stock, is representative of the annual pricing volatility *specifically associated with the local service industry or with UNEs in particular*. As previously discussed, Verizon is the sum of multiple parts, many of which have nothing whatever to do with local services. To the extent that wireless, broadband, and long distance are more discretionary services, their prices are far more likely to fluctuate and lead to greater variability in the RBOCs overall stock price. Indeed, while competition (assumed under TELRIC) has led to price decreases in long distance, cellular, Internet access and broadband, it has not impacted the cost of basic local service (POTS). Therefore, the 36% variability index implicit in Dr. Vander Weide's model is, if anything, reflective of a composite of all of the RBOC's services, and thus grossly overstates the specific price variability associated with local service and with UNEs. This value remains unsupported by Dr. Vander Weide as being representative of the local service industry and is undoubtedly responsible for his extremely high risk-premium. As depicted in the Copeland and Weston example in Table 8, the model is highly sensitive to the annual pricing volatility variable and, if it is to be applied specifically to UNEs, must be representative only of the variability associated with UNE prices. WHen *non-ILEC* components of Verizon are included in an analysis of risk – and cost of capital – specifically applicable to UNEs, the *effect* is to overstate UNE-specific cost of capital and in so doing to create an effective cross-subsidy flowing from monopoly UNEs to support Verizon's competitive lines of business.

80. Verizon Response to AT&T/XO Data Request No. 4-002.

Q. Are you aware of any recent PUC decisions that addressed Dr. Vander Weide's cancelable leases theory?

A. Yes. Dr. Vander Weide proposed the same cancelable-lease-risk-premium theory in a recently completed cost of capital proceeding for Verizon before the New Hampshire Public Utilities Commission, NH PUC Docket No. DT-02-010. In its *Order* issued January 16, 2004, the New Hampshire Commission soundly rejected Verizon's and Dr. Vander Weide's notion:

> Finally, no reasonable basis has been advanced in this case to apply a cancelable lease analogy to the UNE business, as opposed to the retail business. With the exception of individual long term contracts or special tariffs, none of Verizon's customers, wholesale or retail, are bound to remain with Verizon. Arguably, any premium that may apply to reflect the cancelable nature of the use of Verizon's facilities applies to retail service as well as wholesale service. However, as we note above, we have no basis on this record to differentiate the risk of retail and UNE business. In any event, the risk of revenue loss from demand reductions is captured in the overall rate of return, properly set, as is all risk facing the firm.[81]

The full text of that portion of the New Hampshire Order dealing with the "cancelable lease risk premium" is provided herewith as Attachment 4.

The specific findings of the New Hampshire Commission, with which I concur, can be summarized as follows:

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81. *Verizon New Hampshire Investigation into Cost of Capital, Order Establishing Cost of Capital*, New Hampshire Public Utilities Commission Docket No. DT 02-110, Order No. 24,265, January 16, 2004, slip. op. at 47.

(1) Retail customers can also cancel ILEC service, and there was no showing that the likelihood of a CLEC cancelling a UNE is any greater than that for a retail customer cancelling retail service.

(2) Even if the UNE or retail service is cancelled, the ILEC can reuse the same facilities either to serve another customer at the same location, or another nearby customer. In the case of a UNE, if the cancellation is the result of the decision by the retail customer to return to the ILEC (or take service from a different CLEC), the facility will continue to be used. In fact, if the migration is from CLEC to ILEC, the ILEC's revenues could actually increase.

(3) Such risks as may exist are already captured in the overall ILEC cost of capital, and no further premium is necessary.

(4) It was Verizon's own decision to offer UNEs only on a month-to-month basis; had Verizon also offered CLECs the option to take the UNE under a term contract, the risk of cancellation would have been effectively transferred to the CLEC.

(5) UNEs represent an extremely small part of the ILEC's overall business, so even if such a risk is present, its effect would be minimal. Verizon is not required to incur investment expenses specifically to provide UNEs to CLECs; whatever UNEs are being provided are furnished out of the same network that is being used to provide retail end user services.

For all of these reasons, the Commission should reject and dismiss the "cancelable lease risk premium" theory and ascribe no additional risk to those specific UNEs that ILECs will continue to be required to provide to CLECs.

Overall Cost of Capital Applicable to TELRIC

Dr. Vander Weide's cost of capital analysis is replete with overstatements of actual risk, inclusions of unnecessary premiums, and is outdated.

Q. Please summarize the principal flaws that you have identified in Dr. Vander Weide's cost of capital analysis.

A. Dr. Vander Weide's analysis differs methodologically with respect to every one of the cost of capital principles that had been adopted by the FCC's Wireline Competition Bureau in the *Virginia Arbitration Order*. These can be summarized as follows:

- Dr. Vander Weide has based his cost of debt upon a proxy of competitive companies rather than upon the Verizon-specific cost of debt as determined by taking a weighted average of its bond yields to maturity.

- Dr. Vander Weide has used the discounted cash flow ("DCF") model rather than the Capital Asset Pricing Model ("CAPM") to calculate the cost of debt, and in his DCF model has relied upon unreasonably large dividend growth rates applied into perpetuity

that the WCB had expressly cautioned against, ignoring the Bureau's policy that TELRIC pricing reflect the specific risks of a local service provider.

- Dr. Vander Weide appears not to have included all of the RBOCs in the proxy he used in determining the proper capital structure. The effect of this omission is to overstate the equity portion of the average RBOC.

- Finally, Dr. Vander Weide included a 3.95% risk premium on top of his weighted average cost of capital – a premium not even considered in the *Virginia Arbitration Order* – without "demonstrating with specificity" (1) what additional risks Verizon actually faces due to the cancelable nature of UNE lease contracts and (2) how these risks are any different than the risks of losing retail customers (a company-specific risk).

All four of these departures from the Bureau's approved interpretation of TELRIC (especially the 3.95% "cancelable lease" premium) have the effect of increasing the cost of capital to an unnaturally high level given (1) the significant changes in expected future returns of the market for debt and equity, and (2) the lack of inherent systematic risk in the local service industry. The implementation of such a high cost of capital will stifle UNE-based competition and implicitly allow Verizon to subsidize future investment in non-ILEC businesses.

Overall Cost of Capital for Use in TELRIC Studies

The Commission should apply an overall cost of capital of 7.45% in TELRIC studies supporting UNE rates, a rate that reflects current expectations in the market and realistic assessments of risk.

Q. Please summarize your recommendation for the Commission.

A. The Commission should adopt a cost of capital of 7.45% – not Dr. Vander Weide's recommended 15.98%.

- My analysis contains updated information about Verizon's specific cost of debt, Verizon's specific capital structure, and the average market risk premium. These updated Verizon-specific figures best represent the actual expectations in the current market for debt and equity.

- My analysis closely follows the WCB's interpretation and application of TELRIC in the *Virginia Arbitration Order*.

- Finally, my analysis fully addresses the WCB's bifurcated TELRIC policy, and shows empirically that the Commission needs to focus more upon the inherent systematic risks in the local service industry and not upon the hypothetical risk of future facilities-based competition.

Accordingly, the correct cost of capital for use in TELRIC UNE studies is not nearly as high as Dr. Vander Weide or other RBOC proponents would lead one to believe. Despite all their claims, the legacy networks remain in place and RBOC control of economies of scale and scope should be more than sufficient to overcome and to negate any increased "risk" of facilities-based entry.

Q. Does this conclude your rebuttal testimony at this time?

A. Yes, it does.

Attachment 1

Statement of Qualifications

Statement of Qualifications

LEE L. SELWYN

Dr. Lee L. Selwyn has been actively involved in the telecommunications field for more than twenty-five years, and is an internationally recognized authority on telecommunications regulation, economics and public policy. Dr. Selwyn founded the firm of Economics and Technology, Inc. in 1972, and has served as its President since that date. He received his Ph.D. degree from the Alfred P. Sloan School of Management at the Massachusetts Institute of Technology. He also holds a Master of Science degree in Industrial Management from MIT and a Bachelor of Arts degree with honors in Economics from Queens College of the City University of New York.

Dr. Selwyn has testified as an expert on rate design, service cost analysis, form of regulation, and other telecommunications policy issues in telecommunications regulatory proceedings before some forty state commissions, the Federal Communications Commission and the Canadian Radio-television and Telecommunications Commission, among others. He has appeared as a witness on behalf of commercial organizations, non-profit institutions, as well as local, state and federal government authorities responsible for telecommunications regulation and consumer advocacy.

He has served or is now serving as a consultant to numerous state utilities commissions including those in Arizona, Minnesota, Kansas, Kentucky, the District of Columbia, Connecticut, California, Delaware, Maine, Massachusetts, New Hampshire, Vermont, New Mexico, Wisconsin and Washington State, the Office of Telecommunications Policy (Executive Office of the President), the National Telecommunications and Information Administration, the Federal Communications Commission, the Canadian Radio-television and Telecommunications Commission, the United Kingdom Office of Telecommunications, and the Secretaria de Comunicaciones y Transportes of the Republic of Mexico. He has also served as an advisor on telecommunications regulatory matters to the International Communications Association and the Ad Hoc Telecommunications Users Committee, as well as to a number of major corporate telecommunications users, information services providers, paging and cellular carriers, and specialized access services carriers.

Dr. Selwyn has presented testimony as an invited witness before the U.S. House of Representatives Subcommittee on Telecommunications, Consumer Protection and Finance and before the U.S. Senate Judiciary Committee, on subjects dealing with restructuring and deregulation of portions of the telecommunications industry.

In 1970, he was awarded a Post-Doctoral Research Grant in Public Utility Economics under a program sponsored by the American Telephone and Telegraph Company, to conduct research on the economic effects of telephone rate structures upon the computer time sharing industry. This work was conducted at Harvard University's Program on Technology and Society, where he was

appointed as a Research Associate. Dr. Selwyn was also a member of the faculty at the College of Business Administration at Boston University from 1968 until 1973, where he taught courses in economics, finance and management information systems.

Dr. Selwyn has published numerous papers and articles in professional and trade journals on the subject of telecommunications service regulation, cost methodology, rate design and pricing policy. These have included:

"Taxes, Corporate Financial Policy and Return to Investors"
National Tax Journal, Vol. XX, No.4, December 1967.

"Pricing Telephone Terminal Equipment Under Competition"
Public Utilities Fortnightly, December 8, 1977.

"Deregulation, Competition, and Regulatory Responsibility in the Telecommunications Industry"
Presented at the 1979 Rate Symposium on Problems of Regulated Industries - Sponsored by: The American University, Foster Associates, Inc., Missouri Public Service Commission, University of Missouri-Columbia, Kansas City, MO, February 11 - 14, 1979.

"Sifting Out the Economic Costs of Terminal Equipment Services"
Telephone Engineer and Management, October 15, 1979.

"Usage-Sensitive Pricing" (with G. F. Borton)
(a three part series)
Telephony, January 7, 28, February 11, 1980.

"Perspectives on Usage-Sensitive Pricing"
Public Utilities Fortnightly, May 7, 1981.

"Diversification, Deregulation, and Increased Uncertainty in the Public Utility Industries"
Comments Presented at the Thirteenth Annual Conference of the Institute of Public Utilities, Williamsburg, VA - December 14 - 16, 1981.

"Local Telephone Pricing: Is There a Better Way?; The Costs of LMS Exceed its Benefits: a Report on Recent U.S. Experience."
Proceedings of a conference held at Montreal, Quebec - Sponsored by Canadian Radio-Television and Telecommunications Commission and The Centre for the Study of Regulated Industries, McGill University, May 2 - 4, 1984.

"Long-Run Regulation of AT&T: A Key Element of A Competitive Telecommunications Policy"
Telematics, August 1984.

"Is Equal Access an Adequate Justification for Removing Restrictions on BOC Diversification?"
Presented at the Institute of Public Utilities Eighteenth Annual Conference, Williamsburg, VA - December 8 - 10, 1986.

"Market Power and Competition Under an Equal Access Environment"
Presented at the Sixteenth Annual Conference, "Impact of Deregulation and Market Forces on Public Utilities: The Future Role of Regulation"
Institute of Public Utilities, Michigan State University, Williamsburg, VA - December 3 - 5, 1987.

"Contestable Markets: Theory vs. Fact"
Presented at the Conference on Current Issues in Telephone Regulations: Dominance and Cost Allocation in Interexchange Markets - Center for Legal and Regulatory Studies Department of Management Science and Information Systems - Graduate School of Business, University of Texas at Austin, October 5, 1987.

"The Sources and Exercise of Market Power in the Market for Interexchange Telecommunications Services"
Presented at the Nineteenth Annual Conference - "Alternatives to Traditional Regulation: Options for Reform" - Institute of Public Utilities, Michigan State University, Williamsburg, VA, December, 1987.

"Assessing Market Power and Competition in The Telecommunications Industry: Toward an Empirical Foundation for Regulatory Reform"
Federal Communications Law Journal, Vol. 40 Num. 2, April 1988.

"A Perspective on Price Caps as a Substitute for Traditional Revenue Requirements Regulation"
Presented at the Twentieth Annual Conference - "New Regulatory Concepts, Issues and Controversies" - Institute of Public Utilities, Michigan State University, Williamsburg, VA, December, 1988.

"The Sustainability of Competition in Light of New Technologies" (with D. N. Townsend and P. D. Kravtin)
Presented at the Twentieth Annual Conference - Institute of Public Utilities Michigan State University, Williamsburg, VA, December, 1988.

"Adapting Telecom Regulation to Industry Change: Promoting Development Without Compromising Ratepayer Protection" (with S. C. Lundquist)
IEEE Communications Magazine, January, 1989.

"The Role of Cost Based Pricing of Telecommunications Services in the Age of Technology and Competition"
Presented at National Regulatory Research Institute Conference, Seattle, July 20, 1990.

