BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Review of SBC Ohio's	)	
TELRIC Costs for Unbundled Network	)	Case No. 02-1280-TP-UNC
Elements.	)	

DIRECT TESTIMONY
OF
DR. J. RANDALL WOOLRIDGE

ON BEHALF OF
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Dated: May 28, 2004

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LIST OF SCHEDULES

1 **Q1.** **PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.**

2 **A1.** My name is J. Randall Woolridge and my business address is 120 Haymaker Circle, State

3 College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank

4 P. Smeal Endowed University Fellow in Business Administration at the University Park

5 Campus of the Pennsylvania State University. I am also the Director of the Smeal College

6 Trading Room. In addition, I am affiliated with the Columbia Group Inc., a public utility

7 consulting firm based in Ridgefield, CT. A summary of my educational background,

8 research, and related business experience is provided in Appendix A.

9
10 **I.** **SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS**

11
12 **Q2.** **WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

13 **A2.** I am provide an opinion about a forward-looking cost of capital to be used in a cost study of

14 SBC Ohio's interconnection and Unbundled Network Elements (UNEs), which is

15 consistent with Total Element Long-run Incremental Cost (TELRIC) methodology. I also

16 provide an evaluation of the testimony of SBC Ohio's cost of capital witness, Dr. William

17 E. Avera.

18

19 **Q3.** **PLEASE REVIEW YOUR COST OF CAPITAL FINDINGS.**

20 **A3.** I have independently arrived at a forward looking cost of capital. This involves a three-step

21 process: (1) establishing an appropriate capital structure for SBC Ohio; (2) determining a

22 cost rate for the firm's debt; and (3) performing a study to estimate a cost of equity capital

1   for the company. The capital structure that I am proposing is based on the capital structure

2   of SBC Ohio's parent, SBC Communications, Inc., and includes 23.42% long-term debt,

3   and 76.58% common equity. I am employing a long-term debt cost rate of 5.80%. To

4   determine an appropriate equity cost rate, I have evaluated investor return requirements for

5   a group of telecommunications companies using both Discounted Cash Flow (DCF) and

6   Capital Asset Pricing Model (CAPM) approaches. The companies that I have employed in

7   my analysis are the same seven firms used by Dr. Avera. Based on my analysis, I arrived at

8   an equity cost rate of 10.00%. Utilizing my capital structure and debt and equity cost rates,

9   I am recommending an overall cost of capital of 9.02%. This recommendation is

10   summarized in Attachment JRW-1.

11

12 **Q4. PLEASE SUMMARIZE YOUR ASSESSMENT OF THE COMPANY'S RATE OF**

13   **RETURN POSITION.**

14 A4. Dr. Avera provides a recommendation for SBC Communications, Inc.'s capital structure,

15   senior capital cost rates, equity cost rate, and overall cost of capital. SBC Communications,

16   Inc.'s proposed cost of capital is inflated due to an overstated debt cost rate, an

17   inappropriate capital structure, and an excessive equity cost rate. Dr. Avera's estimated

18   equity cost rate of 13.25% is unreasonably high primarily due to (1) reliance on an

19   inappropriate nonconstant DCF model that is highly sensitive to one analyst's forecast of

20   future stock prices and (2) biased and outdated equity risk premium estimates for his

21   CAPM.

1   **Q5.   PLEASE DISCUSS CAPITAL COSTS IN TODAY'S MARKETS.**

2   A5.   Capital cost rates for U.S. corporations are currently at their lowest levels in more than four

3   decades. Corporate capital cost rates are determined by the level of interest rates and the risk

4   premium demanded by investors to buy the debt and equity capital of corporate issuers. The

5   base level of interest rates in the US economy is indicated by the rates on U.S. Treasury

6   bonds. The benchmark for long-term capital costs is the rate on ten-year Treasury bonds.

7   The rates are provided in the graph below from 1953 to the present. As indicated, prior to

8   the secular decline in rates that began last year, the 10-year Treasury had not been in the 4-5

9   percent range since the 1960s.

10
11   **Yields on Ten-Year Treasury Bonds**
                                      1953-Present
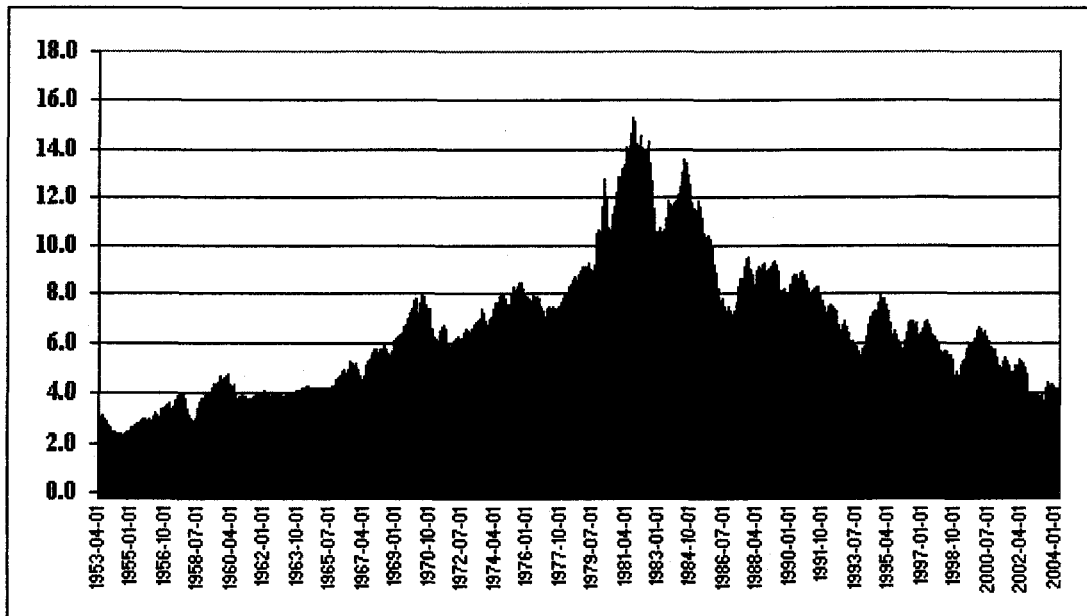
12
13   Source: http://research.stlouisfed.org/fred2/data/GS10.txt
14

15   The second base component of the corporate capital cost rates is the risk premium. The risk

16   premium is the return premium required by investors to purchase riskier securities. Risk

3

1   premiums for bonds are the yield differentials between different bond classes as rated by

2   agencies such as Moody's and Standard and Poor's. The graph below provides the yield

3   differential between BBB-rate corporate bonds and 10-year Treasuries.   This yield

4   differential peaked at 350 basis points (BPs) in 2002 and has declined to 75 BPs. This is an

5   indication that the market price of risk has declined and therefore the risk premium has

6   declined in recent years.

