1 Department orders unduly long lives for cost model inputs, the CLECs' cost of
2 providing service through the purchase of UNEs will be considerably less. Companies
3 such as AT&T and WorldCom will thus have the best of both worlds, able to obtain
4 UNEs at prices substantially below their economic value, while completing their own
5 networks to bypass the ILECs.

6 IV. VERIZON PROPERLY WEIGHS ALL RELEVANT FACTORS IN 7 DETERMINING ECONOMIC LIVES.

8 Q. What method does Verizon use to determine the economic life of an asset?

9 A. When estimating economic lives, Verizon (a) evaluates the criteria that are used to
10 establish the retirement lives of assets as a guideline for estimating economic lives,
11 (b) considers industry benchmark comparisons, and (c) considers the effect the
12 evolving competitive market will have on the economic lives of many of Verizon's
13 assets.

14 Q. Please explain the use of these factors in more detail?

15 A. Verizon first considers the National Association of Regulatory Utility Commissioners'
16 description of factors that cause property to be retired.[2] These include:

17 1. Physical Factors
18 a. Wear and tear
19 b. Decay or deterioration

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1 *Angel takes flight* (May 18, 2000) < http://www.att.com/technology/features/0005fixedwireless.html>

2 Public Utility Depreciation Practices, National Association of Regulatory Utility Commissioners (NARUC), 1996, at 15.

c. Action of the elements and accidents

2. Functional Factors
   a. Inadequacy
   b. Obsolescence
   c. Changes in art and technology
   d. Changes in demand
   e. Requirements of Public Authorities
   f. Management discretion

3. Contingent Factors
   a. Casualties or disasters
   c. Extraordinary obsolescence

These same factors can be used to help estimate an asset's economic life expectancy by allocating the appropriate weighting to each factor. That is, Verizon uses the NARUC factors as a guideline for choosing economic lives of certain assets, but only after allocating proper weighting to those factors that reflect the significant roles competition and technological change play in determining an asset's economic life. Specifically, the "Functional Factors" (Part 2 of the NARUC factors) are sensitive to competition and technological change and are given substantially greater weight when Verizon considers the NARUC criteria in establishing the economic lives of Verizon's assets. As I explained above, the effects of competition and technological change on an asset's economic life must be properly considered when determining competitive market asset lives. It has long been recognized in the industry that traditional methods for determining lives for accounts most affected by technology and competition are inadequate. Most commissions, including this one, have thus seen fit to make adjustments to the physical life indications produced by historical mortality

1 analysis.

2 Q. What other guides do you use in establishing asset lives?

3 A. To help quantify our professional judgment as to the appropriate lives for telephone
4 plant, Verizon also benchmarks against competitors, such as AT&T, WorldCom, and
5 cable television providers, and considers industry studies performed by Technology
6 Futures Inc. ("TFI").

7 Q. Please explain why benchmarking is useful and appropriate.

8 A. Benchmarking affords an excellent example of the reasonableness of Verizon's
9 recommended depreciation lives. In a competitive environment, we should be treated
10 the same as our competitors with respect to setting depreciation rates. Competitors'
11 depreciation rates are not reviewed or approved by any regulatory body, and are a
12 good guide to reasonable practices in a competitive market. Indeed, since the FCC's
13 TELRIC cost methodology is intended to approximate what the incumbent LEC would
14 be able to charge if there were a competitive market for such offerings, the benchmark
15 approach is particularly appropriate.

16 Q. What did you determine using benchmark comparisons with AT&T?

17 A. Comparing the economic lives proposed by Verizon to the lives AT&T uses affords
18 an excellent example of how reasonable Verizon's recommendations are. AT&T's
19 1999 annual report states that the useful life of communications and network
20 equipment ranges from 3 to 15 years. The useful life of other equipment ranges from

1 3 to 7 years. The useful life of buildings and improvements ranges from 10 to 40
2 years. Verizon's recommended lives are not as short as AT&T's. In comparison,
3 Verizon's recommendation for network equipment ranges from 8 to 40 years. My
4 testimony also recommends 5 to 10 years for Other Equipment and 35 years for
5 buildings.
6 Q. What was determined by the comparison with WorldCom?
7 A. WorldCom's 1996 annual report stated that the weighted average depreciable life of
8 the assets comprising the communications system in service approximates 10 years.
9 Furniture, fixtures and equipment are depreciated over a weighted average life of 6
10 years. Buildings are depreciated using lives of up to 35 years. In comparison,
11 Verizon's recommendation for equipment that comprises the communication system
12 ranges from 8 to 40 years. My testimony recommends 5 to 10 years for furniture,
13 fixtures and equipment, and 35 years for buildings.
14 In 1997, WorldCom again shortened the weighted average depreciable life of the assets
15 comprising the communications system in service from approximately ten years to nine
16 years, stating that the company periodically reviews and adjusts the useful lives
17 assigned to fixed assets to ensure that depreciation charges provide appropriate
18 recovery of capital costs over the estimated physical and technological lives of the
19 assets.
20 Q. What was determined by the comparisons to lives used by the cable television

("CATV") operators?