"A Public Good/Private Good Framework for Identifying POTS Objectives for the Public Switched Network" (with Patricia D. Kravtin and Paul S. Keller)
Columbus, Ohio: *National Regulatory Research Institute*, September 1991.

"Telecommunications Regulation and Infrastructure Development: Alternative Models for the Public/Private Partnership"
Prepared for the Economic Symposium of the International Telecommunications Union Europe Telecom '92 Conference, Budapest, Hungary, October 15, 1992.

"Efficient Infrastructure Development and the Local Telephone Company's Role in Competitive Industry Environment" *Presented at the Twenty-Fourth Annual Conference, Institute of Public Utilities, Graduate School of Business, Michigan State University, "Shifting Boundaries between Regulation and Competition in Telecommunications and Energy"*, Williamsburg, VA, December 1992.

"Measurement of Telecommunications Productivity: Methods, Applications and Limitations" (with Françoise M. Clottes)
Presented at Organisation for Economic Cooperation and Development, Working Party on Telecommunication and Information Services Policies, `93 Conference "Defining Performance Indicators for Competitive Telecommunications Markets", Paris, France, February 8-9, 1993.

"Telecommunications Investment and Economic Development: Achieving efficiency and balance among competing public policy and stakeholder interests"
Presented at the 105th Annual Convention and Regulatory Symposium, National Association of Regulatory Utility Commissioners, New York, November 18, 1993.

"The Potential for Competition in the Market for Local Telephone Services" (with David N. Townsend and Paul S. Keller)
Presented at the Organization for Economic Cooperation and Development Workshop on Telecommunication Infrastructure Competition, December 6-7, 1993.

"Market Failure in Open Telecommunications Networks: Defining the new natural monopoly," *Utilities Policy*, Vol. 4, No. 1, January 1994.

The Enduring Local Bottleneck: Monopoly Power and the Local Exchange Carriers, (with Susan M. Gately, et al) a report prepared by ETI and Hatfield Associates, Inc. for AT&T, MCI and CompTel, February 1994.

Commercially Feasible Resale of Local Telecommunications Services: An Essential Step in the Transition to Effective Local Competition, (Susan M. Gately, et al) a report prepared by ETI for AT&T, July 1995.

"Efficient Public Investment in Telecommunications Infrastructure"
Land Economics, Vol 71, No.3, August 1995.

Funding Universal Service: Maximizing Penetration and Efficiency in a Competitive Local Service Environment, Lee L. Selwyn with Susan M. Baldwin, under the direction of Donald Shepheard, A Time Warner Communications Policy White Paper, September 1995.

Stranded Investment and the New Regulatory Bargain, Lee L. Selwyn with Susan M. Baldwin, under the direction of Donald Shepheard, A Time Warner Communications Policy White Paper, September 1995

"Market Failure in Open Telecommunications Networks: Defining the new natural monopoly," in *Networks, Infrastructure, and the New Task for Regulation*, by Werner Sichel and Donal L. Alexander, eds., University of Michigan Press, 1996.

Establishing Effective Local Exchange Competition: A Recommended Approach Based Upon an Analysis of the United States Experience, Lee L. Selwyn, paper prepared for the Canadian Cable Television Association and filed as evidence in Telecom Public Notice CRTC 95-96, Local Interconnection and Network Component, January 26, 1996.

The Cost of Universal Service, A Critical Assessment of the Benchmark Cost Model, Susan M. Baldwin with Lee L. Selwyn, a report prepared by Economics and Technology, Inc. on behalf of the National Cable Television Association and submitted with Comments in FCC Docket No. CC-96-45, April 1996.

Economic Considerations in the Evaluation of Alternative Digital Television Proposals, Lee L. Selwyn (as Economic Consultant), paper prepared for the Computer Industry Coalition on Advanced Television Service, filed with comments in FCC MM Docket No. 87-268, In the Matter of Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, July 11, 1996.

Assessing Incumbent LEC Claims to Special Revenue Recovery Mechanisms: Revenue opportunities, market assessments, and further empirical analysis of the "Gap" between embedded and forward-looking costs, Patricia D. Kravtin and Lee L. Selwyn, In the Matter of Access Charge Reform, in CC Docket No. 96-262, January 29, 1997.

The Use of Forward-Looking Economic Cost Proxy Models, Susan M. Baldwin and Lee L. Selwyn, Economics and Technology, Inc., February 1997.
The Effect of Internet Use On The Nation's Telephone Network, Lee L. Selwyn and Joseph W. Laszlo, a report prepared for the Internet Access Coalition, July 22, 1997.

Regulatory Treatment of ILEC Operations Support Systems Costs, Lee L. Selwyn, Economics and Technology, Inc., September 1997.

The "Connecticut Experience" with Telecommunications Competition: A Case in Getting it Wrong, Lee L. Selwyn, Helen E. Golding and Susan M. Gately, Economics and Technology, Inc., February 1998.

Where Have All The Numbers Gone?: Long-term Area Code Relief Policies and the Need for Short-term Reform, prepared by Economics and Technology, Inc. for the Ad Hoc Telecommunications Users Committee, International Communications Association, March 1998, second edition, June 2000.

Broken Promises: A Review of Bell Atlantic-Pennsylvania's Performance Under Chapter 30, Lee L. Selwyn, Sonia N. Jorge and Patricia D. Kravtin, Economics and Technology, Inc., June 1998.

Building A Broadband America: The Competitive Keys to the Future of the Internet, Lee L. Selwyn, Patricia D. Kravtin and Scott A. Coleman, a report prepared for the Competitive Broadband Coalition, May 1999.

Bringing Broadband to Rural America: Investment and Innovation In the Wake of the Telecom Act, Lee L. Selwyn, Scott C. Lundquist and Scott A. Coleman, a report prepared for the Competitive Broadband Coalition, September 1999.

Bringing Local Telephone Competition to Massachusetts, Lee L. Selwyn and Helen E. Golding, prepared for The Massachusetts Coalition for Competitive Phone Service, January 2000.

Subsidizing the Bell Monopolies: How Government Welfare Programs are Undermining Telecommunications Competition, Lee L. Selwyn, April 2002.

Dr. Selwyn has been an invited speaker at numerous seminars and conferences on telecommunications regulation and policy, including meetings and workshops sponsored by the National Telecommunications and Information Administration, the National Association of Regulatory Utility Commissioners, the U.S. General Services Administration, the Institute of Public Utilities at Michigan State University, the National Regulatory Research Institute at Ohio State University, the Harvard University Program on Information Resources Policy, the Columbia University Institute for Tele-Information, the International Communications Association, the Tele-Communications Association, the Western Conference of Public Service Commissioners, at the New England, Mid-America, Southern and Western regional PUC/PSC conferences, as well as at numerous conferences and workshops sponsored by individual regulatory agencies.

Attachment 2

Current yields to maturity of Verizon bonds

Current Yields to Maturity on Verizon's Bonds As of February 27, 2004 (Page 1 of 4)			
Subsidiary	**S&P Debt Rating**	**Debt Outstanding ($Millions)**	**Yield to Maturity**
Bell Atlantic Financial Services	A+	400	3.01%
Bell Atlantic -- Pennsylvania	A+	125	5.92%
Bell Tel. of Pennsylvania	A+	150	3.13%
Bell Tel. of Pennsylvania	A+	175	6.17%
Bell Tel. of Pennsylvania	A+	125	6.21%
Chesapeake & Potomac Tel. MD	A+	250	6.50%
Chesapeake & Potomac Tel. MD	A+	50	6.17%
Chesapeake & Potomac Tel. MD	A+	100	6.11%
Chesapeake & Potomac Tel. VA	A+	100	1.73%
Chesapeake & Potomac Tel. VA	A+	100	5.22%
Chesapeake & Potomac Tel. VA	A+	100	6.07%
Chesapeake & Potomac Tel. VA	A+	125	6.73%
Chesapeake & Potomac Tel. VA	A+	100	6.17%
Diamond State Telephone	A+	15	5.86%
Diamond State Telephone	A+	20	6.32%
Diamond State Telephone	A+	15	6.21%
GTE California	A+	250	1.50%
GTE California	A+	250	7.57%
GTE California	A+	100	3.78%
GTE California	A+	300	4.21%
GTE California	A+	200	6.17%
GTE California	A+	225	3.93%
GTE California	A+	275	3.04%

Current Yields to Maturity on Verizon's Bonds As of February 27, 2004 (Page 2 of 4)			
Subsidiary	**S&P Debt Rating**	**Debt Outstanding ($Millions)**	**Yield to Maturity**
GTE Corporation	A+	500	4.13%
GTE Corporation	A+	600	5.74%
GTE Corporation	A+	300	6.32%
GTE Corporation	A+	500	6.90%
GTE Corporation	A+	800	6.44%
GTE Corporation	A+	75	2.32%
GTE Florida	A+	200	7.04%
GTE Florida	A+	100	6.74%
GTE Florida	A+	100	2.02%
GTE Florida	A+	300	6.22%
GTE Hawaii	AA	125	1.67%
GTE Hawaii	A+	150	2.62%
GTE Hawaii	A+	150	2.85%
GTE North Inc.	A+	200	6.93%
GTE North Inc.	A+	250	3.85%
GTE North Inc.	A+	150	1.66%
GTE North Inc.	A+	200	4.38%
GTE North Inc.	A+	200	6.22%
GTE North Inc.	A+	250	3.87%
GTE Northwest	A+	175	7.04%
GTE Northwest	A+	175	4.26%
GTE Northwest	A+	200	3.85%
GTE South Inc.	A+	125	3.70%

Current Yields to Maturity on Verizon's Bonds As of February 27, 2004 (Page 3 of 4)			
Subsidiary	**S&P Debt Rating**	**Debt Outstanding ($Millions)**	**Yield to Maturity**
GTE Southwest	AA	100	6.10%
GTE Southwest	A+	250	2.10%
GTE Southwest	A+	150	2.22%
GTE Southwest	A+	150	2.94%
New England Tel. & Tel.	A+	250	6.59%
New England Tel. & Tel.	A+	350	6.24%
New England Tel. & Tel.	A+	125	3.02%
New England Tel. & Tel.	A+	200	3.90%
New Jersey Bell Telephone	A+	200	6.07%
New Jersey Bell Telephone	A+	100	6.40%
New Jersey Bell Telephone	A+	150	6.17%
New York Telephone Co.	A+	200	2.05%
New York Telephone Co.	A+	250	3.73%
New York Telephone Co.	A+	250	4.71%
New York Telephone Co.	A+	150	5.54%
New York Telephone Co.	A+	100	5.73%
New York Telephone Co.	A+	100	5.53%
New York Telephone Co.	A+	250	6.21%
New York Telephone Co.	A+	450	6.92%
New York Telephone Co.	A+	250	6.81%
New York Telephone Co.	A+	100	6.22%
New York Telephone Co.	A+	200	6.61%
NYNEX Capital Funding	A+	10	2.72%

Current Yields to Maturity on Verizon's Bonds
As of February 27, 2004
(Page 4 of 4)

Subsidiary	S&P Debt Rating	Debt Outstanding ($Millions)	Yield to Maturity
Verizon Global Funding	A+	369	8.01%
Verizon Global Funding	A+	1000	3.45%
Verizon Global Funding	A+	1000	4.98%
Verizon Global Funding	A+	500	5.04%
Verizon Maryland	A+	350	6.01%
Verizon New England	A+	1000	4.73%
Verizon New Jersey	A+	1000	4.83%
Verizon New York	A+	1000	5.18%
Verizon New York	A+	500	6.62%
Verizon Pennsylvania	A+	1000	4.76%
Verizon Virginia	A+	1000	5.04%
Weighted Average	**A+**	**276**	**4.98%**

Source: Standard & Poor's, Standard & Poor's Bond Guide, February 27, 2004.