7

8

9   **Corporate Bond Yield Spreads**
10   **BBB-Rated Corporate Bond Yield Minus Ten-Year Treasury Bond Yield**
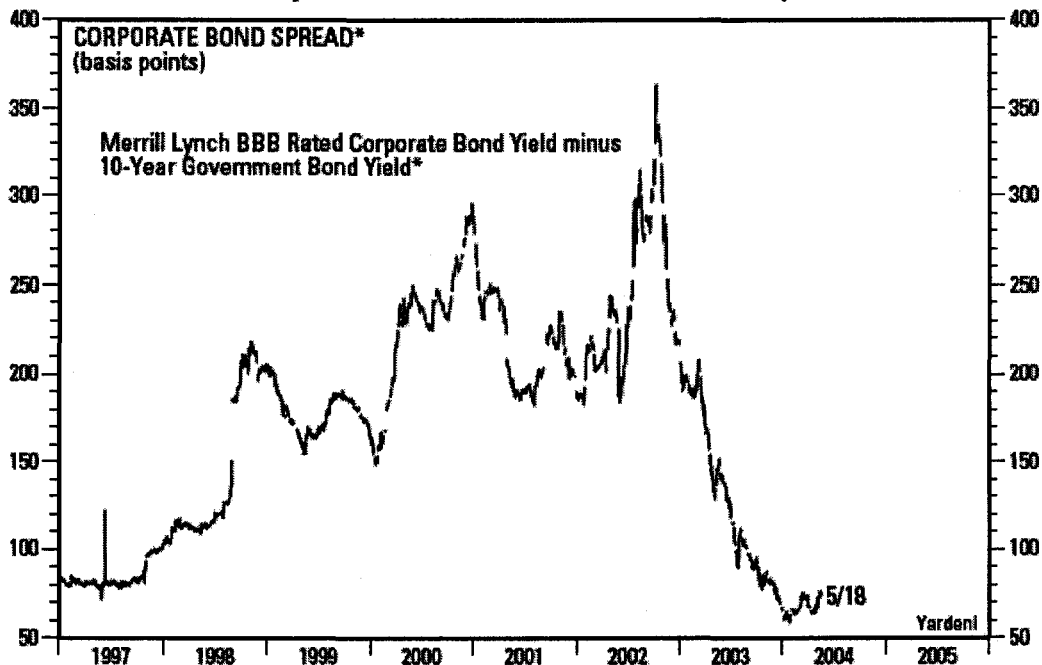
11
12   Source: http://www.cm1.prusec.com/yararch.nsf/(Files)/qs_c.pdf/$file/qs_c.pdf
13
14   The equity risk premium is the return premium required to purchase stocks as opposed to

15   bonds. Since the equity risk premium is not readily observable in the markets (as are bond

16   risk premiums), and there are alternative approaches to estimating the equity premium, it is

4

1   the subject of much debate. One common way to estimate the equity risk premium is to

2   compare the mean returns on bonds and stocks over long historic periods. Measured in this

3   manner, the equity risk premium has been in the 5-7 percent range. But recent studies by

4   leading academics indicate the forward-looking equity risk premium is in the 3-5 percent

5   range. These authors indicate that historic equity risk premiums are upwardly biased

6   measures of expected equity risk premiums. Jeremy Siegel, a Wharton finance professor

7   and author of the popular book *Stocks for the Long Term*, published a study entitled "The

8   Shrinking Equity Risk Premium."[1] He concludes:

9   The degree of the equity risk premium calculated from data
10   estimated from 1926 is unlikely to persist in the future. The real
11   return on fixed-income assets is likely to be significantly higher than
12   estimated on earlier data. This is confirmed by the yields available
13   on Treasury index-linked securities, which currently exceed 4%.
14   Furthermore, despite the acceleration in earnings growth, the return
15   on equities is likely to fall from its historical level due to the very
16   high level of equity prices relative to fundamentals.
17

18   Even Alan Greenspan, the Chairman of the Federal Reserve Board, indicated in an October

19   14, 1999 speech on financial risk that the fact that equity risk premiums have declined

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[1] Jeremy J. Siegel, "The Shrinking Equity Risk Premium," *The Journal of Portfolio Management* (Fall, 1999), p.15.

1   during the past decade is "not in dispute." His assessment focused on the relationship

2   between information availability and equity risk premiums.[2]

3   There can be little doubt that the dramatic improvements in
4   information technology in recent years have altered our approach to
5   risk. Some analysts perceive that information technology has
6   permanently lowered equity premiums and, hence, permanently
7   raised the prices of the collateral that underlies all financial assets.
8
9   The reason, of course, is that information is critical to the
10   evaluation of risk. The less that is known about the current state of
11   a market or a venture, the less the ability to project future outcomes
12   and, hence, the more those potential outcomes will be discounted.
13
14   The rise in the availability of real-time information has reduced the
15   uncertainties and thereby lowered the variances that we employ to
16   guide portfolio decisions. At least part of the observed fall in
17   equity premiums in our economy and others over the past five
18   years does not appear to be the result of ephemeral changes in
19   perceptions. It is presumably the result of a permanent technology-
20   driven increase in information availability, which by definition
21   reduces uncertainty and therefore risk premiums. This decline is
22   most evident in equity risk premiums. It is less clear in the
23   corporate bond market, where relative supplies of corporate and
24   Treasury bonds and other factors we cannot easily identify have
25   outweighed the effects of more readily available information about
26   borrowers.
27

28   In sum, the relatively low interest rates in today's markets as well as the lower risk

29   premiums required by investors indicate that capital costs for U.S. companies are the

30   lowest in decades. In addition, last year's new tax law further lowered capital cost rates

31   for companies.

---

[2] Alan Greenspan, "Measuring Financial Risk in the Twenty-First Century," Office of the Comptroller of the Currency Conference, October 14, 1999.

1   **Q6.**   **HOW DID LAST YEAR'S NEW TAX LAW REDUCE THE COST OF CAPITAL**

2   **FOR COMPANIES?**

3   A6.   On May 28th of last year, President Bush signed the *Jobs and Growth Tax Relief*

4   *Reconciliation Act of 2003.*[3] The primary purpose of this legislation was to reduce taxes

5   to enhance economic growth. A primary component of the new tax law was a significant

6   reduction in the taxation of corporate dividends for individuals. Dividends have been

7   described as "double-taxed." First, corporations pay taxes on the income they earn before

8   they pay dividends to investors, then investors pay taxes on the dividends that they

9   receive from corporations. One of the implications of the double taxation of dividends is

10   that, all else equal, it results in a higher cost of raising capital for corporations. The new

11   tax legislation reduces the effect of double taxation of dividends by lowering the tax rate

12   on dividends from the 30 percent range (the average tax bracket for individuals) to 15

13   percent.

14

15   Overall, the new tax law reduced the pre-tax return requirements of investors, thereby

16   reducing corporations' cost of equity capital. This is because the reduction in the taxation

17   of dividends for individuals enhances their after-tax returns and thereby reduces their pre-

18   tax required returns. This reduction in pre-tax required returns (due to the lower tax on

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[3]   108 P.L. 27.

1   dividends) effectively reduces the cost of equity capital for companies. The new tax law

2   also reduced the tax rate on long-term capital gains from 20% to 15%. The magnitude of

3   the reduction in corporate equity cost rates is debatable, but my assessment indicates that

4   it could be as large as 100 basis points. (See Attachment JRW-2).

5

6   **II.   CAPITAL STRUCTURE**

7

8   **Q7.   WHAT IS SBC OHIO'S PROPOSED CAPITAL STRUCTURE?**

9   A7.   Dr. Avera has proposed a capital structure that consists of 81.0% common equity and

10   19.0% long-term debt. This capital structure is based on the market value capitalization of

11   SBC Communications, Inc. as of September 30, 2003.

12

13   **Q8.   WHAT CAPITAL STRUCTURE RATIOS ARE YOU USING TO ESTIMATE A**

14   **COST OF CAPITAL FOR SBC OHIO?**

15   A8.   Attachment JRW-3 provides the capitalization amounts and ratios for SBC

16   Communications, Inc. for the past 15 years. These amounts and ratios are provided on

17   both a book and market value basis. On a book value basis, SBC Communications, Inc.'s

18   average capitalization has been 40.42% long-term debt and 59.58% common equity. On

19   a market value basis, SBC Communications, Inc.'s average capitalization has been

20   17.36% long-term debt and 82.64% common equity. There has been an upward trend in

21   the amount of equity financing employed by the company. Presumably this trend reflects

1   a higher degree of business risk faced by the company.