A. Verizon's lives are not as short as the lives used by CATV operators. The FCC adopted a flexible range of lives to be used by CATV operators seeking to justify depreciation rates in cost of service filings. The useful lives adopted by the FCC for distribution facilities were from 10 to 15 years. This range was developed from a statistical analysis of lives used by CATV operators for their own facilities. The 16-year economic life for copper cable and the 20-year life for fiber cable calculated selected by Verizon are not as short as the lives within the FCC-allowed range for CATV distribution facilities. Additionally, the lives proposed by Verizon for support assets such as office furniture and equipment, vehicles, and buildings are reasonable when compared to the FCC-allowed ranges for CATV operators. The FCC range for office furniture and equipment is 9-11 years, which compares favorably to Verizon's proposal of 10 years for these accounts. The FCC range for vehicles and equipment is 3-7 years, which is shorter than Verizon's proposal of 8-10 years. The FCC range for buildings is 18-33 years, which compares favorably with Verizon's proposal of 35 years.[3]

Q. Have any other commissions determined that benchmarking is a viable method to assess the reasonableness of Verizon's proposed lives?

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[3] In the Matter of Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992: Rate Regulation and Adoption of a Uniform Accounting System for Provision of Regulated Cable Service, M.M. Docket No. 93-215 and C.S. Docket No. 94-28, Second Report and Order, First Order on Reconsideration, and Further Notice of Proposed Rulemaking, FCC No. 95-502, 11 FCC Rcd. 2220, at 2258, 2314 (January 26, 1996)

1 A. Yes. The Missouri Public Service Commission commented on benchmarking for
2 purposes of establishing depreciation rates to be utilized in Verizon's TELRIC cost
3 studies as follows:

> 4 Staff believes that benchmarking GTE TELRIC rates against
> 5 those booked for financial purposes of likely competitors and
> 6 other companies using similar technologies is appropriate and
> 7 is the best method to determine if GTE's TELRIC rates pass
> 8 the muster of reasonableness.[4]

9 The Missouri Staff chose 19 of the largest IXC, CATV, cellular, CAP, and PCS
10 companies to benchmark against and found that the depreciation rates used to calculate
11 Verizon TELRIC costs were at the bottom or second from the bottom of the list and
12 were significantly lower than several companies in similar industries, concluding:

> 13 This is the most significant factor to Staff's belief that GTE's
> 14 proposed depreciation rates are reasonable.[5]

15 Q. Please explain your use of the TFI studies.
16 A. TFI forecasts the remaining lives for certain assets when technological change is
17 driving the shortening of asset lives. To quantify this technological change, TFI uses
18 a model to analyze remaining economic lives using patterns of technological
19 substitution observed in the communications industry, as well as other industries. The
20 industry studies conducted by TFI forecast the combined effects that competition and
21 technological change will have on an asset's remaining useful life. The studies

---

[4] In the Matter Of AT&T Communications of the Southwest Inc.'s Petition for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Interconnection Agreement between AT&T Communications of the Southwest, Inc. and GTE Midwest Incorporated, Case No. TO-97-63, Final Arbitration Order, Attachment C at 77 (Mo. P.S.C. July 31, 1997) ("Missouri Order").

1 generally project shorter lives than traditionally prescribed by most Commissions.
2 Verizon uses the TFI lives as a reasonableness benchmark comparison with the lives
3 used by other companies, both regulated and non-regulated, with similar types of
4 telecommunications assets.

5 Q. What do the TFI studies recommend Verizon use as economic lives for its assets?

6 A. Verizon's recommendations here are in line with TFI's recommended economic life
7 ranges, as shown by the following chart.[6]

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[5] Missouri Order, Attachment C at 79

[6] Larry K. Vanston, Ray L. Hodges, and Adrian J. Poitras, *Transforming the Local Exchange Network: Analyses and Forecasts of Technology Change* 33, (Technology Futures, Inc., 2d Ed. 1997)

A Comparison of the TFI Ranges with Verizon's Proposed Economic Lives

	TFI Ranges	Verizon Economic
Digital Switching Equipment	9-12	10
Circuit Equipment	6-9	9
Copper Cable	14-20	18
Fiber Cable	20	20

TFI specifically addresses the appropriate lives to be used for outside plant cable, central office switching, and circuit equipment accounts, as these accounts report equipment that are most affected by changes in competition and technology.