Attachment 3

Ibbotson Associates, Stocks, Bonds, Bills, and Inflation 2004 Yearbook: Market Results for 1926 - 2003

Ibbotson Associates Stocks, Bonds, Bills, and Inflation 2004 Yearbook Market Results 1926 - 2003 (Page 1 of 4)			
Year	**Large Company Stock Return**	**Long Term Government Bonds**	**Short Term U.S. Treasury Bills**
1926	11.62%	7.77%	3.27%
1927	37.49%	8.93%	3.12%
1928	43.61%	0.10%	3.56%
1929	-8.42%	3.42%	4.75%
1930	-24.90%	4.66%	2.41%
1931	-43.34%	-5.31%	1.07%
1932	-8.19%	16.84%	0.96%
1933	53.99%	-0.07%	0.30%
1934	-1.44%	10.03%	0.16%
1935	47.67%	4.98%	0.17%
1936	33.92%	7.52%	0.18%
1937	-35.03%	0.23%	0.31%
1938	31.12%	5.53%	-0.02%
1939	-0.41%	5.94%	0.02%
1940	-9.78%	6.09%	0.00%
1941	-11.59%	0.93%	0.06%
1942	20.34%	3.22%	0.27%
1943	25.90%	2.08%	0.35%
1944	19.75%	2.81%	0.33%
1945	36.44%	10.73%	0.33%
1946	-8.07%	-0.10%	0.35%
1947	5.71%	-2.62%	0.50%

Ibbotson Associates Stocks, Bonds, Bills, and Inflation 2004 Yearbook Market Results 1926 - 2003 (Page 2 of 4)			
Year	**Large Company Stock Return**	**Long Term Government Bonds**	**Short Term U.S. Treasury Bills**
1950	31.71%	0.06%	1.20%
1951	24.02%	-3.93%	1.49%
1952	18.37%	1.16%	1.66%
1953	-0.99%	3.64%	1.82%
1954	52.62%	7.19%	0.86%
1955	31.56%	-1.29%	1.57%
1956	6.56%	-5.59%	2.46%
1957	-10.78%	7.46%	3.14%
1958	43.36%	-6.09%	1.54%
1959	11.96%	-2.26%	2.95%
1960	0.47%	13.78%	2.66%
1961	26.89%	0.97%	2.13%
1962	-8.73%	6.89%	2.73%
1963	22.80%	1.21%	3.12%
1964	16.48%	3.51%	3.54%
1965	12.45%	0.71%	3.93%
1966	-10.06%	3.65%	4.76%
1967	23.98%	-9.18%	4.21%
1968	11.06%	-0.26%	5.21%
1969	-8.50%	-5.07%	6.58%
1970	4.01%	12.11%	6.52%
1971	14.31%	13.23%	4.39%

Ibbotson Associates Stocks, Bonds, Bills, and Inflation 2004 Yearbook Market Results 1926 - 2003 (Page 3 of 4)			
Year	**Large Company Stock Return**	**Long Term Government Bonds**	**Short Term U.S. Treasury Bills**
1974	-26.47%	4.35%	8.00%
1975	37.20%	9.20%	5.80%
1976	23.84%	16.75%	5.08%
1977	-7.18%	-0.69%	5.12%
1978	6.56%	-0.18%	7.18%
1979	18.44%	-1.23%	10.00%
1980	32.42%	-3.95%	11.24%
1981	-4.91%	1.86%	14.71%
1982	21.41%	10.36%	10.54%
1983	22.51%	0.65%	8.80%
1984	6.27%	15.48%	9.85%
1985	32.16%	30.97%	7.72%
1986	18.47%	24.53%	6.16%
1987	5.23%	-2.71%	5.47%
1988	16.81%	9.67%	6.35%
1989	31.49%	18.11%	8.37%
1990	-3.17%	6.18%	7.81%
1991	30.55%	19.30%	5.60%
1992	7.67%	8.05%	3.51%
1993	9.99%	18.24%	2.90%
1994	1.31%	-7.77%	3.90%
1995	37.43%	31.67%	5.60%

Ibbotson Associates
Stocks, Bonds, Bills, and Inflation 2004 Yearbook
Market Results 1926 - 2003
(Page 4 of 4)

Year	Large Company Stock Return	Long Term Government Bonds	Short Term U.S. Treasury Bills
1998	28.58%	13.06%	4.86%
1999	21.04%	-8.96%	4.68%
2000	-9.11%	21.48%	5.89%
2001	-11.88%	3.70%	3.83%
2002	-22.20%	17.84%	1.65%
2003	28.70%	1.45%	1.02%
Weighted Average	**12.41%**	**5.80%**	**3.80%**

Source: Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation (SBBI) 2004 Yearbook: Market Results for 1926 - 2003.*

Attachment 4

Technical Description of Regression Analysis

Technical Description of Regression Analysis

Overview

In the *Virginia Arbitration Order*, the Wireline Competition Bureau (WCB) concluded that facilities-based competition in the local service market (assumed under TELRIC) would increase the systematic risk (beta values) of the incumbent providers and thus "absent evidence of any unique risks associated with the telecommunications industry, or a particular segment of the industry,"[1] the WCB was "uncomfortable prescribing a cost of equity capital for UNEs that is based on a beta significantly higher or lower than the average beta for companies that face competition"[2] – i.e., a beta of 1.0. No specific empirical analysis or other authority was advanced by the Commission in support of this "imputed" beta value. This analysis disputes the WCB's conclusion by providing evidence of the unique lack of risks associated with the local service industry, which greatly distinguish its beta from the average competitive company.

Beta is a measure of *systematic risk.* Systematic risk is influenced by a number of *macroeconomic* factors, such as changes in interest rates, GDP, or inflation; conditions that impact all companies simultaneously. Companies within like industries tend to respond to these macro factors similarly, yet not all industries respond the same way (see Table 1 in my Direct Testimony). For example, the soft drink industry confronts only minor fluctuations in demand regardless of what is happening in the economy – exhibited in its very low industry beta of 0.67. The local service industry, as will be explained in greater detail below, is very similar.

RBOC betas have been increasing in recent years. In the *Virginia* order, the Commission ascribed the increases in RBOCs betas to the presence of faciliites-based competition confronting incumbent local exchange carriers ("ILECs"). To test this hypothesis, ETI conducted an econometric analysis employing ordinary least squares regression modelling to identify and quantify the principal sources of the higher RBOC beta values. The analysis, which is described in this Attachment, does not support the hypothesized relationship between facilities-based competition and increased systematic risk. In fact, several factors *other than the presence of faciliites-based competition* (including diversification and financial leverage) appear to be the primary drivers of the higher risks and increases in cost of capital that the RBOCs now confront.

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1. *Virginia Arbitration Order*, at para. 90.

2. *Id*., at para. 90.

Since the enactment of the 1996 legislation, the RBOCs have invested heavily in *non-ILEC*, non-regulated activities, such as wireless services, broadband and related Internet services, foreign ventures, and, most recently, long distance. Unlike core basic local telephone service, the demand for which is highly price- and income-inelastic, these newer RBOC investment initiatives are more discretionary goods and far more heavily impacted by macroeconomic factors. For example, the three principal publicly-traded *non-RBOC* wireless carriers – AT&T Wireless, Sprint PCS and Nextel – have an average beta of 1.65.[3] It is reasonable to assume that the RBOCs confront an equally elevated level of systematic risk with respect to their own wireless affiliates, causing the parent company betas to be higher than they would otherwise be if, for example, wireless was not in their portfolios. Other *non-ILEC* RBOC ventures exhibit similar elevated levels of risk which, when averaged with the considerably less risky ILEC operation, explain the increase in overall RBOC beta values.

The Data

We considered four potential sources to explain the varying degrees of exposure to systematic risk (beta values) confronted by the RBOCs – facilities-based competition, all competition, RBOC asset diversification into non-ILEC ventures, and financial leverage. The data for this analysis was taken from several publicly available sources – FCC Form 477, SEC Forms 10-K and 10-Q, and the Value Line Investment Survey. The data were collected for each RBOC for 1996 through 2002, except for data on facilities-based competition, which was only available for 1999 through 2002.

RBOC Betas. The regression models were estimated using both annual and semi-annual data. For the annual analyses, RBOC betas were averaged over the four quarters following the public release date of the corresponding explanatory variable; for the semi-annual analysis, the RBOC betas were averaged over the two quarters following the public release date of the explanatory variable. By averaging beta values (over two quarters or four, respectively), seasonal or random variation in the beta values are addressed.

Facilities-based competition. The level of facilities-based competition came from the FCC's *Local Telephone Competition and Broadband Deployment* report for 1999 through 2002.[4] CLEC-owned lines (by state) were separated by RBOC region and CLEC facilities-based market shares were calculated for each RBOC region by using the counts of RBOC ILEC lines for each

3. As of January 2004, beta values for each were 1.45 for AT&T Wireless, 1.80 for NEXTEL, and 1.65 for Sprint PCS. Value Line Investment Survey, January 2, 2004, pp. 722, 734, 739.

4. The reports are available online at http://www.fcc.gov/wcb/iatd/comp.html.

state. Since the data for CLEC-owned lines has only been reported by state since end-of-year 1999, the analysis was necessarily limited to the seven half-year periods from 2H99 through and including 2H02. Because betas necessarily reflect historic conditions, the explanatory variables were lagged by one period relative to the beta values .

All competition. The level of all competition came from the FCC's *Local Telephone Competition and Broadband Deployment* report for 1999 through 2002.[5] Total CLEC end-user switched access lines (by state) were separated by RBOC region and CLEC market shares were calculated for each RBOC region by using the counts of RBOC ILEC lines for each state. Since the data for CLEC end-user switched access lines has only been reported by state since end-of-year 1999, the analysis was necessarily limited to the seven half-year periods from 2H99 through and including 2H02. Because betas necessarily reflect historic conditions, the explanatory variables were lagged by one period relative to the beta values .

Asset diversification. The measure of diversification was calculated as the share of total RBOC assets devoted to non-ILEC activities. The data was obtained from the parent company and ILEC affiliate 10-K and 10-Q reports filed with the Securities and Exchange Commission ("SEC"). Assets were used as a measure of diversification because they best represent and quantify long-term investment commitments of the RBOCs. The share of non-ILEC RBOC assets was calculated by subtracting the value of the assets in the RBOC ILEC affiliates (i.e., the BOCs) from the total parent company assets, and then dividing that value by the total parent company assets.[6]

Financial leverage. The financial leverage variable was calculated from Value Line Investment Survey data as the ratio of debt financing to total debt plus equity in the RBOC. Not surprisingly, there was some correlation between the diversification variable and financial leverage variable, since some of the diversification was financed disproportionately with debt.[7]

Finally, since the data are both cross-sectional (representing different RBOCs) and time-series (covering different time periods), dummy variables were assigned for each company and

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5. The reports are available online at http://www.fcc.gov/wcb/iatd/comp.html.

6. Percent Non-ILEC = (Total RBOC Assets - ΣILEC Assets)/Total RBOC Assets

7. There was also some correlation between the facilities-based competition variable and the diversification variable. However, there is no intuitive basis to ascribe any direct linkage or causality between the two. Rather, both have tended to increase over time, and hence exhibit some apparent correlation in a time-series analysis.

each time period. This technique is known as pooling and allows one to combine both cross-sectional and time-series data effectively.[8]

The Regression Models and Results

ETI ran three distinct regressions to best understand the relationships between systematic risk (beta) and the principal explanatory variables – facilities-based competition, all competition, asset diversification, and financial leverage. Since FCC data on the extent of facilities-based competition has only been reported since end-of-year 1999, the analyses in which competition was included was necessarily limited to the seven most recent half-year periods. These results are presented in Tables A4-1 and A4-2 below (Appendices 1 and 2 to this Attachment contain the results of the individual regression runs). The third iteration excluded all competition-based variables and was extended back to 1996. Table A4-3 contains these results, with the regression run results being provided in Appendix 3 to this Attachement. All three iterations of the regression, which are described below, indicate that the growth of facilities-based competition and all competition were not significant sources of the increase in RBOC beta values, and show that RBOC asset diversification has been the principal source of the increase in RBOC betas.[9]

8. SHAZAM, a widely-used econometric software package produced through the University of British Columbia (and which was used for the regressions described herein), provides a description of this technique on its web page. See, http://shazam.econ.ubc.ca/intro/poolols.htm.

9. This is true both for a two-sided test and a one-sided test. For a two-sided test, one tests for any (either positive or negative) correlation between the dependent variable (beta) and the independent variables (facilities-based competition, all competition, diversification, and leverage). For a one-sided test, one tests for a potential positive correlation only. A one-sided test is valid in this situation because of the WCB's hypothesis that competition *increases* systematic risk. In a one-tail *t*-test, a value of *t* below *positive* 1.83 in this case (for 9 degrees of freedom at the 95% confidence level), which necessarily includes all negative values of *t*, fails the test of statistical significance at the 95% confidence level. In a two-tail *t*-test, *t* must be above 2.26 to be deemed significant at the 95% level.

Table A4-1
Regression Results
7 period semi-annual data
2H99 - 2H02

Explanatory Variable	Coefficient	*t*-Statistic
Constant	**0.58**	3.59
FB Competition	-10.68	-1.88
Percent Non-ILEC	**1.34**	5.71
Leverage	**0.80**	2.58
SBC Dummy	**-0.26**	-3.03
Adjusted R^2	0.915	
Durbin-Watson	2.01	

Notes: (1) With 9 degrees of freedom, the *t*-statistic must be greater than 2.26 for a two-tailed test and 1.83 for a one-tailed test to be significant at the 95% level. Bolded numbers are significant.
(2) All other dummy variables for the companies and time periods were not significant and thus were not included in the table.

To further test the validity of this conclusion, two alternate model specifications were used in which (1) the facilities-based competition variable was replaced with a total competition variable and (2) the facilities-based competition variable was excluded. Since the second alternative model was not limited to the time periods covered by the FCC Local Competition Reports with respect to competition, the analysis was extended back to the 1996, when TA96 was enacted and when the FCC's *Local Competition Order* was issued (see Appendix 3 to this Attachment). The analysis covered seven years of data and included six out of the original seven ILECs.[10] All three models similarly ascribed the principal sources of increased RBOC betas to the growing share of total RBOC assets that were committed to *non-ILEC* (non-BOC) lines of business (see Tables A4-2 and A4-3).

10. The Pacific Telesis-SBC merger was announced in April 1996 and became effective as of April 1, 1997. Value Line did not publish beta values for Pacific Telesis in 1996 or 1997, and so Pacific Telesis was not included in the model.

Table A4-2
Alternative Regression Specification 1:
Replacing facilities-based competition with all competition
7 period semi-annual data
2H99 - 2H02

Explanatory Variable	Coefficient	*t*-Statistic
Constant	0.60	3.12
All Competition	-3.99	-1.52
Percent Non-LEC	**1.33**	5.27
Leverage	0.53	2.00
SBC Dummy	**-0.25**	-2.73
Adjusted R^2	0.906	
Durbin-Watson	1.89	

Notes: (1) With 9 degrees of freedom, the *t*-statistic must be greater than 2.26 for a two-tailed test and 1.83 for a one-tailed test to be significant at the 95% level. Bolded numbers are significant
(2) All other dummy variables for the companies and time periods were not significant and thus were not included in the table.