2

3   To arrive at an appropriate forward-looking capitalization using the data in Attachment

4   JRW-3, I used the average of the book and market value capitalizations over the past five

5   years. I employed only the past five years of data due to the upward trend in equity

6   financing. Also, the impact of any one-time financings, acquisitions, and/or significant

7   economic events is minimized by using five years of data. Book value capitalizations are

8   the most common form of capitalization reported in financial reports and publications. In

9   addition, they are usually more stable over time. Straight market value capitalizations, on

10   the other hand, are rarely reported to investors and tend to vary significantly over time

11   due to their sensitivity to the prevailing stock price. And it is noteworthy that there is a

12   tendency for book and market value capitalizations to converge over time. Therefore, I

13   averaged the book and market value capitalizations over five years to provide for a

14   forward-looking, relatively stable capitalization for SBC Communications, Inc. My

15   proposed capitalization is:

| Capital	Ratio
Long-Term Debt	23.36%
Common Equity	76.42%

16

17

1 **III.   DEBT COST RATE**

2

3 **Q9.   WHAT IS SBC OHIO'S PROPOSED DEBT COST RATE?**

4 A9.   Dr. Avera has proposed a debt cost rate of 6.18%. This figure reflects the prevailing yield

5   on long-term, 'A' rated industrial bonds as reported by Moody's as of December 8, 2003.

6

7 **Q10. IS THIS THE APPROPRIATE COST OF DEBT FOR SBC OHIO?**

8 A10. No, it is excessive. It simply reflects the rates on long-term 'A' rated debt. Bloomberg

9   reports that SBC Communications, Inc. and its subsidiaries have 126 different debt issues in

10   the market. These securities are of varying maturities, and are not all long-term. For

11   example, SBC Communications, Inc. and its subsidiaries have an extensive medium-term

12   note program. Medium-term notes have maturities of 5-12 years and almost always have

13   lower coupon rates than long-term bonds. This is because the yield curve, which plots the

14   relationship between yield-to-maturity and time-to-maturity, is almost always upward

15   sloping since investors require higher yields to invest in longer maturity bonds (see below).

16   Companies like SBC Communications, Inc. take advantage of this to get lower cost

17   financing by issuing notes with intermediate maturities (5-12 years) as opposed to long-

18   term maturities (>12 years). In fact, three-quarters of SBC Communications, Inc.'s debt

19   issues are medium-term notes issued by either SBC Communications, Inc. or a subsidiary.

1
2

U.S. Treasury Yield Curve
May 17, 2004

3
4   Source: http://www.bloomberg.com/markets/rates/index.html

5
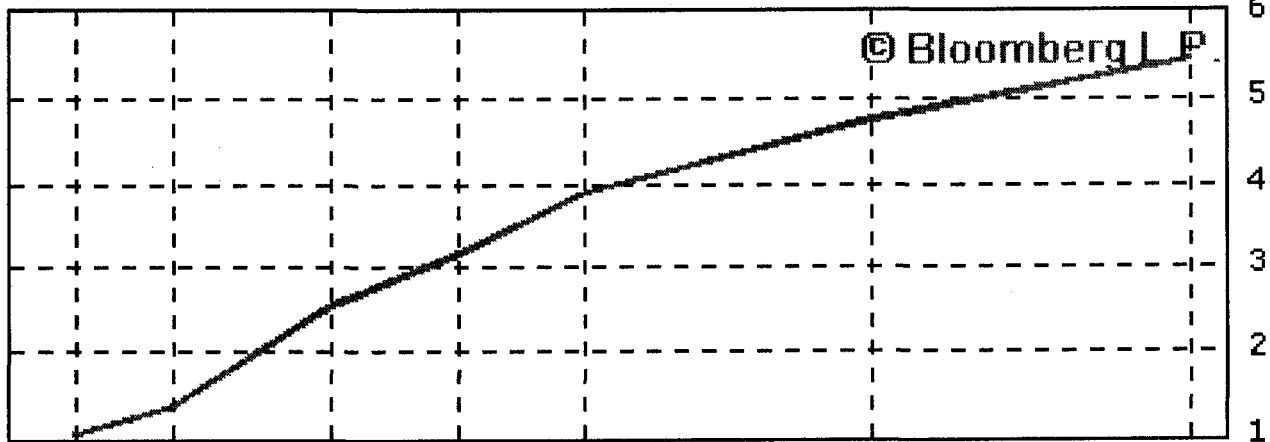
6   **Q11.   WHAT DEBT RATE ARE YOU USING FOR SBC OHIO?**

7   A11.   In Attachment JRW-4, I calculate a debt cost rate for SBC Communications, Inc. of 5.80%.

8   I base my debt cost rate on the 10-year Treasury yield. As of May 17, 2004, the yield curve

9   is shown above, and the 10-year Treasury yield was 4.76%.

10

11   On pages 2 through 6 of JRW-4 I provide the data and a graph of the yields on 10-year

12   Treasuries, as well as the yields on 10-year 'A' rated corporate and public utility bonds over

13   the past ten years. The median spreads between the 10-year Treasury and the corporate and

14   public utility bonds are 104 and 61 basis points (BPs), respectively. Whereas over 90% of

15   SBC Communications, Inc.'s debt issues have been issued through subsidiary operating

16   telephone companies, I am using the larger corporate bond spread in gauging SBC

17   Communications, Inc.'s cost of debt. Adding the average 'A' rated corporate - Treasury

11

1   spread of 104 BPs to the 4.76% 10-year Treasury yield provides a debt cost rate of 5.80%.

2

3   This debt cost rate is very fair on a forward-looking basis for SBC Communications, Inc.

4   given the maturity structure of the firm's debt. Only twenty-eight of SBC Communications,

5   Inc.'s 126 debt issues have a maturity of longer than ten years. Forty-seven issues have

6   maturities of less than three years, and fifty-one issues have maturities of three to ten years.

7   And, as previously noted, three-quarters of SBC Communications, Inc.'s debt issues have

8   been in the form of medium-term notes. Therefore, the maturity structure of SBC

9   Communications, Inc.'s debt and the company's financing patterns suggest that a lower

10   debt cost rate is more reflective of the actual borrowing costs.

11

12 **Q12.** **WHY HAVE YOU NOT USED ANY FORECASTS OF INTEREST RATES IN**

13   **YOUR ANALYSIS?**

14 A12.   I am not aware of any services that have demonstrated superior forecasting ability for

15   interest rates.

1 **IV.   THE COST OF COMMON EQUITY CAPITAL**

2   **A.   OVERVIEW**

3

4 **Q13.   PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE**

5   **CONTEXT OF THE THEORY OF THE FIRM.**

6 A13.   The total cost of operating a business includes the cost of capital. The cost of common

7   equity capital is the expected return on a firm's common stock that the marginal investor

8   would deem sufficient to compensate for risk and the time value of money. In equilibrium,

9   the expected and required rates of return on a company's common stock are equal.

10

11   Normative economic models of the firm, developed under very restrictive assumptions,

12   provide insight into the relationship between firm performance or profitability, capital costs,

13   and the value of the firm. Under the economist's ideal model of perfect competition, where

14   entry and exit is costless, products are undifferentiated, and there are increasing marginal

15   costs of production, firms produce up to the point where price equals marginal cost. Over

16   time, a long-run equilibrium is established where price equals average cost, including the

17   firm's capital costs. In equilibrium, total revenues equal total costs, and because capital

18   costs represent investors' required return on the firm's capital, actual returns equal required

19   returns and the market value and the book value of the firm's securities must be equal.

20

1   In the real world, firms can and do achieve competitive advantage due to product market

2   imperfections - most notably through product differentiation (adding real or perceived value

3   to products) and achieving economies of scale (decreasing marginal costs of production).

4   Competitive advantage allows firms to price products above average cost and thereby earn

5   accounting profits greater than those required to cover capital costs. When these profits are

6   in excess of that required by investors, or when a firm earns a return on equity in excess of

7   its cost of equity, investors respond by valuing the firm's equity in excess of its book value.