V. VERIZON'S ECONOMIC LIVES HAVE BEEN ENDORSED BY OTHER STATE REGULATORY COMMISSIONS

Q. Has any other regulatory body approved the economic lives presented here?

A. Yes. In 1996, the California Public Utilities Commission ("CPUC") endorsed the use of the same economic lives used by Verizon and Pacific Bell for external financial reporting were the appropriate forward-looking lives for cost studies. The CPUC rejected the suggestion by AT&T and others that FCC-prescribed lives are forward-looking, stating:

> We agree with Pacific that the schedules formally adopted in the represcription proceeding reflect the previous paradigm of the regulated monopoly environment, and so are difficult to justify in a cost study that looks forward to an environment in which there is local exchange competition. We also see little merit in the Coalition's original suggestion that we use FCC schedules. These schedules also reflect the previous paradigm; moreover, they are based on different assumptions and applied in different ways than our own. It also seems to be the case, however, that Pacific is now using these schedules in

> financial reports it is required to file, and thus for purposes of these cost studies, the schedules also appear consistent with generally accepted accounting principles. The schedules also appear realistic for a firm having to operate in a competitive environment, as Pacific will soon have to do. Accordingly, we will approve their use in this proceeding.

Q. Has the use of economic lives been endorsed in other state proceedings?

A. Yes. In 1997, the Missouri Public Service Commission adopted the same economic lives proposed in this case, stating:

> Staff's goal has been to recommend depreciation rates based on parameters that GTE is likely to experience for financial purposes so as to fully recover its long run capital costs in a timely fashion.[7]

The Michigan Public Service Commission also adopted its Staff's recommendation to approve the use of Verizon's economic lives on February 25, 1998, stating:

> GTE proposes to reduce its asset lives in accordance with their economic lives ... The Staff's view is that GTE's proposed asset lives are largely consistent with a forward-looking approach and are reasonable .... The Commission finds that GTE's proposal related to depreciation is appropriate for TSLRIC purposes .... The Commission further finds AT&T/MCI's proposal to be insufficiently forward looking for purposes of a TSLRIC study.[8]

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[7] Missouri Order, Attachment C at 76.

[8] In the Matter, on the Commission's own Motion to consider the total service long run incremental costs and to determine the prices of unbundled network elements, interconnection services, resold services and basic local exchange services for GTE North, Docket No. U-11281, Opinion and Order at 28 (Mich. P.S.C. Feb. 25, 1998)

1 **VI. CONCLUSION**

2 Q. Please summarize your direct testimony.

3 A. Traditional historical methods of establishing depreciation lives are not forward-
4 looking. The economic lives used in Verizon's cost studies are properly based on a
5 forward-looking approach. Verizon uses the same depreciation inputs as
6 recommended in this docket for financial reporting to its shareholders. Verizon's
7 proposed lives are reasonable in comparison to the financial reporting lives of
8 competitive telecommunications providers such as AT&T and cable television
9 companies, and should be adopted by the Department for use in establishing
10 permanent UNE rates.

11 Q. Does this conclude your direct testimony?

12 A. Yes.

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

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

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

May 4, 2001

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D.T.E. 01-20

DIRECT TESTIMONY OF DR. JAMES H. VANDER WEIDE

1 **I. INTRODUCTION**

2 Q. What is your name and business address?

3 A. My name is James H. Vander Weide. I am Research Professor of
4 Finance and Economics at the Fuqua School of Business of Duke
5 University. I am also President of Financial Strategy Associates, a
6 firm that provides strategic and financial consulting services to clients
7 in the electric, gas, insurance, telecommunications, and water
8 industries. My business address is 3606 Stoneybrook Drive, Durham,
9 North Carolina.

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

12 A. I graduated from Cornell University in 1966 with a Bachelor's Degree
13 in Economics. I then attended Northwestern University where I earned
14 a Ph.D. in Finance. In January 1972, I joined the faculty of the School
15 of Business at Duke University and was named Assistant Professor,
16 Associate Professor, and then Professor.