Table A4-3
Alternative Regression Specification 2:
Excluding competition variables
annual data
1996 - 2002

Variable	Coefficient	*t*-Statistic
Constant	0.11	0.89
Percent Non-LEC	**1.18**	7.78
Leverage	**0.79**	2.74
1997 Dummy	**0.14**	2.42
1998 Dummy	**0.16**	2.86
Qwest Dummy	**0.31**	3.26
Verizon Dummy	**0.22**	2.32
Adjusted R^2	0.830	
Durbin-Watson	1.68	

Notes: (1) With 16 degrees of freedom, the *t*-statistic must be greater than 2.12 for a two-tailed test and 1.** for a one-tailed test to be significant at the 95% level. Bolded numbers are significant.
(2) All other dummy variables for the companies and time periods were not significant and thus were not included in the table.

Conclusion

The regression analysis refutes the relationship hypothesized by the Commission – i.e., that facilities-based competition increases systematic risk and, therefore, causes the RBOCs to confront higher costs of capital than would prevail under noncompetitive conditions. The analysis also demonstrates that the primary source of increased risk is RBOC diversification into non-ILEC, nonregulated lines of business. The effect of the Commission's imputation of a beta value of 1.00 – the average beta value of a firm facing facilities-based competition – is to shift the consequences of these increased *non-ILEC* sources of risk into the RBOCs' regulated core services. By requiring that the cost of capital applicable to TELRIC be based upon *average*

RBOC corporation-wide risks rather than being confined to the substantially lower risk confronting the BOC's ILEC entities specifically, the effect is to overstate the cost of capital attributable to the RBOCs' regulated operations and in so doing shift capital costs out of the nonregulated, non-ILEC competitive components of the RBOCs over to their regulated operations, in effect forcing the ILEC to cross-subsidize the remaining and far more risky portions of the RBOCs' business.

Appendix 1

Dependent Variable:	ILEC Beta Values
Explanatory Variables:	Facilities-Based Competition (FB_Comp) Diversification (Non_ILEC) Financial Leverage (Leverage)
Time Series:	Betas, 1H00 – 1H03 (7 periods) Explanatory Variables, 2H99 – 2H02 (7 periods)
Companies Included:	BellSouth (7 observations) Qwest (5 observations)[1] SBC (7 observations) Verizon (3 observations)[2]
Total Observations:	22

1. Value Line did not publish beta values for Qwest 2H00. Qwest has not released its 2002 10-K.

2. Value Line did not publish beta values for Verizon 2H00 - 2H02.

Data Underlying Appendix 1					
Company	**Year**	**Beta**	**FB_Comp**	**Non_ILEC**	**Leverage**
BellSouth	1H00	0.825	0.0186	0.4719	0.1593
BellSouth	2H00	0.825	0.0207	0.4260	0.1967
BellSouth	1H01	0.825	0.0238	0.4170	0.2108
BellSouth	2H01	0.800	0.0260	0.3868	0.1931
BellSouth	1H02	0.775	0.0192	0.3861	0.2244
BellSouth	2H02	0.850	0.0199	0.3670	0.3141
BellSouth	1H03	0.900	0.0240	0.3641	0.2557
Qwest	2H00	0.750	0.0122	0.1415	0.2582
Qwest	1H01	1.600	0.0255	0.6892	0.2458
Qwest	2H01	1.475	0.0322	0.6644	0.4206
Qwest	1H02	1.475	0.0393	0.6603	0.6490
Qwest	2H02	1.675	0.0449	0.6557	0.8614
SBC	1H00	0.825	0.0124	0.3904	0.1274
SBC	2H00	0.850	0.0208	0.4317	0.1391
SBC	1H01	0.825	0.0276	0.4375	0.1542
SBC	2H01	0.800	0.0296	0.6150	0.1452
SBC	1H02	0.775	0.0326	0.6119	0.1692
SBC	2H02	0.900	0.0342	0.6145	0.2557
SBC	1H03	0.975	0.0351	0.6328	0.2366
Verizon	1H00	0.850	0.0171	0.3184	0.1773
Verizon	2H02	1.025	0.0480	0.4483	0.4349
Verizon	1H03	1.000	0.0478	0.4472	0.3680

SHAZAM OUTPUT

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Content-Disposition: form-data; name="IX"; filename="C:\Documents and Settings\BJP.000\Desktop\d
 FILE UPLOAD (120 CHARS MAX) FOR:de99biannual_fb_comp.csv
Content-Type: application/octet-stream
*****************************************************************
Hello/Bonjour/Aloha/Howdy/G Day/Kia Ora/Konnichiwa/Buenos Dias/Nee Hau/Ciao
Welcome to SHAZAM - Version 9.0  -  OCT 2003 SYSTEM=LINUX    PAR=   781
|_SAMPLE 1 22,,,,,,,,,,,,,,,,
|_READ beta FB_Comp Non_LEC Leverage P1 P2 P3 P4 P5 P6 C1 C2 C3,,,,,,,,,,,,,,,,
  13 VARIABLES AND       22 OBSERVATIONS STARTING AT OBS       1

|_STAT beta FB_Comp Non_LEC Leverage P1 P2 P3 P4 P5 P6 C1 C2 C3/ pcor pcov,,,,,,,,,,,,
NAME         N    MEAN         ST. DEV      VARIANCE     MINIMUM      MAXIMUM
BETA          22  0.98455      0.28872     0.83359E-01  0.75000       1.6800
FB_COMP       22  0.27795E-01 0.10527E-01 0.11081E-03  0.12200E-01  0.48000E-01
NON_LEC       22  0.47909      0.14222     0.20228E-01  0.14000      0.69000
LEVERAGE      22  0.28227      0.17774     0.31590E-01  0.13000      0.86000
P1            22  0.18182      0.39477     0.15584       0.0000       1.0000
P2            22  0.13636      0.35125     0.12338       0.0000       1.0000
P3            22  0.13636      0.35125     0.12338       0.0000       1.0000
P4            22  0.13636      0.35125     0.12338       0.0000       1.0000
P5            22  0.18182      0.39477     0.15584       0.0000       1.0000
P6            22  0.13636      0.35125     0.12338       0.0000       1.0000
C1            22  0.22727      0.42893     0.18398       0.0000       1.0000
C2            22  0.31818      0.47673     0.22727       0.0000       1.0000
C3            22  0.31818      0.47673     0.22727       0.0000       1.0000

 CORRELATION MATRIX OF VARIABLES -       22 OBSERVATIONS


BETA        1.0000
FB_COMP    0.51324       1.0000
NON_LEC    0.67398      0.61138       1.0000
LEVERAGE   0.78197      0.65343      0.41094       1.0000
P1        -0.28334     -0.58305     -0.54820     -0.27085       1.0000
P2         0.14385     -0.83536E-01  0.10745     -0.18064     -0.18732
           1.0000
P3         0.59335E-01  0.56842E-01  0.22184     -0.66222E-01 -0.18732
          -0.15789       1.0000
P4         0.40553E-01  0.99342E-01  0.21231      0.14735     -0.18732
          -0.15789     -0.15789       1.0000
P5         0.21801      0.41044      0.14727      0.49605     -0.22222
          -0.18732     -0.18732     -0.18732       1.0000
P6        -0.34576E-01  0.30283      0.25997E-02  0.17682E-01 -0.18732
          -0.15789     -0.15789     -0.15789     -0.18732       1.0000
C1         0.79490      0.15949      0.32359      0.64251      0.25565E-01
           0.10057      0.10057      0.10057      0.25565E-01 -0.21550
           1.0000
C2        -0.31892     -0.21523E-01  0.26433     -0.41358     -0.69007E-01
           0.12926E-01  0.12926E-01  0.12926E-01 -0.69007E-01  0.12926E-01
          -0.37048       1.0000
C3        -0.37081     -0.40203     -0.40288     -0.23936     -0.69007E-01
           0.12926E-01  0.12926E-01  0.12926E-01 -0.69007E-01  0.12926E-01
          -0.37048     -0.46667       1.0000
              BETA         FB_COMP      NON_LEC      LEVERAGE     P1
              P2           P3           P4           P5           P6
              C1           C2           C3

 COVARIANCE MATRIX OF VARIABLES -       22 OBSERVATIONS
```

```
BETA      0.83359E-01
FB_COMP   0.15599E-02  0.11081E-03
NON_LEC   0.27676E-01  0.91533E-03  0.20228E-01
LEVERAGE  0.40127E-01  0.12225E-02  0.10388E-01  0.31590E-01
P1       -0.32294E-01 -0.24229E-02 -0.30779E-01 -0.19004E-01  0.15584
P2        0.14589E-01 -0.30887E-03  0.53680E-02 -0.11277E-01 -0.25974E-01
          0.12338
P3        0.60173E-02  0.21017E-03  0.11082E-01 -0.41342E-02 -0.25974E-01
         -0.19481E-01  0.12338
P4        0.41126E-02  0.36732E-03  0.10606E-01  0.91991E-02 -0.25974E-01
         -0.19481E-01 -0.19481E-01  0.12338
P5        0.24848E-01  0.17056E-02  0.82684E-02  0.34805E-01 -0.34632E-01
         -0.25974E-01 -0.25974E-01 -0.25974E-01  0.15584
P6       -0.35065E-02  0.11197E-02  0.12987E-03  0.11039E-02 -0.25974E-01
         -0.19481E-01 -0.19481E-01 -0.19481E-01 -0.25974E-01  0.12338
C1        0.98442E-01  0.72013E-03  0.19740E-01  0.48983E-01  0.43290E-02
          0.15152E-01  0.15152E-01  0.15152E-01  0.43290E-02 -0.32468E-01
          0.18398
C2       -0.43896E-01 -0.10801E-03  0.17922E-01 -0.35043E-01 -0.12987E-01
          0.21645E-02  0.21645E-02  0.21645E-02 -0.12987E-01  0.21645E-02
         -0.75758E-01  0.22727
C3       -0.51039E-01 -0.20175E-02 -0.27316E-01 -0.20281E-01 -0.12987E-01
          0.21645E-02  0.21645E-02  0.21645E-02 -0.12987E-01  0.21645E-02
         -0.75758E-01 -0.10606      0.22727
             BETA         FB_COMP      NON_LEC      LEVERAGE     P1
             P2           P3           P4           P5           P6
             C1           C2           C3

|_OLS beta FB_Comp Non_LEC Leverage P1 P2 P3 P4 P5 P6 C1 C2 C3/ auxrsqr rstat dwpvalue,,,,,,,,,,

REQUIRED MEMORY IS PAR=      11 CURRENT PAR=     781
 OLS ESTIMATION
       22 OBSERVATIONS     DEPENDENT VARIABLE= BETA
...NOTE..SAMPLE RANGE SET TO:      1,     22

DURBIN-WATSON STATISTIC  =   2.00878
DURBIN-WATSON POSITIVE AUTOCORRELATION TEST P-VALUE =    0.116824
              NEGATIVE AUTOCORRELATION TEST P-VALUE =    0.883176
R-SQUARE OF FB_COMP  ON OTHER INDEPENDENT VARIABLES =   0.9052
R-SQUARE OF NON_LEC  ON OTHER INDEPENDENT VARIABLES =   0.6970
R-SQUARE OF LEVERAGE ON OTHER INDEPENDENT VARIABLES =   0.8890
R-SQUARE OF P1       ON OTHER INDEPENDENT VARIABLES =   0.7149
R-SQUARE OF P2       ON OTHER INDEPENDENT VARIABLES =   0.6152
R-SQUARE OF P3       ON OTHER INDEPENDENT VARIABLES =   0.6323
R-SQUARE OF P4       ON OTHER INDEPENDENT VARIABLES =   0.6087
R-SQUARE OF P5       ON OTHER INDEPENDENT VARIABLES =   0.7358
R-SQUARE OF P6       ON OTHER INDEPENDENT VARIABLES =   0.6614
R-SQUARE OF C1       ON OTHER INDEPENDENT VARIABLES =   0.8765
R-SQUARE OF C2       ON OTHER INDEPENDENT VARIABLES =   0.8026
R-SQUARE OF C3       ON OTHER INDEPENDENT VARIABLES =   0.8476
R-SQUARE OF CONSTANT ON OTHER INDEPENDENT VARIABLES =   0.0000

 R-SQUARE =   0.9635     R-SQUARE ADJUSTED =   0.9147
VARIANCE OF THE ESTIMATE-SIGMA**2 =  0.71089E-02
STANDARD ERROR OF THE ESTIMATE-SIGMA =  0.84314E-01
SUM OF SQUARED ERRORS-SSE=  0.63980E-01
MEAN OF DEPENDENT VARIABLE =  0.98455
LOG OF THE LIKELIHOOD FUNCTION =  33.0259

MODEL SELECTION TESTS - SEE JUDGE ET AL. (1985,P.242)
 AKAIKE (1969) FINAL PREDICTION ERROR - FPE =     0.11310E-01
    (FPE IS ALSO KNOWN AS AMEMIYA PREDICTION CRITERION - PC)
```

```
 AKAIKE (1973) INFORMATION CRITERION - LOG AIC =  -4.6584
 SCHWARZ (1978) CRITERION - LOG SC =              -4.0137
MODEL SELECTION TESTS - SEE RAMANATHAN (1998,P.165)
 CRAVEN-WAHBA (1979)
    GENERALIZED CROSS VALIDATION - GCV =          0.17377E-01
 HANNAN AND QUINN (1979) CRITERION =              0.11037E-01
 RICE (1984) CRITERION =                         -0.15995E-01
 SHIBATA (1981) CRITERION =                       0.63451E-02
 SCHWARZ (1978) CRITERION - SC =                  0.18066E-01
 AKAIKE (1974) INFORMATION CRITERION - AIC =      0.94815E-02

                    ANALYSIS OF VARIANCE - FROM MEAN
                      SS          DF            MS               F
REGRESSION        1.6866          12.       0.14055           19.771
ERROR            0.63980E-01       9.       0.71089E-02      P-VALUE
TOTAL             1.7505          21.       0.83359E-01         0.000