8

9   James M. McTaggart, founder of the international management consulting firm Marakon

10   Associates, has described this essential relationship between the return on equity, the cost of

11   equity, and the market-to-book ratio in the following manner:[4]

12   Fundamentally, the value of a company is determined by the cash
13   flow it generates over time for its owners, and the minimum
14   acceptable rate of return required by capital investors. This "cost of
15   equity capital" is used to discount the expected equity cash flow,
16   converting it to a present value. The cash flow is, in turn, produced
17   by the interaction of a company's return on equity and the annual
18   rate of equity growth. High return on equity (ROE) companies in
19   low-growth markets, such as Kellogg, are prodigious generators of
20   cash flow, while low ROE companies in high-growth markets, such
21   as Texas Instruments, barely generate enough cash flow to finance
22   growth.
23
24   A company's ROE over time, relative to its cost of equity, also
25   determines whether it is worth more or less than its book value. If its
26   ROE is consistently greater than the cost of equity capital (the
27   investor's minimum acceptable return), the business is economically
28   profitable and its market value will exceed book value. If, however,
29   the business earns an ROE consistently less than its cost of equity, it

---

[4] James M. McTaggart, "The Ultimate Poison Pill: Closing the Value Gap,'" *Commentary* (Spring 1988), p. 2.

1   is economically unprofitable and its market value will be less than

2   book value.

3

4   As such, the relationship between a firm's return on equity, cost of equity, and market-to-

5   book ratio is relatively straightforward. A firm which earns a return on equity above its cost

6   of equity will see its common stock sell at a price above its book value. Conversely, a firm

7   which earns a return on equity below its cost of equity will see its common stock sell at a

8   price below its book value.

9

10 **Q14. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED**

11   **RATE OF RETURN ON EQUITY?**

12 A14. The expected or required rate of return on common stock is a function of market-wide, as

13   well as company-specific, factors. The most important market factor is the time value of

14   money as indicated by the level of interest rates in the economy. Common stock investor

15   requirements generally increase and decrease with like changes in interest rates. The

16   perceived risk of a firm is the predominant factor that influences investor return

17   requirements on a company-specific basis. Firm risk is often separated into business and

18   financial risk. Business risk encompasses all factors that affect a firm's operating revenues

19   and expenses. Financial risk results from incurring fixed obligations in the form of debt in

20   financing its assets.

21

1 **Q15. HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON COMMON**

2 **EQUITY CAPITAL BE DETERMINED?**

3 A15. The costs of debt and preferred stock are normally based on historic or book values and can

4 be determined with a great degree of accuracy. The cost of common equity capital,

5 however, cannot be determined precisely and must instead be estimated from market data

6 and informed judgment. This return to the equity owner should be commensurate with

7 returns on investments in other enterprises having comparable risks.

8

9 According to valuation principles, the present value of an asset equals the discounted value

10 of its expected future cash flows. Investors discount these expected cash flows at their

11 required rate of return that, as noted above, reflects the time value of money and the

12 perceived riskiness of the expected future cash flows. As such, the cost of common equity

13 is the rate at which investors discount expected cash flows associated with common stock

14 ownership.

15

16 Models have been developed to ascertain the cost of common equity capital for a firm.

17 Each model, however, has been developed using restrictive economic assumptions.

18 Consequently, judgment is required in selecting appropriate financial valuation models to

19 estimate a firm's cost of common equity capital, in determining the data inputs for these

20 models, and in interpreting the models' results.

21

16

1 **Q16. HOW DO YOU ESTIMATE THE COST OF EQUITY CAPITAL FOR SBC**

2 **COMMUNICATIONS, INC.?**

3 A16. I am employing two different models to ascertain the company's cost of equity capital – the

4 DCF and the CAPM. I rely primarily on the DCF model to estimate the cost of equity

5 capital because I believe that, when properly applied, it provides a better indication of a

6 firm's cost of equity capital. I also use the CAPM which is one application of the risk

7 premium approach.

8

9 **B.   DISCOUNTED CASH FLOW ANALYSIS**

10
11 **Q17. BRIEFLY DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF**

12 **MODEL.**

13 A17. According to the discounted cash flow model, the current stock price is equal to the

14 discounted value of all future dividends that investors expect to receive from investment in

15 the firm. As such, stockholders' returns ultimately result from current as well as future

16 dividends. As owners of a corporation, common stockholders are entitled to a pro-rata

17 share of the firm's earnings. The DCF model presumes that earnings that are not paid out in

18 the form of dividends are reinvested in the firm so as to provide for future growth in

19 earnings and dividends. The rate by which investors discount future dividends to reflect the

20 timing and riskiness of expected cash flows, is interpreted as the market's expected or

21 required return on the common stock. Therefore this discount rate represents the cost of

17

1   common equity. Algebraically, the DCF model can be expressed as:

2

3
4    $$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \ldots \frac{Dn}{(1+k)^n}$$
5

6

7   where P is the current stock price, D_n is the dividend in year n, and k is the cost of common

8   equity.

9

10   **Q18.   PLEASE DISCUSS THE DIFFERENT FORMS OF THE DCF MODEL.**

11   A18.   There are two general forms of the DCF model – the constant-growth DCF and the

12   nonconstant-growth or multistage DCF models.

13

14   Under certain assumptions, including a constant and infinite expected growth rate, and

15   constant dividend/earnings and price/earnings ratios, the DCF model can be simplified to

16   the following:

17
18
19   $$P = \frac{D_1}{k - g}$$
20
21

1   where D_1 represents the expected dividend over the coming year and g is the expected

2   growth rate of dividends. This is known as the constant-growth version of the DCF model.

3   To use the constant-growth DCF model to estimate a firm's cost of equity, one solves for k

4   in the above expression to obtain the following:

$$k \quad = \quad \frac{D_1}{P} \quad + \quad g$$

10   In the constant-growth version of the DCF model, the current dividend payment and stock

11   price are directly observable. Therefore, the primary problem and controversy in applying

12   the DCF model to estimate equity cost rates entails estimating investors' expected dividend

13   growth rate.

14

15   **Q19. PLEASE DESCRIBE THE NONCONSTANT GROWTH DCF MODEL.**

16   A19. In situations in which the constant growth assumption is not appropriate, a nonconstant-

17   growth or multistage DCF model is employed. This is typically the situation when applying

18   the DCF model to a firm that is growing its earnings very rapidly – for example in excess of

19   10% per year – and this growth is not expected to last indefinitely. In this case, earnings

20   and dividends are projected to grow at different rates during different stages of a firm's life

21   cycle. The stages in a three-stage DCF model are discussed below. This model presumes

22   that a company's dividend payout progresses initially through a growth stage, then proceeds

23   through a transition stage, and finally assumes a steady state stage. The dividend payment

1   stage of a firm depends on the profitability of its internal investments, which, in turn, is

2   largely a function of the life cycle of the product or service. These stages are depicted in the

3   graphic below labeled the Three Stage DCF Model.[5]

4   1.   **Growth stage**: Characterized by rapidly expanding sales, high profit margins, and
5   abnormally high growth in earnings per share. Because of highly profitable
6   expected investment opportunities, the payout ratio is low. Competitors are
7   attracted by the unusually high earnings, leading to a decline in the growth rate.
8

9   2.   **Transition stage**: In later years, increased competition reduces profit margins and
10   earnings growth slows. With fewer new investment opportunities, the company
11   begins to pay out a larger percentage of earnings.
12

13   3.   **Maturity (steady-state) stage**: Eventually the company reaches a position where
14   its new investment opportunities offer, on average, only slightly attractive returns
15   on equity. At that time its earnings growth rate, payout ratio, and return on equity
16   stabilize for the remainder of its life. The constant-growth DCF model is appropriate
17   when a firm is in the maturity stage of the life cycle.
18

19   **Three-Stage DCF Model**
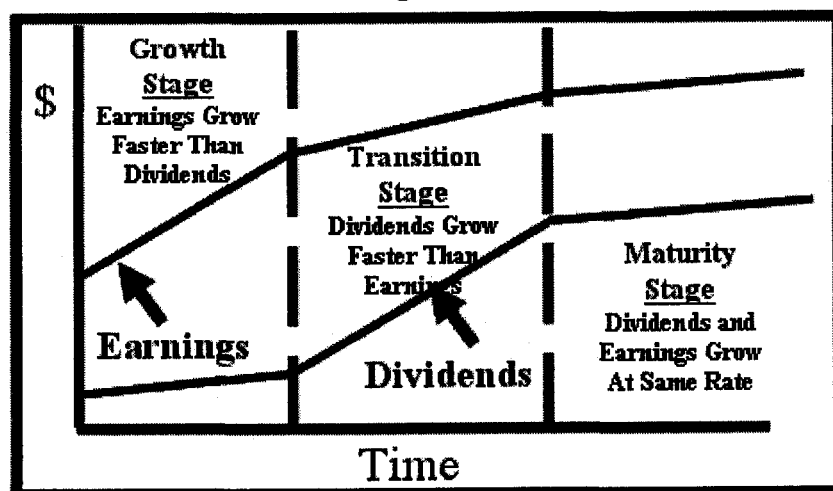
20
21
22   In using this model to estimate a firm's cost of equity capital, dividends are projected into

---

[5] This description comes from William F. Sharp, Gordon J. Alexander, and Jeffrey V. Bailey, *Investments* (Prentice-Hall, 1995), pp. 590-91.