17 Since joining the faculty I have taught courses in corporate
18 finance, investment management, and management of financial
19 institutions. I have taught a graduate seminar on the theory of public
20 utility pricing and lectured in executive development seminars on the
21 cost of capital, financial analysis, capital budgeting, mergers and

1 acquisitions, cash management, short-run financial planning, and
2 competitive strategy. I have also served as Program Director of
3 several executive education programs at the Fuqua School of
4 Business, including the Duke Advanced Management Program, the
5 Duke Executive Program in Telecommunications, Competitive
6 Strategies in Telecommunications, and the Duke Program for Manager
7 Development for managers from the former Soviet Union.
8 I have conducted seminars and training sessions on financial
9 analysis, financial strategy, cost of capital, cash management,
10 depreciation policies, and short-run financial planning for a wide
11 variety of U.S. and international companies, including ABB, Allstate,
12 Ameritech, AT&T, Bell Atlantic, BellSouth, Carolina Power & Light,
13 Contel, Fisons, Glaxo Wellcome, GTE, Lafarge, MidAmerican Energy,
14 New Century Energies, Norfolk Southern, Pacific Bell Telephone, The
15 Rank Group, Siemens, Southern New England Telephone, TRW, and
16 Wolseley Plc.
17 In addition to my teaching and executive education activities, I
18 have written research papers on such topics as portfolio management,
19 the cost of capital, capital budgeting, the effect of regulation on the
20 performance of public utilities, and cash management. My articles
21 have been published in *American Economic Review, Financial*

1 *Management, International Journal of Industrial Organization, Journal*
2 *of Financial and Quantitative Analysis, Journal of Bank Research,*
3 *Journal of Accounting Research, Journal of Cash Management,*
4 *Management Science, The Journal of Portfolio Management, Atlantic*
5 *Economic Journal, Journal of Economics and Business,* and
6 *Computers and Operations Research.* I have written a book titled
7 *Managing Corporate Liquidity: an Introduction to Working Capital*
8 *Management*, and a chapter for *The Handbook of Modern Finance*,
9 "Financial Management in the Short Run."
10 Q. Have you previously testified on financial or economic issues?
11 A. Yes. As an expert on financial and economic theory, I have testified
12 on the cost of capital, competition, risk, incentive regulation, forward-
13 looking economic cost, economic pricing guidelines, depreciation,
14 accounting, valuation, and other financial and economic issues in
15 some 300 cases before the U.S. Congress, the Canadian Radio-
16 Television and Telecommunications Commission, the Federal
17 Communications Commission, the National Telecommunications and
18 Information Administration, the Federal Energy Regulatory
19 Commission, the public service commissions of 39 states, and the
20 insurance commissions of five states. With respect to implementation
21 of the Telecommunications Act of 1996, I have testified in 26 states,

1 including Massachusetts, on issues relating to the pricing of
2 unbundled network elements and universal service cost studies, and
3 have consulted with Bell Canada, Deutsche Telekom, and Telefónica
4 on similar issues.
5 Q. What is the purpose of your testimony?
6 A. Verizon New England Inc., d/b/a Verizon Massachusetts
7 ("Verizon MA") asked me to make an independent appraisal of the
8 appropriate weighted average cost of capital to be used in
9 Verizon MA's studies of the forward-looking cost of providing
10 interconnection and unbundled network elements. On the basis of
11 that appraisal, Verizon MA asked me to determine whether the
12 12.6 percent weighted average cost of capital Verizon MA used in its
13 cost studies is "forward-looking" as required by the relevant FCC
14 rules. I conclude that a 12.6 percent weighted average cost of capital
15 is a conservative estimate of the forward-looking cost of capital
16 required by the FCC's rules. This conclusion is based on my
17 independent analysis of the forward-looking cost of capital, which
18 yields a 12.95 percent weighted average cost.
19 Q. Please summarize the applicable FCC rules.
20 A. FCC Rule 51.505(b)(2) provides that a "forward-looking cost of capital
21 shall be used in calculating the total element long-run incremental cost

of an element." Forward-looking costs are the costs "that a carrier would incur in the future," and do not include embedded or historical costs. (First Report and Order, *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996* ("LCO"), at paras. 683, 704).

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

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

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

1 forward-looking cost of established companies that operate in the real
2 world.

3 **II. FUNDAMENTAL ECONOMIC PRINCIPLES**

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

6 A. Yes. The FCC determined the basic economic principles for setting
7 rates for unbundled network elements in its *First Report and Order In*
8 *the Matter of Implementation of the Local Competition Provisions in the*
9 *Telecommunications Act of 1996* ("LCO").

10 Q. Are you familiar with the LCO?

11 A. Yes, I am.

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

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

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

19 A. The FCC rejects the use of embedded or accounting costs in
20 unbundled network element cost studies because it believes that
21 embedded or accounting costs are irrelevant to companies operating

in competitive markets. In particular, embedded or accounting costs depend on accounting rules and conventions rather than economic criteria, are based on historical costs, and are inherently historically oriented rather than forward looking.