                    ANALYSIS OF VARIANCE - FROM ZERO
                      SS          DF            MS               F
REGRESSION        23.012          13.        1.7701          249.004
ERROR            0.63980E-01       9.       0.71089E-02      P-VALUE
TOTAL             23.076          22.        1.0489             0.000


VARIABLE   ESTIMATED  STANDARD   T-RATIO        PARTIAL STANDARDIZED ELASTICITY
  NAME    COEFFICIENT   ERROR      9 DF   P-VALUE CORR. COEFFICIENT  AT MEANS
FB_COMP   -10.683      5.677      -1.882     0.093-0.531    -0.3895    -0.3016
NON_LEC    1.3407     0.2350       5.705     0.000 0.885     0.6604     0.6524
LEVERAGE  0.80202     0.3107       2.581     0.030 0.652     0.4937     0.2299
P1       -0.72472E-01 0.8728E-01 -0.8303     0.428-0.267    -0.0991    -0.0134
P2        0.62853E-01 0.8444E-01  0.7443     0.476 0.241     0.0765     0.0087
P3       -0.52059E-01 0.8638E-01 -0.6027     0.562-0.197    -0.0633    -0.0072
P4       -0.12403     0.8374E-01  -1.481     0.173-0.443    -0.1509    -0.0172
P5       -0.42318E-01 0.9067E-01 -0.4667     0.652-0.154    -0.0579    -0.0078
P6        0.38595E-01 0.9002E-01  0.4287     0.678 0.141     0.0470     0.0053
C1        0.47771E-01 0.1221      0.3914     0.705 0.129     0.0710     0.0110
C2       -0.26331     0.8687E-01  -3.031     0.014-0.711    -0.4348    -0.0851
C3       -0.19950     0.9885E-01  -2.018     0.074-0.558    -0.3294    -0.0645
CONSTANT  0.58025     0.1616       3.591     0.006 0.767     0.0000     0.5894

DURBIN-WATSON = 2.0088    VON NEUMANN RATIO = 2.1044    RHO = -0.01152
RESIDUAL SUM = -0.69389E-17  RESIDUAL VARIANCE =  0.71089E-02
SUM OF ABSOLUTE ERRORS=   1.0182
R-SQUARE BETWEEN OBSERVED AND PREDICTED = 0.9635
RUNS TEST:   12 RUNS,   10 POS,    0 ZERO,   12 NEG  NORMAL STATISTIC =  0.0401
COEFFICIENT OF SKEWNESS =  -0.1968 WITH STANDARD DEVIATION OF 0.4910
COEFFICIENT OF EXCESS KURTOSIS =  -0.9587 WITH STANDARD DEVIATION OF 0.9528

JARQUE-BERA NORMALITY TEST- CHI-SQUARE(2 DF)=    1.0676 P-VALUE= 0.586

     GOODNESS OF FIT TEST FOR NORMALITY OF RESIDUALS - 20 GROUPS
OBSERVED  0.0  0.0  0.0  0.0  0.0  0.0  2.0  2.0  3.0  5.0  0.0  5.0  4.0  1.0  0.0  0.0  0.0  0

EXPECTED  0.1  0.1  0.2  0.4  0.7  1.1  1.5  2.0  2.4  2.6  2.6  2.4  2.0  1.5  1.1  0.7  0.4  0

CHI-SQUARE =   15.3471 WITH  5 DEGREES OF FREEDOM, P-VALUE= 0.009
|_DIAGNOS / HET,,,,,,,,,,,,

REQUIRED MEMORY IS PAR=     104 CURRENT PAR=     781
DEPENDENT VARIABLE = BETA            22 OBSERVATIONS
REGRESSION COEFFICIENTS
  -10.6834969400       1.34068482369      0.802017974582     -0.724719002523E-01
  0.628527661288E-01 -0.520588199993E-01 -0.124026368247     -0.423175707540E-01
```

```
  0.385948439102E-01  0.477706679284E-01 -0.263305611030     -0.199503213445
  0.580249443876

HETEROSKEDASTICITY TESTS
                            CHI-SQUARE     D.F.   P-VALUE
                           TEST STATISTIC
E**2 ON YHAT:                       2.570     1    0.10893
E**2 ON YHAT**2:                    2.505     1    0.11351
E**2 ON LOG(YHAT**2):               2.599     1    0.10692
E**2 ON LAG(E**2) ARCH TEST:        0.001     1    0.97670
LOG(E**2) ON X (HARVEY) TEST:      16.228    12    0.18100
ABS(E) ON X (GLEJSER) TEST:         9.429    12    0.66592
E**2 ON X                  TEST:
          KOENKER(R2):             11.160    12    0.51525
          B-P-G (SSR) :             5.495    12    0.93935

...MATRIX INVERSION FAILED IN ROW   21
...RESULTS MAY BE UNRELIABLE
E**2 ON X X**2    (WHITE) TEST:
          KOENKER(R2):         **********    24  *********
          B-P-G (SSR) :        **********    24  *********

...MATRIX INVERSION FAILED IN ROW   21
...RESULTS MAY BE UNRELIABLE
E**2 ON X X**2 XX (WHITE) TEST:
          KOENKER(R2):         **********    90  *********
          B-P-G (SSR) :        **********    90  *********

|_stop,,,,,,,,,,,,
```

Appendix 2

Dependent Variable:	ILEC Beta Values
Explanatory Variables:	All Competition (All_Comp) Diversification (Non_ILEC) Financial Leverage (Leverage)
Time Series:	Betas, 1H00 – 1H03 (7 periods) Explanatory Variables, 2H99 – 2H02 (7 periods)
Companies Included:	BellSouth (7 observations) Qwest (5 observations)[1] SBC (7 observations) Verizon (3 observations)[2]
Total Observations:	22

1. Value Line did not publish beta values for Qwest 2H00. Qwest has not released its 2002 10-K.

2. Value Line did not publish beta values for Verizon 2H00 - 2H02.

Data Underlying Appendix 2					
Company	**Year**	**Beta**	**All_Comp**	**Non_ILEC**	**Leverage**
BellSouth	1H00	0.825	0.0425	0.4719	0.1593
BellSouth	2H00	0.825	0.0419	0.4260	0.1967
BellSouth	1H01	0.825	0.0536	0.4170	0.2108
BellSouth	2H01	0.800	0.0632	0.3868	0.1931
BellSouth	1H02	0.775	0.0638	0.3861	0.2244
BellSouth	2H02	0.850	0.0737	0.3670	0.3141
BellSouth	1H03	0.900	0.1012	0.3641	0.2557
Qwest	2H00	0.750	0.0235	0.1415	0.2582
Qwest	1H01	1.600	0.0606	0.6892	0.2458
Qwest	2H01	1.475	0.0714	0.6644	0.4206
Qwest	1H02	1.475	0.0926	0.6603	0.6490
Qwest	2H02	1.675	0.1012	0.6557	0.8614
SBC	1H00	0.825	0.0380	0.3904	0.1274
SBC	2H00	0.850	0.0536	0.4317	0.1391
SBC	1H01	0.825	0.0715	0.4375	0.1542
SBC	2H01	0.800	0.0846	0.6150	0.1452
SBC	1H02	0.775	0.0993	0.6119	0.1692
SBC	2H02	0.900	0.1135	0.6145	0.2557
SBC	1H03	0.975	0.1345	0.6328	0.2366
Verizon	1H00	0.850	0.0423	0.3184	0.1773
Verizon	2H02	1.025	0.1417	0.4483	0.4349
Verizon	1H03	1.000	0.1529	0.4472	0.3680

SHAZAM OUTPUT

```
-----------------------------7d41a62cc029c
Content-Disposition: form-data; name="IX"; filename="C:\Documents and Settings\BJP.000\Desktop\d
 FILE UPLOAD (120 CHARS MAX) FOR:
Content-Type: application/octet-stream
*****************************************************************
Hello/Bonjour/Aloha/Howdy/G Day/Kia Ora/Konnichiwa/Buenos Dias/Nee Hau/Ciao
Welcome to SHAZAM - Version 9.0  -  OCT 2003 SYSTEM=LINUX    PAR=   781
|_SAMPLE 1 22,,,,,,,,,,,,,,,
|_READ beta All_Comp Non_LEC Leverage P1 P2 P3 P4 P5 P6 C1 C2 C3,,,,,,,,,,,,,,,
  13 VARIABLES AND       22 OBSERVATIONS STARTING AT OBS       1

|_STAT beta All_Comp Non_LEC Leverage P1 P2 P3 P4 P5 P6 C1 C2 C3/ pcor pcov,,,,,,,,,,,
NAME         N    MEAN         ST. DEV      VARIANCE     MINIMUM      MAXIMUM
BETA          22  0.98455      0.28872     0.83359E-01  0.75000       1.6800
ALL_COMP      22  0.78232E-01 0.35411E-01 0.12539E-02  0.23500E-01  0.15290
NON_LEC       22  0.47909      0.14222     0.20228E-01  0.14000      0.69000
LEVERAGE      22  0.28227      0.17774     0.31590E-01  0.13000      0.86000
P1            22  0.18182      0.39477     0.15584       0.0000       1.0000
P2            22  0.13636      0.35125     0.12338       0.0000       1.0000
P3            22  0.13636      0.35125     0.12338       0.0000       1.0000
P4            22  0.13636      0.35125     0.12338       0.0000       1.0000
P5            22  0.18182      0.39477     0.15584       0.0000       1.0000
P6            22  0.13636      0.35125     0.12338       0.0000       1.0000
C1            22  0.22727      0.42893     0.18398       0.0000       1.0000
C2            22  0.31818      0.47673     0.22727       0.0000       1.0000
C3            22  0.31818      0.47673     0.22727       0.0000       1.0000

 CORRELATION MATRIX OF VARIABLES -       22 OBSERVATIONS


BETA        1.0000
ALL_COMP   0.24105       1.0000
NON_LEC    0.67398      0.46909       1.0000
LEVERAGE   0.78197      0.40809      0.41094       1.0000
P1        -0.28334     -0.56760     -0.54820     -0.27085       1.0000
P2         0.14385     -0.18758      0.10745     -0.18064     -0.18732
           1.0000
P3         0.59335E-01 -0.59324E-01  0.22184     -0.66222E-01 -0.18732
          -0.15789       1.0000
P4         0.40553E-01  0.80416E-01  0.21231      0.14735     -0.18732
          -0.15789     -0.15789       1.0000
P5         0.21801      0.39914      0.14727      0.49605     -0.22222
          -0.18732     -0.18732     -0.18732       1.0000
P6        -0.34576E-01  0.58922      0.25997E-02  0.17682E-01 -0.18732
          -0.15789     -0.15789     -0.15789     -0.18732       1.0000
C1         0.79490     -0.13123      0.32359      0.64251      0.25565E-01
           0.10057      0.10057      0.10057      0.25565E-01 -0.21550
           1.0000
C2        -0.31892      0.13364      0.26433     -0.41358     -0.69007E-01
           0.12926E-01  0.12926E-01  0.12926E-01 -0.69007E-01  0.12926E-01
          -0.37048       1.0000
C3        -0.37081     -0.30386     -0.40288     -0.23936     -0.69007E-01
           0.12926E-01  0.12926E-01  0.12926E-01 -0.69007E-01  0.12926E-01
          -0.37048     -0.46667       1.0000
              BETA         ALL_COMP     NON_LEC      LEVERAGE     P1
              P2           P3           P4           P5           P6
              C1           C2           C3

 COVARIANCE MATRIX OF VARIABLES -       22 OBSERVATIONS
```

```
BETA      0.83359E-01
ALL_COMP  0.24645E-02  0.12539E-02
NON_LEC   0.27676E-01  0.23625E-02  0.20228E-01
LEVERAGE  0.40127E-01  0.25684E-02  0.10388E-01  0.31590E-01
P1       -0.32294E-01 -0.79346E-02 -0.30779E-01 -0.19004E-01  0.15584
P2        0.14589E-01 -0.23331E-02  0.53680E-02 -0.11277E-01 -0.25974E-01
          0.12338
P3        0.60173E-02 -0.73788E-03  0.11082E-01 -0.41342E-02 -0.25974E-01
         -0.19481E-01  0.12338
P4        0.41126E-02  0.10002E-02  0.10606E-01  0.91991E-02 -0.25974E-01
         -0.19481E-01 -0.19481E-01  0.12338
P5        0.24848E-01  0.55797E-02  0.82684E-02  0.34805E-01 -0.34632E-01
         -0.25974E-01 -0.25974E-01 -0.25974E-01  0.15584
P6       -0.35065E-02  0.73288E-02  0.12987E-03  0.11039E-02 -0.25974E-01
         -0.19481E-01 -0.19481E-01 -0.19481E-01 -0.25974E-01  0.12338
C1        0.98442E-01 -0.19933E-02  0.19740E-01  0.48983E-01  0.43290E-02
          0.15152E-01  0.15152E-01  0.15152E-01  0.43290E-02 -0.32468E-01
          0.18398
C2       -0.43896E-01  0.22561E-02  0.17922E-01 -0.35043E-01 -0.12987E-01
          0.21645E-02  0.21645E-02  0.21645E-02 -0.12987E-01  0.21645E-02
         -0.75758E-01  0.22727
C3       -0.51039E-01 -0.51297E-02 -0.27316E-01 -0.20281E-01 -0.12987E-01
          0.21645E-02  0.21645E-02  0.21645E-02 -0.12987E-01  0.21645E-02
         -0.75758E-01 -0.10606      0.22727
             BETA         ALL_COMP     NON_LEC      LEVERAGE     P1
             P2           P3           P4           P5           P6
             C1           C2           C3

|_OLS beta All_Comp Non_LEC Leverage P1 P2 P3 P4 P5 P6 C1 C2 C3/ auxrsqr rstat dwpvalue,,,,,,,,,