1   the future using the different growth rates in the alternative stages, and then the equity cost

2   rate is the discount rate that equates the present value of the future dividends to the current

3   stock price.

4

5 **Q20.** **GIVEN THIS DISCUSSION, WHAT FORM OF THE DCF MODEL ARE YOU**

6   **USING TO ESTIMATE SBC COMMUNICATIONS, INC.'S COST OF EQUITY**

7   **CAPITAL?**

8 A20. I used the constant-growth DCF model with a composite of the seven telecommunications

9   firms (identified by Dr. Avera) in my DCF analysis. Using this approach, I averaged the

10   dividend yields and expected growth rates for the companies to estimate SBC

11   Communications, Inc.'s cost of equity capital. As is evident, whereas the constant-growth

12   DCF model would not be appropriate for several of the companies in the group (such as

13   Sprint and Telephone & Data Systems), the expected growth figures indicate that it is

14   appropriate for the composite of the seven company group.

15

16 **Q21.** **PLEASE DISCUSS ATTACHMENT JRW-5.**

17 A21. My DCF analysis is provided in Attachment JRW-5. The DCF summary is on page 1, of

18   this Attachment and the supporting data and analysis for the dividend yield and expected

19   growth rate then follow.

20

1 **Q22. WHAT DIVIDEND YIELD DO YOU EMPLOY IN YOUR DCF ANALYSIS FOR**

2 **THE GROUP?**

3 A22. The dividend yields on the common stock for the group are provided on page 2 of

4 Attachment JRW-5 for the five-month period ending May, 2004. Over this period, the

5 average monthly dividend yield for this group has been in the 3.0% range, which I use in

6 my DCF analysis.

7

8 **Q23. PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF MODEL.**

9 A23. There is much debate about the proper methodology to employ in estimating the growth

10 component of the DCF model. By definition, this component is an investors' expectation of

11 the long-term dividend growth rate. Presumably, investors use some combination of historic

12 and/or projected growth rates for earnings and dividends per share and for internal or book

13 value growth to assess long-term potential.

14

15 **Q24. HOW DO YOU DETERMINE A GROWTH RATE COMPONENT FOR YOUR**

16 **DCF MODEL?**

17 A24. I have analyzed many measures of growth for the companies in the group. Initially, I

18 evaluated historic earnings, dividends, and book value per share growth rates as provided in

19 the *Value Line Investment Survey.* I have also used *Value Line's* 5-year projected growth

20 rate estimates for earnings, dividends, and book value per share. In addition, I have utilized

21 earnings growth rate forecasts as provided by Zacks, Reuters, and Yahoo First Call. These

1   services solicit 5-year earnings per share growth rate projections from securities analysts

2   and compile and publish the averages of these forecasts on a monthly basis. They are

3   readily available on the Internet. I have also assessed long-term growth trends for earnings

4   and dividends for the S&P 500. This provides a basis to compare the results for the group

5   to a broader range of companies.

6

7 **Q25. PLEASE DISCUSS HISTORIC GROWTH IN EARNINGS AND DIVIDENDS AS**

8 **WELL AS INTERNAL GROWTH.**

9   A25. Historic growth rates for earnings per share (EPS), dividends per share (DPS), and book

10   value per share (BVPS) are readily available to virtually all investors and are presumably an

11   important ingredient in forming expectations concerning future growth. However, historic

12   growth numbers as measures of investors' expectations should be relied on with caution. In

13   some cases, past growth may not reflect future growth potential. Also, employing a single

14   growth rate number (for example, for five or ten years), is unlikely to accurately measure

15   investors' expectations due to the sensitivity of a single growth rate figure to fluctuations in

16   individual firm performance as well as overall economic fluctuations (i.e., business cycles).

17   In addition, one must appraise the context in which the growth rate is being employed.

18   According to the conventional DCF model, the expected return on a security is equal to the

19   sum of the dividend yield and the expected long-term growth in dividends. Therefore, to

20   best estimate the cost of common equity capital using the conventional DCF model, one

21   must look to long-term growth rate expectations.

1 **Q26.** **PLEASE SUMMARIZE YOUR ANALYSIS OF *VALUE LINE'S* HISTORIC AND**

2 **PROJECTED GROWTH RATES FOR THE GROUP.**

3 A26. Page 3 of Attachment JRW-5 provides a summary of historic and projected growth rates for

4 the companies in the group as provided in the *Value Line Investment Survey.* The average

5 historic growth rate figures for the group are highly variable and range from 3.8% to 12.8%.

6 The average of the historic five- and ten-year EPS, DPS, and BVPS growth rate figures is

7 8.4%.

8

9 *Value Line*'s projected growth rates for the group are much less variable and lower. The

10 average projected growth rates for EPS, DPS, and BVPS for the group are 4.1%, 4.8%, and

11 5.5%, respectively.

12

13 **Q27.** **PLEASE ASSESS GROWTH FOR THE GROUP AS MEASURED BY ANALYSTS'**

14 **FORECASTS OF EXPECTED 5-YEAR GROWTH IN EPS.**

15 A27. Zacks, Yahoo First Call, and Reuters collect, summarize, and publish Wall Street analysts'

16 projected 5-year EPS growth rate forecasts for companies. These forecasts are provided for

17 the companies on page 4 of Attachment JRW-5. The average of the expected 5-year EPS

18 growth rates from the three services for the group are 7.4%, 8.0%, and 7.1%, with an overall

19 group average of 7.5%.

20

1 **Q28. HOW MUCH WEIGHT DO YOU GIVE THE GROWTH RATE FORECASTS OF**

2 **WALL STREET ANALYSTS?**

3 A28. I believe they are important, but it must be recognized that there is a well-known upward

4 bias to these growth rate forecasts. I will cover this issue in-depth later in my testimony.

5

6 **Q29. WHAT OTHER INDICATORS OF THE LONG-TERM GROWTH RATE HAVE**

7 **YOU REVIEWED IN YOUR ANALYSIS?**

8 A29. The growth of the telecommunications industry tends to reflect the growth in the overall

9 economy. Edward Yardeni, Chief Economist for the Prudential Equity Group, tracks

10 growth of the economy and corporate profits on an ongoing basis. The graph below shows

11 nominal Gross Domestic Product (GDP) and after-tax corporate profit growth since 1960.