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

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

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

And at ¶ 738, the FCC states,

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

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

A. Yes, I am.

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

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

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

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

A. Yes. As noted above, the FCC requires that unbundled network element cost studies be based on the forward-looking economic cost of providing interconnection and unbundled network elements. The

1 forward-looking economic cost of providing interconnection and
2 unbundled network elements includes both capital costs and
3 expenses. The capital costs, in turn, include three elements: the
4 LEC's incremental investment in the telecommunications facilities
5 required to provide interconnection or unbundled network elements;
6 the economic depreciation on these facilities; and the required rate of
7 return, or cost of capital, associated with these facilities.
8 Q. How do economists define the required rate of return, or cost of
9 capital, associated with particular investment decisions, such as the
10 decision to invest in the building of telecommunications network
11 facilities?
12 A. Economists define the required rate of return on a particular
13 investment as the return that investors forego by making that
14 investment instead of an alternative investment of equal risk.
15 Q. How does the cost of capital affect a firm's investment decisions?
16 A. The goal of a firm is to maximize the value of the firm. This goal can
17 be accomplished by accepting all investments in plant and equipment
18 with an expected rate of return greater than or equal to the cost of
19 capital. Thus, a firm should continue to invest in plant and equipment
20 only so long as the return on its investment is greater than or equal to
21 its cost of capital.

1 Q. How does the cost of capital affect investors' willingness to invest in a
2 company?
3 A. The cost of capital measures the return investors can expect on
4 investments of comparable risk. Rational investors will not invest in a
5 particular investment opportunity if the expected return on that
6 opportunity is less than the cost of capital. Thus, the expected rate of
7 return on an investment in a company must exceed the cost of capital
8 before investors will be willing to invest in that company.
9 Q. Do all investors have the same position in the firm?
10 A. No. Debt investors have a fixed claim on a firm's assets and income
11 that must be paid prior to any payment to the firm's equity investors.
12 Since the firm's equity investors have a residual claim on the firm's
13 assets and income, equity investments are riskier than debt
14 investments. Thus, the cost of equity exceeds the cost of debt.
15 Q. What is the overall or weighted average cost of capital?
16 A. The overall or weighted average cost of capital is a weighted average
17 of the cost of debt and cost of equity, where the weights are the
18 percentages of debt and equity in a firm's capital structure.
19 Q. Can you illustrate the calculation of the overall or weighted average
20 cost of capital?

1 A. Yes. Assume that the cost of debt is 9 percent, the cost of equity is
2 15 percent, and the percentages of debt and equity in the firm's capital
3 structure are 25 percent and 75 percent, respectively. Then the
4 weighted average cost of capital is expressed by 0.25 times 9 percent
5 plus 0.75 times 15 percent, or 13.5 percent.
6 Q. How do economists define the cost of debt component of the weighted
7 average cost of capital?
8 A. Economists define the cost of debt as the market interest rate that a
9 firm would have to pay on newly-issued debt obligations. In efficient
10 markets, the market interest rate is also the best estimate of future
11 interest rates. The correct economic definition of the cost of debt is
12 thus forward looking and market oriented.
13 Q. How do economists define the cost of equity component of the
14 weighted average cost of capital?
15 A. Economists define the cost of equity as the return investors expect to
16 receive on alternative equity investments of comparable risk. Since
17 the return on an equity investment of comparable risk is not a
18 contractual return, the cost of equity is more difficult to measure than
19 the cost of debt. There is agreement, however, as I have already
20 noted, that the cost of equity is greater than the cost of debt. There is

1 also agreement among economists that the cost of equity, like the cost
2 of debt, is both forward looking and market based.
3 Q. What approaches do economists employ to obtain numerical
4 estimates of the cost of equity?
5 A. Economists generally use market models such as the Discounted
6 Cash Flow ("DCF") Model to estimate a firm's cost of equity. The DCF
7 Model is based on the assumption that the market price of a firm's
8 stock is equal to the present value of the stream of cash flows that
9 investors expect to receive from owning the stock. The cost of equity
10 in the DCF Model is that discount rate that equates the firm's stock
11 price to the present value of the future stream of cash flows investors
12 expect from owning the stock.
13 Q. How do economists measure the percentages of debt and equity in a
14 firm's capital structure?
15 A. Economists measure the percentages of debt and equity in a firm's
16 capital structure by first calculating the market value of the firm's debt
17 and the market value of its equity. Economists then calculate the
18 percentage of debt by the ratio of the market value of debt to the
19 combined market value of debt and equity, and the percentage of
20 equity by the ratio of the market value of equity to the combined
21 market values of debt and equity. For example, if a firm's debt has a