REQUIRED MEMORY IS PAR=      11 CURRENT PAR=     781
 OLS ESTIMATION
       22 OBSERVATIONS     DEPENDENT VARIABLE= BETA
...NOTE..SAMPLE RANGE SET TO:      1,     22

DURBIN-WATSON STATISTIC  =   1.88940
DURBIN-WATSON POSITIVE AUTOCORRELATION TEST P-VALUE =    0.080905
              NEGATIVE AUTOCORRELATION TEST P-VALUE =    0.919095
R-SQUARE OF ALL_COMP ON OTHER INDEPENDENT VARIABLES =   0.9565
R-SQUARE OF NON_LEC  ON OTHER INDEPENDENT VARIABLES =   0.7090
R-SQUARE OF LEVERAGE ON OTHER INDEPENDENT VARIABLES =   0.8290
R-SQUARE OF P1       ON OTHER INDEPENDENT VARIABLES =   0.7043
R-SQUARE OF P2       ON OTHER INDEPENDENT VARIABLES =   0.6446
R-SQUARE OF P3       ON OTHER INDEPENDENT VARIABLES =   0.7106
R-SQUARE OF P4       ON OTHER INDEPENDENT VARIABLES =   0.7886
R-SQUARE OF P5       ON OTHER INDEPENDENT VARIABLES =   0.8940
R-SQUARE OF P6       ON OTHER INDEPENDENT VARIABLES =   0.9219
R-SQUARE OF C1       ON OTHER INDEPENDENT VARIABLES =   0.8881
R-SQUARE OF C2       ON OTHER INDEPENDENT VARIABLES =   0.8078
R-SQUARE OF C3       ON OTHER INDEPENDENT VARIABLES =   0.8821
R-SQUARE OF CONSTANT ON OTHER INDEPENDENT VARIABLES =   0.0000

 R-SQUARE =   0.9595     R-SQUARE ADJUSTED =   0.9055
VARIANCE OF THE ESTIMATE-SIGMA**2 =  0.78806E-02
STANDARD ERROR OF THE ESTIMATE-SIGMA =  0.88773E-01
SUM OF SQUARED ERRORS-SSE=  0.70926E-01
MEAN OF DEPENDENT VARIABLE =  0.98455
LOG OF THE LIKELIHOOD FUNCTION =  31.8922

MODEL SELECTION TESTS - SEE JUDGE ET AL. (1985,P.242)
 AKAIKE (1969) FINAL PREDICTION ERROR - FPE =     0.12537E-01
    (FPE IS ALSO KNOWN AS AMEMIYA PREDICTION CRITERION - PC)
```

```
 AKAIKE (1973) INFORMATION CRITERION - LOG AIC =  -4.5553
 SCHWARZ (1978) CRITERION - LOG SC =              -3.9106
MODEL SELECTION TESTS - SEE RAMANATHAN (1998,P.165)
 CRAVEN-WAHBA (1979)
    GENERALIZED CROSS VALIDATION - GCV =          0.19264E-01
 HANNAN AND QUINN (1979) CRITERION =              0.12235E-01
 RICE (1984) CRITERION =                         -0.17731E-01
 SHIBATA (1981) CRITERION =                       0.70339E-02
 SCHWARZ (1978) CRITERION - SC =                  0.20028E-01
 AKAIKE (1974) INFORMATION CRITERION - AIC =      0.10511E-01

                    ANALYSIS OF VARIANCE - FROM MEAN
                     SS         DF            MS               F
REGRESSION        1.6796         12.       0.13997            17.761
ERROR            0.70926E-01      9.       0.78806E-02       P-VALUE
TOTAL             1.7505         21.       0.83359E-01          0.000

                    ANALYSIS OF VARIANCE - FROM ZERO
                     SS         DF            MS               F
REGRESSION        23.005         13.        1.7696           224.551
ERROR            0.70926E-01      9.       0.78806E-02       P-VALUE
TOTAL             23.076         22.        1.0489             0.000


VARIABLE   ESTIMATED  STANDARD   T-RATIO        PARTIAL STANDARDIZED ELASTICITY
  NAME    COEFFICIENT   ERROR       9 DF   P-VALUE CORR. COEFFICIENT  AT MEANS
ALL_COMP  -3.9893      2.623      -1.521     0.163-0.452    -0.4893    -0.3170
NON_LEC    1.3301     0.2525       5.268     0.001 0.869     0.6552     0.6472
LEVERAGE  0.52598     0.2635       1.996     0.077 0.554     0.3238     0.1508
P1       -0.56163E-01 0.9024E-01 -0.6224     0.549-0.203    -0.0768    -0.0104
P2        0.73986E-01 0.9251E-01  0.7998     0.444 0.258     0.0900     0.0102
P3       -0.20970E-01 0.1025     -0.2046     0.842-0.068    -0.0255    -0.0029
P4       -0.30425E-01 0.1199     -0.2537     0.805-0.084    -0.0370    -0.0042
P5        0.10561     0.1508      0.7006     0.501 0.227     0.1444     0.0195
P6        0.24009     0.1973       1.217     0.255 0.376     0.2921     0.0333
C1        0.59331E-01 0.1350      0.4394     0.671 0.145     0.0881     0.0137
C2       -0.25333     0.9268E-01  -2.733     0.023-0.674    -0.4183    -0.0819
C3       -0.20593     0.1183      -1.740     0.116-0.502    -0.3400    -0.0666
CONSTANT  0.59875     0.1917       3.123     0.012 0.721     0.0000     0.6081

DURBIN-WATSON = 1.8894    VON NEUMANN RATIO = 1.9794    RHO =  0.04937
RESIDUAL SUM =  0.24286E-16  RESIDUAL VARIANCE =  0.78806E-02
SUM OF ABSOLUTE ERRORS=   1.0835
R-SQUARE BETWEEN OBSERVED AND PREDICTED = 0.9595
RUNS TEST:   12 RUNS,   11 POS,    0 ZERO,   11 NEG  NORMAL STATISTIC =  0.0000
COEFFICIENT OF SKEWNESS =  -0.0426 WITH STANDARD DEVIATION OF 0.4910
COEFFICIENT OF EXCESS KURTOSIS =  -1.0712 WITH STANDARD DEVIATION OF 0.9528

JARQUE-BERA NORMALITY TEST- CHI-SQUARE(2 DF)=    1.1222 P-VALUE= 0.571

     GOODNESS OF FIT TEST FOR NORMALITY OF RESIDUALS - 20 GROUPS
OBSERVED  0.0  0.0  0.0  0.0  0.0  0.0  3.0  1.0  4.0  3.0  2.0  3.0  5.0  1.0  0.0  0.0  0.0  0

EXPECTED  0.1  0.1  0.2  0.4  0.7  1.1  1.5  2.0  2.4  2.6  2.6  2.4  2.0  1.5  1.1  0.7  0.4  0

CHI-SQUARE =   13.2432 WITH  5 DEGREES OF FREEDOM, P-VALUE= 0.021
|_DIAGNOS / HET,,,,,,,,,,,

REQUIRED MEMORY IS PAR=     104 CURRENT PAR=     781
DEPENDENT VARIABLE = BETA            22 OBSERVATIONS
REGRESSION COEFFICIENTS
  -3.98927608712       1.33011525303      0.525980482282     -0.561630649694E-01
  0.739863221802E-01 -0.209703957492E-01 -0.304253308588E-01  0.105612960295
```

```
  0.240090652401      0.593311201458E-01 -0.253328013463     -0.205925324926
  0.598748361562

HETEROSKEDASTICITY TESTS
                            CHI-SQUARE     D.F.   P-VALUE
                           TEST STATISTIC
E**2 ON YHAT:                       2.918     1    0.08759
E**2 ON YHAT**2:                    2.764     1    0.09642
E**2 ON LOG(YHAT**2):               3.054     1    0.08056
E**2 ON LAG(E**2) ARCH TEST:        0.000     1    0.99078
LOG(E**2) ON X (HARVEY) TEST:       9.194    12    0.68625
ABS(E) ON X (GLEJSER) TEST:         7.261    12    0.83990
E**2 ON X                  TEST:
          KOENKER(R2):              9.057    12    0.69803
          B-P-G (SSR) :             4.059    12    0.98234

...MATRIX INVERSION FAILED IN ROW   17
...RESULTS MAY BE UNRELIABLE
E**2 ON X X**2    (WHITE) TEST:
          KOENKER(R2):         **********    24  *********
          B-P-G (SSR) :        **********    24  *********

...MATRIX INVERSION FAILED IN ROW   17
...RESULTS MAY BE UNRELIABLE
E**2 ON X X**2 XX (WHITE) TEST:
          KOENKER(R2):         **********    90  *********
          B-P-G (SSR) :        **********    90  *********

|_stop,,,,,,,,,,,
```

Appendix 3

Dependent Variable:	ILEC Beta Values
Explanatory Variables:	Diversification (Non_ILEC) Financial Leverage (Leverage)
Time Series:	Betas, 1997 – 2003 (7 years) Explanatory Variables, 1996 – 2002 (7 years)
Companies Included:	Ameritech (3 observations)[1] BellSouth (7 observations) NYNEX (1 observation)[2] Qwest (6 observations)[3] SBC (7 observations) Verizon (6 observations)[4]
Total Observations:	30

1. Value Line stopped publishing Ameritech's beta after 1999.
2. Value Line stopped publishing NYNEX's beta after 1997.
3. Qwest has not released its 2002 10-K.
4. Value Line did not publish beta values for Verizon in 2000.

Data Underlying Appendix 3				
Company	**Year**	**Beta**	**Non_ILEC**	**Leverage**
Ameritech	1997	0.900	0.3428	0.1896
Ameritech	1998	0.900	0.3696	0.1242
Ameritech	1999	0.833	0.4618	0.1141
BellSouth	1997	0.950	0.2948	0.1974
BellSouth	1998	0.925	0.3625	0.1426
BellSouth	1999	0.813	0.3956	0.1350
BellSouth	2000	0.825	0.4179	0.1593
BellSouth	2001	0.813	0.4170	0.2108
BellSouth	2002	0.800	0.3861	0.2244
BellSouth	2003	0.900	0.3641	0.2557
NYNEX	1997	0.875	0.3112	0.3271
Qwest	1997	0.775	0.0374	0.2916
Qwest	1998	0.713	0.0373	0.1722
Qwest	1999	0.750	0.0450	0.2640
Qwest	2000	0.750	0.1415	0.2582
Qwest	2001	1.538	0.6892	0.2458
Qwest	2002	1.563	0.6603	0.6490
SBC	1997	0.925	0.4043	0.1881
SBC	1998	0.875	0.2757	0.1503
SBC	1999	0.813	0.3084	0.1249
SBC	2000	0.838	0.3904	0.1274
SBC	2001	0.813	0.4375	0.1542
SBC	2002	0.825	0.6119	0.1692
SBC	2003	0.975	0.6328	0.2366

Verizon	1997	0.950	0.2303	0.2387
Verizon	1998	0.925	0.2689	0.2000
Verizon	1999	0.863	0.2611	0.1996
Verizon	2000	0.850	0.3184	0.1773
Verizon	2002	1.025	0.4551	0.3387
Verizon	2003	1.000	0.4472	0.3680

SHAZAM OUTPUT

```
-----------------------------7d43e620c029c
Content-Disposition: form-data; name="IX"; filename="C:\Documents and Settings\BJP.000\Desktop\d
 FILE UPLOAD (120 CHARS MAX) FOR:de97_no_comp.csv
Content-Type: application/octet-stream
*****************************************************************
Hello/Bonjour/Aloha/Howdy/G Day/Kia Ora/Konnichiwa/Buenos Dias/Nee Hau/Ciao
Welcome to SHAZAM - Version 9.0  -  OCT 2003 SYSTEM=LINUX    PAR=   781
|_SAMPLE 1 30,,,,,,,,,,,,
|_READ beta Non_LEC Leverage Y1 Y2 Y3 Y4 Y5 Y6 C1 C2 C3 C4 C5,,,,,,,,,,,,
  14 VARIABLES AND       30 OBSERVATIONS STARTING AT OBS       1

|_STAT beta Non_LEC Leverage Y1 Y2 Y3 Y4 Y5 Y6 C1 C2 C3 C4 C5/ pcor pcov,,,,,,,,,,,,
NAME         N    MEAN        ST. DEV      VARIANCE     MINIMUM      MAXIMUM
BETA          30  0.90985     0.18953     0.35922E-01  0.71250       1.5625
NON_LEC       30  0.35920     0.16500     0.27223E-01  0.37300E-01  0.68920
LEVERAGE      30  0.22113     0.10450     0.10921E-01  0.11410      0.64900
Y1            30  0.20000     0.40684     0.16552       0.0000       1.0000
Y2            30  0.16667     0.37905     0.14368       0.0000       1.0000
Y3            30  0.16667     0.37905     0.14368       0.0000       1.0000
Y4            30  0.10000     0.30513     0.93103E-01   0.0000       1.0000
Y5            30  0.10000     0.30513     0.93103E-01   0.0000       1.0000
Y6            30  0.13333     0.34575     0.11954       0.0000       1.0000
C1            30  0.10000     0.30513     0.93103E-01   0.0000       1.0000
C2            30  0.23333     0.43018     0.18506       0.0000       1.0000
C3            30  0.20000     0.40684     0.16552       0.0000       1.0000
C4            30  0.23333     0.43018     0.18506       0.0000       1.0000
C5            30  0.20000     0.40684     0.16552       0.0000       1.0000