12 The growth of both the economy and profits is about the same - 7% per year on a nominal

13 basis. Yardeni therefore concludes that 7% is the appropriate number for long-term growth.
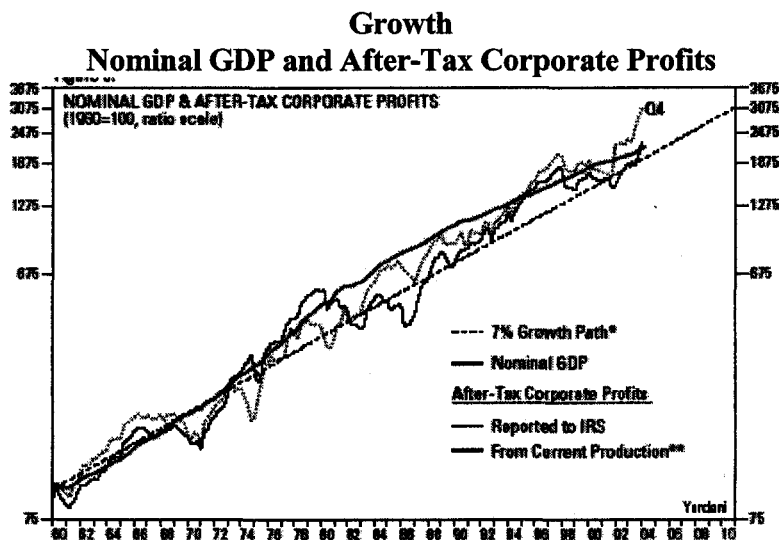
14
15

Growth
Nominal GDP and After-Tax Corporate Profits

16
17 Source: http://www.cml.prusec.com/yararch.nsf/(Files)/hand.pdf/$file/hand.pdf

25

1 **Q30. HOW DOES THIS ECONOMIC AND PROFIT GROWTH RATE COMPARE**

2 **WITH THE EARNINGS AND DIVIDENDS PER SHARE GROWTH RATES FOR**

3 **U.S. COMPANIES?**

4 A30. In evaluating growth for cost of capital purposes, it is common to focus on the growth in

5 earnings and dividends per share. The S&P 500 is an index of firms that is tracked by

6 most professionals in the investment community. It was created by Standard and Poors'

7 in 1960. The S&P 500 consists of 500 companies that are listed on the New York Stock

8 Exchange as well as NASDAQ. A unique feature of the S&P 500 is that it is modeled

9 after the US economy with firms coming from 10 different economic sectors (technology,

10 health care, energy, telecommunications, utilities, etc.). On an ongoing basis, S&P

11 reviews the composition of the Index and makes adjustments to insure that it continues to

12 reflect the make-up of the economy.

13

1   The table below shows the earnings and dividends per share growth rates by decade and

2   overall since 1960 for the companies in the S&P 500. While the decade to decade results

3   vary somewhat, the growth rates for the entire 44-year period are 6.88% for EPS and

4   5.25% for DPS.

5

6   **The S&P 500**

7 **Average Annual Compounded Growth in Earnings and Dividends Per Share**

8

	Earnings Per Share Growth	Dividends Per Share Growth
1960s	5.91%	4.87%
1970s	10.52%	7.27%
1980s	3.78%	6.74%
1990s	9.12%	2.79%
2000s	1.36%	3.20%
1960-2003	6.88%	5.25%

9
10   Data Source: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/implpr.html

1   **Q31.   HOW DOES THE ACTUAL LONG-TERM EPS GROWTH RATE FOR THE S&P**

2   **500 COMPANIES COMPARE TO THE GROWTH IN EPS PROJECTED BY**

3   **WALL STREET ANALYSTS?**

4   A31.   As noted above, to estimate long-term projected growth, it is very common to look at the 5-

5   year EPS growth rate forecasts of Wall Street analysts. It was also noted that these

6   estimates are known to be upwardly biased. The graph below shows the analysts' average

7   5-year earnings per share growth rate forecasts for the S&P 500 since 1984 (the first year

8   they became available). These growth rate forecasts hovered in the 11.5% range until 1995,

9   then increased dramatically to almost 19.0% by 2000 as analysts helped propel the Internet

10   stock market bubble. They have since declined to the 12.0% range. Meanwhile, over the

11   same 1984-2003 period that is covered in the graph, the actual mean compounded annual

12   EPS growth rate for the S&P 500 was only 6.34%.

13
14   **The S&P 500**
15   **Analysts' Average Projected 5-Year Earnings Per Share Growth Rate**
16   **1984-2004**

17
18   Source: http://www.cm1.prusec.com/yararch.nsf/(Files)/t_010603.pdf/$file/t_010603.pdf

1 **Q32. GIVEN THIS DISCUSSION ON EXPECTED GROWTH, WHAT GROWTH RATES**

2 **DO YOU DEEM RELEVANT FOR THE GROUP OF TELECOMMUNICATIONS**

3 **COMPANIES?**

4 A32. The table below provides a summary of the average growth rates discussed above.

5

6

Growth Rate Indicator	Growth Rate
Average 5- and 10- Year Historic Growth Rate in EPS, DPS, and BVPS for the Group (Value Line)	8.40%
Average 3-5 Year Projected Growth Rate in EPS, DPS, and BVPS for the Group (Value Line)	4.80%
Average 5-Year Projected EPS Growth Rate for the Group (Zacks, Reuters, Yahoo First Call)	7.50%
Compounded Annual Growth in GDP and After-Tax Corporate Profits (Yardeni --1960-2003)	7.00%
Compounded Annual EPS Growth Rate for the S&P 500 (1960-2003)	6.88%
Compounded Annual DPS Growth Rate for the S&P 500 (1960-2003)	5.25%

7

8 Given these figures, and giving primary weight to the growth in earnings, I use a DCF

9 growth rate of 7.00% for the telecommunications companies.

1 **Q33. BASED ON THE ABOVE ANALYSIS, WHAT IS YOUR INDICATED COMMON**

2 **EQUITY COST RATE FROM THE DCF MODEL FOR THE TELECOMMUNICATIONS**

3 **GROUP?**

4 A33. My DCF-derived equity cost rate for the telecommunications group is provided on page 1

5 of Attachment JRW-5. My analysis indicates an equity cost rate of 10.21%.

$$\text{DCF Equity Cost Rate (k)} = \frac{D_1}{P} + g$$

Telecommunications Group $\quad 3.00\% * 1.07 + 7.00\% = 10.21\%$

14 **C.   CAPITAL ASSET PRICING MODEL RESULTS**

16 **Q34. PLEASE DISCUSS THE CAPITAL ASSET PRICING MODEL (CAPM).**

17 A34. The CAPM is a more general risk premium approach to gauging a firm's cost of equity

18 capital. According to the risk premium approach, the cost of equity is the sum of the

19 interest rate on a risk-free bond (R_f) and a risk premium (RP), as in the following:

20 $$k = R_f + RP$$

21 The yield on long-term Treasury securities is normally used as R_f. Risk premiums are

22 measured in different ways. The CAPM is a theory of the risk and expected returns of

23 common stocks. In the CAPM, two types of risk are associated with a stock: firm-specific

24 risk or unsystematic risk; and market or systematic risk, which is measured by a firm's

1   beta. The only risk that investors receive a return for bearing is systematic risk.

2

3   According to the CAPM, the expected return on a company's stock, which is also the

4   equity cost rate (K), is equal to:

5    $$K = (R_f) + \beta_{ibm} * [E(R_m) - (R_f)]$$

6   Where:

7

8   • K represents the estimated rate of return on the stock;
9   • $E(R_m)$ represents the expected return on the overall stock market. Frequently, the 'market'
10   refers to the S&P 500;
11   • (R_f) represents the risk-free rate of interest;
12   • $[E(R_m) - (R_f)]$ represents the expected equity or market risk premium—the excess return
13   that an investor expects to receive above the risk-free rate for investing in risky stocks;
14   • $Beta$—(β_i) is a measure of the systematic risk of an asset.

15

16   To estimate the required return or cost of equity using the CAPM requires three inputs:

17   the risk-free rate of interest (R_f), the beta (β_i), and the expected equity or market risk

18   premium, $[E(R_m) - (R_f)]$. R_f is the easiest of the inputs to measure – it is the yield on

19   long-term Treasury bonds. β_i, the measure of systematic risk, is a little more difficult to

20   measure because there are different opinions about what adjustments, if any, should be

21   made to historic betas due to their tendency to regress to 1.0 over time. And finally, an

22   even more difficult input to measure is the expected equity or market risk premium,

23    $[E(R_m) - (R_f)]$. I will discuss each of these inputs, with most of the discussion focusing on

24   the expected equity risk premium.