 CORRELATION MATRIX OF VARIABLES -       30 OBSERVATIONS


BETA       1.0000
NON_LEC   0.64430       1.0000
LEVERAGE  0.62771      0.21221       1.0000
Y1       -0.37609E-01 -0.27453      0.85728E-01   1.0000
Y2       -0.10164     -0.26576     -0.27540     -0.22361       1.0000
Y3       -0.22979     -0.17870     -0.23335     -0.22361     -0.20000
          1.0000
Y4        0.86727E-01  0.25102      0.21293     -0.16667     -0.14907
         -0.14907       1.0000
Y5        0.25815      0.31924     -0.56881E-01 -0.16667     -0.14907
         -0.14907     -0.11111       1.0000
Y6        0.30158      0.40898      0.47409     -0.19612     -0.17541
         -0.17541     -0.13074     -0.13074       1.0000
C1       -0.57569E-01  0.66158E-01 -0.25467      0.11111      0.14907
          0.14907     -0.11111     -0.11111     -0.13074      1.00000
C2       -0.14547      0.60036E-01 -0.17084     -0.78811E-01 -0.35245E-01
         -0.35245E-01  0.78811E-01  0.78811E-01  0.15456E-01 -0.18389
          1.0000
C3        0.28102     -0.27972      0.44932     -0.41667E-01  0.94133E-17
          0.15620E-16 -0.16667      0.11111      0.49029E-01 -0.16667
         -0.27584       1.0000
C4       -0.12961      0.26554     -0.30469     -0.78811E-01 -0.35245E-01
         -0.35245E-01  0.78811E-01  0.78811E-01  0.15456E-01 -0.18389
         -0.30435     -0.27584       1.0000
C5        0.68600E-01 -0.89497E-01  0.15856     -0.41667E-01  0.14067E-16
          0.14067E-16  0.11111     -0.16667      0.49029E-01 -0.16667
         -0.27584     -0.25000     -0.27584       1.0000
             BETA         NON_LEC      LEVERAGE     Y1           Y2
             Y3           Y4           Y5           Y6           C1
```

```
             C2           C3           C4           C5

 COVARIANCE MATRIX OF VARIABLES -       30 OBSERVATIONS


BETA       0.35922E-01
NON_LEC    0.20148E-01  0.27223E-01
LEVERAGE   0.12433E-01  0.36591E-02  0.10921E-01
Y1        -0.29000E-02 -0.18428E-01  0.36448E-02  0.16552
Y2        -0.73017E-02 -0.16621E-01 -0.10909E-01 -0.34483E-01  0.14368
Y3        -0.16509E-01 -0.11176E-01 -0.92437E-02 -0.34483E-01 -0.28736E-01
           0.14368
Y4         0.50155E-02  0.12638E-01  0.67897E-02 -0.20690E-01 -0.17241E-01
          -0.17241E-01  0.93103E-01
Y5         0.14929E-01  0.16072E-01 -0.18138E-02 -0.20690E-01 -0.17241E-01
          -0.17241E-01 -0.10345E-01  0.93103E-01
Y6         0.19762E-01  0.23331E-01  0.17130E-01 -0.27586E-01 -0.22989E-01
          -0.22989E-01 -0.13793E-01 -0.13793E-01  0.11954
C1        -0.33293E-02  0.33307E-02 -0.81207E-02  0.13793E-01  0.17241E-01
           0.17241E-01 -0.10345E-01 -0.10345E-01 -0.13793E-01  0.93103E-01
C2        -0.11860E-01  0.42613E-02 -0.76805E-02 -0.13793E-01 -0.57471E-02
          -0.57471E-02  0.10345E-01  0.10345E-01  0.22989E-02 -0.24138E-01
           0.18506
C3         0.21669E-01 -0.18777E-01  0.19103E-01 -0.68966E-02  0.14516E-17
           0.24087E-17 -0.20690E-01  0.13793E-01  0.68966E-02 -0.20690E-01
          -0.48276E-01  0.16552
C4        -0.10567E-01  0.18847E-01 -0.13698E-01 -0.13793E-01 -0.57471E-02
          -0.57471E-02  0.10345E-01  0.10345E-01  0.22989E-02 -0.24138E-01
          -0.56322E-01 -0.48276E-01  0.18506
C5         0.52897E-02 -0.60076E-02  0.67414E-02 -0.68966E-02  0.21693E-17
           0.21693E-17  0.13793E-01 -0.20690E-01  0.68966E-02 -0.20690E-01
          -0.48276E-01 -0.41379E-01 -0.48276E-01  0.16552
              BETA         NON_LEC      LEVERAGE     Y1           Y2
              Y3           Y4           Y5           Y6           C1
              C2           C3           C4           C5

|_OLS beta Non_LEC Leverage Y1 Y2 Y3 Y4 Y5 Y6 C1 C2 C3 C4 C5/ auxrsqr rstat dwpvalue,,,,,,,,,,,

REQUIRED MEMORY IS PAR=      17 CURRENT PAR=     781
 OLS ESTIMATION
       30 OBSERVATIONS     DEPENDENT VARIABLE= BETA
...NOTE..SAMPLE RANGE SET TO:      1,     30

DURBIN-WATSON STATISTIC  =   1.68338
DURBIN-WATSON POSITIVE AUTOCORRELATION TEST P-VALUE =    0.039587
              NEGATIVE AUTOCORRELATION TEST P-VALUE =    0.960413
R-SQUARE OF NON_LEC  ON OTHER INDEPENDENT VARIABLES =   0.6626
R-SQUARE OF LEVERAGE ON OTHER INDEPENDENT VARIABLES =   0.7674
R-SQUARE OF Y1       ON OTHER INDEPENDENT VARIABLES =   0.6211
R-SQUARE OF Y2       ON OTHER INDEPENDENT VARIABLES =   0.5100
R-SQUARE OF Y3       ON OTHER INDEPENDENT VARIABLES =   0.4960
R-SQUARE OF Y4       ON OTHER INDEPENDENT VARIABLES =   0.5538
R-SQUARE OF Y5       ON OTHER INDEPENDENT VARIABLES =   0.4875
R-SQUARE OF Y6       ON OTHER INDEPENDENT VARIABLES =   0.6641
R-SQUARE OF C1       ON OTHER INDEPENDENT VARIABLES =   0.7969
R-SQUARE OF C2       ON OTHER INDEPENDENT VARIABLES =   0.8807
R-SQUARE OF C3       ON OTHER INDEPENDENT VARIABLES =   0.8551
R-SQUARE OF C4       ON OTHER INDEPENDENT VARIABLES =   0.8898
R-SQUARE OF C5       ON OTHER INDEPENDENT VARIABLES =   0.8536
R-SQUARE OF CONSTANT ON OTHER INDEPENDENT VARIABLES =   0.0000

 R-SQUARE =   0.9062     R-SQUARE ADJUSTED =   0.8299
VARIANCE OF THE ESTIMATE-SIGMA**2 =  0.61091E-02
```

```
STANDARD ERROR OF THE ESTIMATE-SIGMA =  0.78161E-01
SUM OF SQUARED ERRORS-SSE=  0.97746E-01
MEAN OF DEPENDENT VARIABLE =  0.90985
LOG OF THE LIKELIHOOD FUNCTION =  43.3306

MODEL SELECTION TESTS - SEE JUDGE ET AL. (1985,P.242)
 AKAIKE (1969) FINAL PREDICTION ERROR - FPE =     0.89600E-02
    (FPE IS ALSO KNOWN AS AMEMIYA PREDICTION CRITERION - PC)
 AKAIKE (1973) INFORMATION CRITERION - LOG AIC =  -4.7933
 SCHWARZ (1978) CRITERION - LOG SC =              -4.1394
MODEL SELECTION TESTS - SEE RAMANATHAN (1998,P.165)
 CRAVEN-WAHBA (1979)
    GENERALIZED CROSS VALIDATION - GCV =          0.11455E-01
 HANNAN AND QUINN (1979) CRITERION =              0.10213E-01
 RICE (1984) CRITERION =                          0.48873E-01
 SHIBATA (1981) CRITERION =                       0.62992E-02
 SCHWARZ (1978) CRITERION - SC =                  0.15933E-01
 AKAIKE (1974) INFORMATION CRITERION - AIC =      0.82855E-02

                    ANALYSIS OF VARIANCE - FROM MEAN
                     SS         DF             MS                F
REGRESSION       0.94399         13.       0.72615E-01           11.886
ERROR            0.97746E-01     16.       0.61091E-02          P-VALUE
TOTAL             1.0417         29.       0.35922E-01            0.000

                    ANALYSIS OF VARIANCE - FROM ZERO
                     SS         DF             MS                F
REGRESSION        25.779         14.        1.8413              301.410
ERROR            0.97746E-01     16.       0.61091E-02          P-VALUE
TOTAL             25.877         30.       0.86255                0.000


VARIABLE   ESTIMATED  STANDARD   T-RATIO        PARTIAL STANDARDIZED ELASTICITY
  NAME    COEFFICIENT   ERROR      16 DF   P-VALUE CORR. COEFFICIENT  AT MEANS
NON_LEC    1.1775     0.1515       7.775     0.000 0.889     1.0251     0.4649
LEVERAGE  0.78923     0.2880       2.740     0.015 0.565     0.4352     0.1918
Y1        0.14007     0.5796E-01   2.417     0.028 0.517     0.3007     0.0308
Y2        0.15643     0.5470E-01   2.860     0.011 0.582     0.3128     0.0287
Y3        0.58217E-01 0.5394E-01   1.079     0.296 0.261     0.1164     0.0107
Y4       -0.95853E-01 0.7121E-01  -1.346     0.197-0.319    -0.1543    -0.0105
Y5       -0.32236E-02 0.6644E-01 -0.4852E-01 0.962-0.012    -0.0052    -0.0004
Y6       -0.14135     0.7243E-01  -1.951     0.069-0.438    -0.2579    -0.0207
C1        0.75647E-01 0.1055      0.7167     0.484 0.176     0.1218     0.0083
C2        0.14089     0.9768E-01   1.442     0.168 0.339     0.3198     0.0361
C3        0.30573     0.9371E-01   3.262     0.005 0.632     0.6563     0.0672
C4        0.94764E-01 0.1016      0.9323     0.365 0.227     0.2151     0.0243
C5        0.21648     0.9323E-01   2.322     0.034 0.502     0.4647     0.0476
CONSTANT  0.11033     0.1245      0.8863     0.389 0.216     0.0000     0.1213

DURBIN-WATSON = 1.6834    VON NEUMANN RATIO = 1.7414    RHO =  0.14783
RESIDUAL SUM =   0.0000      RESIDUAL VARIANCE =  0.61091E-02
SUM OF ABSOLUTE ERRORS=   1.4347
R-SQUARE BETWEEN OBSERVED AND PREDICTED = 0.9062
RUNS TEST:   16 RUNS,   14 POS,    0 ZERO,   16 NEG  NORMAL STATISTIC =  0.0249
COEFFICIENT OF SKEWNESS =   0.3938 WITH STANDARD DEVIATION OF 0.4269
COEFFICIENT OF EXCESS KURTOSIS =  -0.6183 WITH STANDARD DEVIATION OF 0.8327

JARQUE-BERA NORMALITY TEST- CHI-SQUARE(2 DF)=    1.3351 P-VALUE= 0.513

     GOODNESS OF FIT TEST FOR NORMALITY OF RESIDUALS - 20 GROUPS
OBSERVED  0.0  0.0  0.0  0.0  0.0  0.0  2.0  4.0  7.0  3.0  4.0  3.0  3.0  2.0  1.0  1.0  0.0  0

EXPECTED  0.1  0.1  0.3  0.5  0.9  1.4  2.1  2.7  3.2  3.5  3.5  3.2  2.7  2.1  1.4  0.9  0.5  0
```

```
CHI-SQUARE =    9.8749 WITH  4 DEGREES OF FREEDOM, P-VALUE= 0.043
|_DIAGNOS / HET,,,,,,,,,,,,

REQUIRED MEMORY IS PAR=     139 CURRENT PAR=     781
DEPENDENT VARIABLE = BETA            30 OBSERVATIONS
REGRESSION COEFFICIENTS
   1.17751735500      0.789230055078      0.140067812435      0.156426721244
  0.582167608414E-01 -0.958528779239E-01 -0.322362384786E-02 -0.141354799437
  0.756471265502E-01  0.140888586499      0.305727703906      0.947644155631E-01
  0.216483295950      0.110331635673

HETEROSKEDASTICITY TESTS
                           CHI-SQUARE     D.F.   P-VALUE
                          TEST STATISTIC
E**2 ON YHAT:                      0.468     1    0.49411
E**2 ON YHAT**2:                   0.558     1    0.45520
E**2 ON LOG(YHAT**2):              0.327     1    0.56719
E**2 ON LAG(E**2) ARCH TEST:       0.336     1    0.56220
LOG(E**2) ON X (HARVEY) TEST: **********    13    0.00000
ABS(E) ON X (GLEJSER) TEST:       15.559    13    0.27374
E**2 ON X                 TEST:
          KOENKER(R2):            17.500    13    0.17746
          B-P-G (SSR) :           11.257    13    0.58934

...MATRIX INVERSION FAILED IN ROW   17
...RESULTS MAY BE UNRELIABLE
E**2 ON X X**2    (WHITE) TEST:
          KOENKER(R2):        **********    26  *********
          B-P-G (SSR) :       **********    26  *********