25

31

1 **Q35. PLEASE DISCUSS ATTACHMENT JRW-6.**

2 A35. Attachment JRW-6 provides the summary results for my CAPM study, which indicates an

3 equity cost rate for SBC Communications, Inc. of 8.38%. The individual inputs for my

4 CAPM are discussed in detail below.

5

6 **Q36. PLEASE DISCUSS THE RISK-FREE INTEREST RATE AND BETA IN YOUR**

7 **CAPM?**

8 A36. In recent years, the yield on 10-year Treasury bonds has become the benchmark long-term

9 Treasury rate. As of May 17, 2004, the 10-year Treasury yield was 4.76%. I use this rate

10 as R_f.

11

12 $ß$ is a measure of the systematic risk of a stock. The market, usually taken to be the S&P

13 500, has a $ß$ of 1.0. The $ß$ of a stock with the same price movement as the market also has

14 a $ß$ of 1.0. A stock whose price movement is greater than that of the market, such as a

15 technology stock, is riskier than the overall market and has a $ß$ greater than 1.0. A stock

16 with a below average price movement, such as the stock of a regulated public utility, is

17 less risky than the overall market and has a $ß$ less than 1.0. Estimating a stock's $ß$

1   involves running a linear regression of the stock's return over time on the market return,

2   as shown in the graph below:

Calculation of Beta
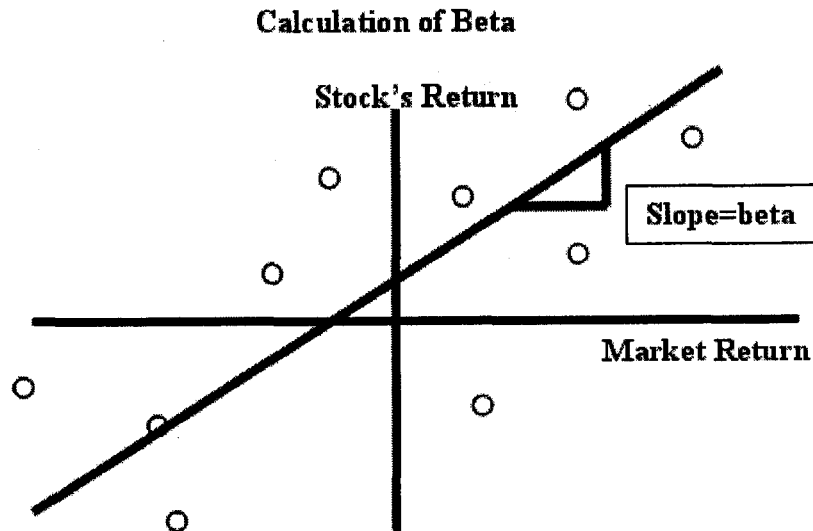
3

4   The slope of the regression line is the stock's ß. A steeper line indicates the stock is more

5   sensitive to the return on the overall market. This means that the stock has a higher ß and

6   greater than average market risk. A less steep line indicates a lower ß and less market

7   risk.

8

9   Numerous online investment information services, such Yahoo and Reuters, provide

10   estimates of stock betas. Most of the time these services report different betas for the

11   same stock. The differences are usually due to (1) the time period over which the ß is

12   measured and (2) any adjustments that are made to reflect the fact that betas tend to

13   regress to 1.0 over time.

14

1   In estimating an equity cost rate for SBC Communications, Inc. using the group of

2   telecommunications firms, like Dr. Avera, I will use the betas provided by the *Value Line*

3   *Investment Survey*. These betas are:

4   **Betas for Telecommunications Firms**
5   ***Value Line Investment Survey***

ALLTEL	1.00
BellSouth	0.95
CenturyTel	1.10
SBC Communications	1.05
Sprint	1.05
Telephone & Data Systems	1.00
Verizon	1.00
Average	**1.02**

6   Data Source: *Value Line Investment Survey*, April 2, 2004.
7

8   Given these figures, I will use a ß of 1.0 for the group.

9

10   **Q37. PLEASE DISCUSS THE DEBATE REGARDING THE EQUITY RISK PREMIUM.**

11   A37. The equity or market risk premium—*[E(R$_m$) – R$_f$]*: is equal to the expected return on the

12   stock market (e.g., the expected return on the S&P 500 (E(R$_m$)) minus the risk-free rate of

13   interest (R$_f$). The equity premium is the difference in the expected total return between

14   investing in equities and investing in "safe" fixed-income assets, such as long-term

15   government bonds. However, while the equity risk premium is easy to define conceptually,

16   it is difficult to measure because it requires an estimate of the expected return on the market.

17

1 **Q38. PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING THE**

2 **EQUITY RISK PREMIUM.**

3 A38. The table below highlights the primary approaches to, and issues in, estimating the expected

4 equity risk premium.

	Historical Ex Post Excess Returns	Surveys	Ex Ante Models and Market Data
Means of Assessing the Equity-Bond Risk Premium	Historical average is a popular proxy for the ex ante premium – but likely to be misleading	Investor and expert surveys can provide direct estimates of prevailing expected returns/premiums	Current financial market prices (simple valuation ratios or DDM-based measures) can give most objective estimates of feasible ex ante equity-bond risk premium
Problems/ Debated Issues	Time variation in required returns and systematic selection and other biases have boosted valuations over time, and have exaggerated realized excess equity returns compared with ex ante expected premiums	Limited survey histories and questions of survey representativeness Surveys may tell more about hoped-for expected returns than about objective required premiums due to irrational biases such as extrapolation.	Assumptions needed for DDM inputs, notably the trend earnings growth rate, make even these models' outputs subjective. Range of views on this growth rate (plus debates on relevant stock and bond yields) => range of premium estimates.

5 .

6 Source: Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003).

7

8 The traditional way to measure the equity risk premium was using the difference between

9 historic ex post average stock and bond returns. Therefore, ex post returns were used as

10 market expectations. This type of historic evaluation of stock and bond returns is often

11 called the "Ibbotson approach" after Professor Roger Ibbotson who popularized this method

12 of assessing historic financial market returns. Most historic assessments of the equity risk

13 premium suggest an equity risk premium of 5-7 percent above the rate on long-term

35

1   Treasury bonds. However, this can be a problem because (1) ex post returns are not the

2   same as ex ante expectations, (2) market risk premiums can change over time, increasing

3   when investors become more risk-averse, and decreasing when investors become less

4   risk-averse, and (3) market conditions can change such that ex post historic returns are

5   poor estimates of ex ante expectations.

6

7   The use of historic returns as market expectations has been criticized in numerous academic

8   studies.[6] The general theme of these studies is that the large equity risk premium discovered

9   in historic stock and bond returns cannot be justified by the fundamental data. These

10   studies, which fall under the category "Ex Ante Models and Market Data," compute ex ante

11   expected returns using market data to arrive at an expected equity risk premium. These

12   studies have also been called "Puzzle Research" after the famous study by Mehra and

13   Prescott in which the authors first questioned the magnitude of historic equity risk

14   premiums relative to fundamentals.[7]

15

16 **Q39. PLEASE BRIEFLY SUMMARIZE SOME OF THE NEW ACADEMIC STUDIES**

17   **THAT DEVELOP EX ANTE EQUITY RISK PREMIUMS.**

18 A39. Two of the most prominent studies of ex ante expected equity risk premiums were by

19   Eugene Fama and Ken French (2002) and James Claus and Jacob Thomas (2001). The

---

[6]The problems with using ex post historic returns as measure of ex ante expectation will be discussed at length later in my testimony.

[7]Rahnish Mehra and Edward Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economic* (1985).

1   primary debate in these studies revolves around two related issues: (1) the size of expected

2   equity risk premium, which is the return equity investors require above the yield on bonds;

3   and (2) the fact that estimates of the ex ante expected equity risk premium using

4   fundamental firm data (earnings and dividends) are much lower than estimates using

5   historic stock and bond return data. Fama and French (2002), two of the most preeminent

6   scholars in finance, use dividend and earnings growth models to estimate expected stock

7   returns and ex ante expected equity risk premiums.[8] They compare these results to actual

8   stock returns over the period 1951-2000. Fama and French estimate that the expected

9   equity risk premium from DCF models using dividend and earnings growth to be between

10   2.55% and 4.32%. These figures are much lower than the ex post historic equity risk

11   premium produced from the average stock and bond return returns over the same period,

12   which is 7.40%.