...MATRIX INVERSION FAILED IN ROW   17
...RESULTS MAY BE UNRELIABLE
E**2 ON X X**2 XX (WHITE) TEST:
          KOENKER(R2):        **********   104  *********
          B-P-G (SSR) :       **********   104  *********

|_stop,,,,,,,,,,,,
```

Data Sources

The following attachment presents the sources for all data used in the figures and tables in the Declaration of Lee Selwyn in WUTC Docket No. UT-023003.

Section 1: Data relied upon in Table 1 – Average Company Beta Values by Industry

Auto Industry Betas
Value Line Investment Survey, 9/5/03, at 102-110.

Brokerage/Securities Industry Betas
Value Line Investment Survey, 10/31/03, at 1425-1433.

Computer Industry Betas
Value Line Investment Survey, 10/17/03, at 1107-1136.

Home Appliance Industry Betas
Value Line Investment Survey, 9/5/03, at 118-123.

Insurance Industry Betas
Value Line Investment Survey, 9/26/03 at 587-612.

Paper Industry Betas
Value Line Investment Survey, 10/10/03, at 907-923.

Petroleum Industry Betas
Value Line Investment Survey, 9/19/03, at 407-427.

Restaurant Industry Betas
Value Line Investment Survey, 9/12/03, at 295-323.

Soft Drink Industry Betas
Value Line Investment Survey, 11/7/03, at 1546-1553.

Tire Industry Betas
Value Line Investment Survey, 9/5/03, at 112-116.

Section 2: Data relied upon in Table 2 through Table 4 – The Regression Analysis.

A. Equity Beta Values

RBOC Betas
Value Line Investment Survey, 1/10/97, at 743-772;
4/11/97, at 743-769;

7/11/97, at 743-769;
10/10/97, at 742-769;
1/9/98, at 741-767;
4/10/98, at 740-766;
7/10/98, at 737-762;
10/9/98, at 737-763;
1/8/99, at 737-762;
4/9/99, at 736-764;
7/9/99, at 736-765;
10/8/99, at 736-769;
1/7/00, at 735-768;
4/7/00, at 733-766;
7/7/00, at 732-763;
10/6/00, at 732-758;
1/5/01, at 729-756;
4/6/01, at 722-747;
7/6/01, at 722-747;
10/5/01, at 722-746;
1/4/02, at 727-745;
4/5/02, at 722-743;
7/5/02, at 722-743;
10/4/02, at 722-741;
1/3/03, at 722-741;
4/4/03, at 722-742;
7/4/03, at 722-742;
1/2/04, at 722-742.

B. Facilities-Based Competition & All Competition

Industry Analysis Division, FCC, *Local Telephone Competition and Broadband Deployment*, Local Telephone Competition, data as of December 31, 2002 at Table 7 and Table 10.
Data as of June 30, 2002 at Table 6 and Table 8.
Data as of December 31, 2001 at Table 6 and Table 8.
Data as of June 30, 2001 at Table 6.
Data as of December 31, 2000 at Table 6.
Data as of June 30, 2000 at Table 5.
Data as of December 31, 1999 at Table 4.

Industry Analysis Division, FCC, State-level Aggregated CLEC Data available at http://www.fcc.gov/wcb/iatd/comp.html, data as of June 20, 2001.
Data as of December 31, 2000.
Data as of June 30, 2000.
Data as of December 31, 1999.

C. RBOC Diversification

BellSouth Corporation

2002 10K filed February 28, 2003.
2001 10K filed February 28, 2002.
2000 10K filed March 2, 2001.
1999 10K filed March 2, 2000.

Second Quarter 2002 10Q filed August 2, 2002.
Second Quarter 2001 10Q filed August 3, 2001.
Second Quarter 2000 10Q filed August 14, 2000.

BellSouth Telecommunication Inc.[1]

1999 10K filed March 2, 2000.

Second Quarter 2000 10Q filed August 14, 2000.

Qwest Communications International Inc.

2001 10K filed April 1, 2002.
2000 10K filed March 16, 2001.
1999 10K filed March 17, 2000.

First Quarter 2002 10Q filed May 15, 2002.[2]
Second Quarter 2001 10Q filed August 14, 2001.
Second Quarter 2000 10Q filed August 11, 2000.

Qwest Corporation

2001 10K filed April 1, 2002.
2000 10K filed April 2, 2001.
1999 10K filed March 3, 2000.

First Quarter 2002 10Q filed May 15, 2002.[3]
Second Quarter 2001 10Q filed August 14, 2001.

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1. Since 2000, BellSouth Corp. has tracked BellSouth Telecommunications Inc.'s assets in its own 10K and 10Q.

2. First quarter figures were used because Qwest Communication International Inc. has yet to file a second quarter 2002 10K.

3. First quarter figures were used because Qwest Corporation has yet to file a second quarter 2002 10K.

Second Quarter 2000 10Q filed August 11, 2000.

SBC Communications Inc.[4]

2002 10K filed March 14, 2003.
2001 10K filed February 28, 2002.
2000 10K filed March 12, 2001.
1999 10K filed March 10, 2003.

Second Quarter 2002 10Q filed August 12, 2002.
Second Quarter 2001 10Q filed August 8, 2001.
Second Quarter 2000 10Q filed August 10, 2000.

Verizon Communications Inc.

2002 10K filed March 14, 2003.
2001 10K filed March 20, 2002.
2000 10K filed March 23, 2001.
1999 10K filed March 30, 2000.

Second Quarter 2002 10Q filed August 12, 2002.
Second Quarter 2001 10Q filed August 14, 2001.
Second Quarter 2000 10Q filed August 14, 2000.

Verizon New Jersey Inc.[5]

2002 10K filed March 19, 2003.
2001 10K filed March 25, 2002.
2000 10K filed March 23, 2001.
1999 10K filed March 30, 2000.

Second Quarter 2002 10Q filed August14, 2002.
Second Quarter 2001 10Q filed August 14, 2001.
Second Quarter 2000 10Q filed August 14, 2000.

D. RBOC Financial Leverage

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4. SBC Communications Inc.'s 10Ks and 10Qs contain data on its ILEC affiliates.

5. Verizon Communications Inc. has 15 other ILEC subsidiaries including Verizon California Inc., Verizon Delaware Inc., Verizon Florida Inc., Verizon Hawaii Inc., Verizon Maryland Inc., Verizon New England Inc., Verizon New York Inc., Verizon North Inc., Verizon Northwest Inc., Verizon Pennsylvania Inc., Verizon South Inc., Verizon Virginia Inc., Verizon Washington DC Inc., Verizon West Virginia Inc., and GTE Southwest Inc. Each affiliate filed its 10K and 10Q on same days as Verizon New Jersey. All affiliates were included in ETI's analysis and are available on the Edgar database on the SEC's web page, www.sec.gov.

Value Line Investment Survey, 4/11/97, at 743-769;
4/10/98, at 740-766;
4/9/99, at 736-764;
4/7/00, at 733-766;
4/6/01, at 722-747;
4/5/02, at 722-743;
4/4/03, at 722-742.

Section 3: Data relied upon in Table 5 and Table 6 – Extracting a Pure ILEC Beta

A. Beta Values, Value of Debt, Shares Outstanding, and Income Tax Rate

Value Line Investment Survey, 1/02/04, at 721-742;
2/27/04, at ***-***.

B. Stock Prices as of 4/1/04

Bloomberg.com, accessed 4/2/04.

C. Segment Breakdowns

BellSouth Corporation, 2003 10K filed February 24, 2004.
Qwest Communication International, Inc., 2003 10K filed March 11, 2004.
SBC Communications, Inc., 2003 10K filed March 11, 2004.
Verizon Communications, Inc., 2003 10K filed March 12, 2004.

Section 4: Data relied upon in Figure 1 – Federal Fund Rates 2000 - February 2004.

http://www.federalreserve.gov/releases/h15/data/m/fedfund.txt,
accessed 4/5/04.

Attachment 5

***Verizon New Hampshire Investigation into Cost of Capital, Order Establishing Cost of Capital*, New Hampshire Public Utilities Commission Docket No. DT 02-110, Order No. 24,265 January 16, 2004 (excerpt)**

DT 02-110

VERIZON NEW HAMPSHIRE

Investigation into Cost of Capital

Order Establishing Cost of Capital

O R D E R N O. 24,265

January 16, 2004

APPEARANCES: Victor D. Del Vecchio, Esq. for Verizon New Hampshire; Swidler Berlin Shereff Friedman, LLP by Philip J. Macres, Esq. and Eric J. Branfman, Esq. on behalf of Freedom Ring Communications, LLC d/b/a BayRing Communications; Laura Gallo, Esq., Kenneth W. Salinger, Esq., and Katherine A. Davenport, Esq. for WorldCom, Inc.(now MCI Communications, Inc.); F. Anne Ross, Esq. for the Office of the Consumer Advocate on behalf of residential ratepayers, E. Barclay Jackson, Esq. for the Staff of the New Hampshire Public Utilities Commission.

I. PROCEDURAL HISTORY

The New Hampshire Public Utilities Commission (Commission) initiated this docket, by Order of Notice dated June 28, 2002, to determine the appropriate cost of capital for Verizon New Hampshire (Verizon) and to examine whether recurring TELRIC[1] rates should be modified to take into account a revised cost of capital. Motions to intervene in the matter were filed by Otel Telekom, Inc.(Otel); Global NAPS, Inc. (Global NAPS); Conversent Communications of New Hampshire, LLC (Conversent); CTC Communications Corporation (CTC), Dieca Communications Inc.

[1] TELRIC, or total element long run incremental cost, has been approved by the Federal Communications Commission (FCC) as the appropriate methodology for establishing rates for unbundled network elements.

of capital. There is no requirement under FCC rules or the TAct that a separate cost of capital be specified for UNE rates.

We conclude that it is reasonable to view the company as a whole to arrive at a weighted average cost of capital. This overall cost of capital will be utilized by Verizon for jurisdictional filings that require cost studies that call for an estimate of the cost of capital. More specifically, we will use this overall weighted average cost of capital to modify TELRIC rates; we will also use this overall weighted cost of capital in any future retail rate case and in examining Verizon's earnings going forward.

B. UNE Risk Premium

There are several infirmities with regard to the 5.48 percent risk premium Verizon proposes to add to its overall cost of capital which prevent us from adopting it. In particular, the method advanced by Verizon's witness Dr. Vander Weide to derive the risk premium is inapplicable to the UNE situation.

In the article cited by Dr. Vander Weide to support his UNE risk premium (Copeland and Weston), the authors developed a method to estimate the appropriate cost (and associated internal rate of return) for a cancelable equipment lease, as opposed to a non-cancelable equipment lease. According to Copeland and Weston, if a lessee can cancel an equipment lease, the lessor must adjust the lease fee upwards

from a non-cancelable lease fee to reflect any uncertainty as to the likely economic value of the property at the times when the lessee may exercise this option. The risk is on the lessor, and the required lease payments and internal rate of return must reflect this assumed risk. The authors point out that from the lessor's point of view, a cancelable lease is equivalent in value to a pure financial lease (which cannot be cancelled and which, according to the authors, has a cost equal to the cost of debt), minus an American put option with a declining exercise price. *Id.*, at 60.

Dr. Vander Weide calculated his 5.48% risk premium drawing on the arguments developed in the paper, and added it to his estimate of 12.45% weighted average retail cost of capital, to arrive at his recommended 17.93% weighted average UNE cost of capital. Whatever the merits of the cancelable lease analogy to the UNE line of business, we find that it is not appropriate to use the Copeland/Weston formulas to develop a UNE risk premium, and add the resulting premium to an overall cost of capital to develop a separate rate of return for UNE leasing.

Second, use of the Copeland/Weston theory in the UNE context implicitly assumes that it is only the action of the lessee in demanding cancelability that subjects Verizon to the risk of cancellation. As the CLEC parties pointed out, it is Verizon that restricts CLEC UNE leases to one-month terms, and

declines to offer longer term non-cancelable UNE leases. Presumably this is a result of a judgment by Verizon that its risk is decreased, not increased, by shorter terms, notwithstanding the associated exposure to increased risk of CLEC discontinuance of service.

The analogy between Copeland/Weston and the UNE line of business breaks down further as the value of the premium depends fundamentally on the investment required to serve the lease (Version Att. A, p. 65). Copeland/Weston state that a higher investment expense produces a higher premium (*id.*, pp. 64-5). However, as we have noted above, Verizon is not required to incur investment expenses explicitly for CLEC lines of business.

In addition, as stated in footnote 6 of Copeland/Weston, the lessor must, when faced with a cancellation of a lease, either "a) sell the asset at market value, or b) lease it again at a lower rate." We find neither of these scenarios persuasive for the actual business of a regulated provider of UNEs. We note that the possibility of the leased asset returning to the retail side of Verizon's business and earning a higher return than the original UNE lease is inappropriately excluded from the application of Copeland/Weston to UNEs.

Finally, no reasonable basis has been advanced in this case to apply a cancelable lease analogy to the UNE business, as opposed to the retail business. With the exception of individual long term contracts or special tariffs, none of Verizon's customers, wholesale or retail, are bound to remain with Verizon. Arguably, any premium that may apply to reflect the cancelable nature of the use of Verizon's facilities applies to retail service as well as wholesale service. However, as we note above, we have no basis on this record to differentiate the risk of retail and UNE business. In any event, the risk of revenue loss from demand reductions is captured in the overall rate of return, properly set, as is all risk facing the firm.

The Copeland/Weston argument, while perhaps sound for the purpose for which it was conceived, is not appropriate for application to the UNE business. For these reasons, it would be inappropriate to add the proposed premium to the UNE prices, and we decline to do so.

C. Capital Structure

In *Appeal of Conservation Law Foundation of New England*, 127 N.H. 606 at 636, 507 A.2d 652 (1986), the New Hampshire Supreme Court opined that in setting a reasonable rate of return for a regulated company, the Commission must look both at capital costs and comparable risks outside the company and also at the "actual circumstances" of the company. *Id.* at 635.