13

14   Fama and French conclude that the ex ante equity risk premium estimates using DCF

15   models and fundamental data are superior to those using ex post historic stock returns for

16   three reasons: (1) the estimates are more precise (a lower standard error); (2) the Sharpe

17   ratio, which is measured as the [(expected stock return – risk-free rate)/standard deviation],

18   is constant over time for the DCF models but more than doubles for the average stock-bond

19   return model; and (3) valuation theory specifies relationships between the market-to-book

20   ratio, return on investment, and cost of equity capital that favor estimates from

---

[8]Eugene F. Fama and Kenneth R. French, "The Equity Premium," *The Journal of Finance*, April 2002. This paper
may be downloaded from the Internet at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=236590.

1   fundamentals.   They also conclude that the high average stock returns over the past 50

2   years were the result of low expected returns and that the average equity risk premium has

3   been in the 3-4 percent range.

4

5   The study by Claus and Thomas of Columbia University provides direct support for the

6   findings of Fama and French.[9]   These authors compute ex ante expected equity risk

7   premiums over the 1985-1998 period by (1) computing the discount rate that equates market

8   values with the present value of expected future cash flows, and (2) then subtracting the

9   risk-free interest rate. The expected cash flows are developed using analysts' earnings

10   forecasts.   The authors conclude that over this period the ex ante expected equity risk

11   premium is in the range of 3.0%.   Claus and Thomas note that over this period ex post

12   historic stock returns overstate the ex ante expected equity risk premium because as the

13   expected equity risk premium has declined, stock prices have risen (present values increase

14   when required rates of return decline). The higher stock prices have produced stock returns

15   that have exceeded expectations and therefore ex post historic equity risk premium

16   estimates are biased upwards as measures of ex ante expected equity risk premiums.

17

18   **Q40.   PLEASE PROVIDE A SUMMARY OF THE EX ANTE EXPECTED EQUITY RISK**

19   **PREMIUM STUDIES?**

20   A40.   Richard Derrig and Elisha Orr (2003) recently completed the most comprehensive paper to

---

[9] James Claus and Jacob Thomas, "Equity Risk Premia as Low as Three Percent? Empirical Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Market," *Journal of Finance*. (October 2001).

1   date which summarizes and assesses the many risk premium studies.[10] Appendix B of their

2   study, which provides summary statistics for the different studies, is included as Attachment

3   JRW-7. The risk premium studies listed under the 'Social Security' and 'Puzzle Research'

4   sections are primarily ex ante expected equity risk premium studies. Most of these studies

5   are performed by leading academic scholars in finance and economics. A review of the

6   'ERP Estimate' column in Appendix B of the Derrig and Orr paper suggests that the

7   average ex ante equity risk premium estimate is in the 4.0% range.

8

9   **Q41. GIVEN THIS BACKGROUND INFORMATION, HOW WILL YOU ESTIMATE**

10   **AN EQUITY RISK PREMIUM FOR YOUR CAPM?**

11   A41. My equity risk premium is the average of: (1) the 4.0% average ex ante expected equity

12   risk premiums from the studies covered in the Derrig and Orr (2003) paper and (2) an ex

13   ante expected equity risk premium developed using Ibbotson and Chen's "building blocks

14   methodology."

---

[10] Richard Derrig and Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, August 28, 2003.

1 **Q42. PLEASE DISCUSS THE EX ANTE EXPECTED EQUITY RISK PREMIUM**

2 **COMPUTED USING THE "BUILDING BLOCKS METHODOLOGY."**

3 A42. Ibbotson and Chen (2002) evaluate the ex post historic mean stock and bond returns in what

4 is called a "building blocks methodology."[11] They use 75 years of data and relate the

5 compounded historic returns to the different fundamental variables employed by different

6 researchers in building ex ante expected equity risk premiums. Among the variables

7 included were inflation, real EPS and DPS growth, ROE and book value growth, and P/E

8 ratios. By relating the fundamental factors to the ex post historic returns, the methodology

9 bridges the gap between the ex post and ex ante equity risk premiums. Ilmanen (2003)

10 illustrates this approach using the geometric returns and five fundamental variables –

11 inflation (CPI), dividend yield (D/P), real earnings growth (RG), repricing gains (PEGAIN)

12 and return interaction/reinvestment (INT). [12] This is shown in the graph below. The first

13 column breaks the 1926-2000 geometric mean stock return of 10.7% into the different

14 return components demanded by investors: the historic Treasury bond return (5.2%), the

15 excess equity return (5.2%), and a small interaction term (0.3%). This 10.7% annual stock

---

[11] Roger Ibbotson and Peng Chen, "Long Run Returns: Participating in the Real Economy," *Financial Analysts Journal*, January 2003.

[12] Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003), p. 11.

1   return over the 1926-2000 period can then be broken down into the following fundamental

2   elements: inflation (3.1%), dividend yield (4.3%), real earnings growth (1.8%), repricing

3   gains (1.3%) associated with higher P/E ratios, and a small interaction term (0.2%).

4
5

Decomposing Equity Market Returns
**The Building Blocks Methodology**
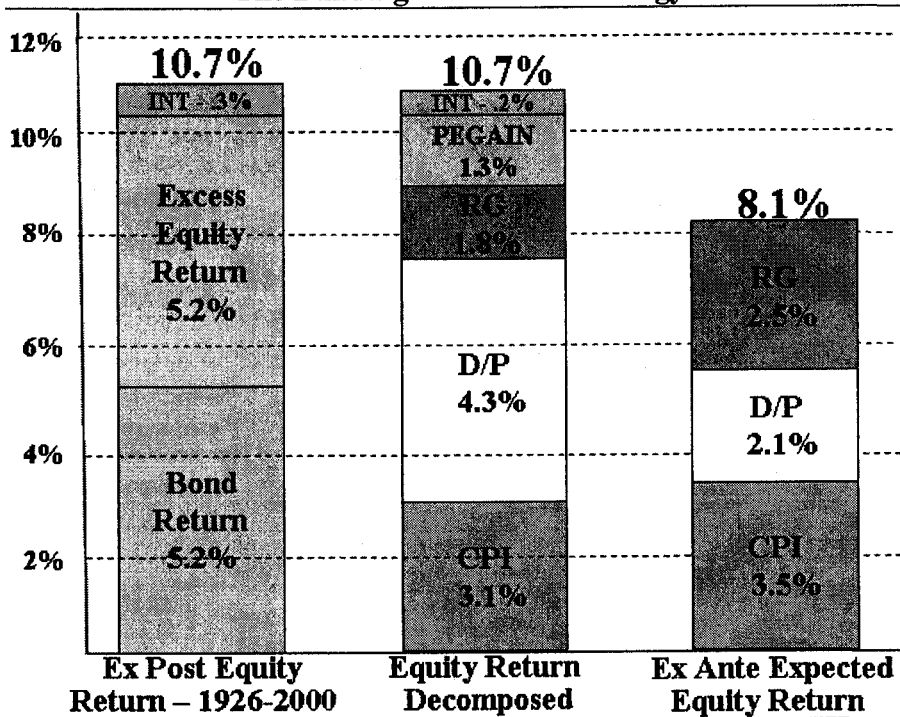
6
7

8   **Q43. HOW ARE YOU USING THIS METHODOLOGY TO DERIVE AN EX ANTE**

9   **EXPECTED EQUITY RISK PREMIUM?**

10 A43. The third column in the graph above shows current inputs to estimate an ex ante expected

11 market return. These inputs include:

1   CPI – the graph below shows the expected inflation over the coming year according to the

2   University of Michigan Survey Research Center. In April, expected inflation hit 3.2%.

3   Given the trend in consumer prices, and especially oil-related energy prices, I used an

4   expected inflation figure of 3.5%.

5

6   **Expected Inflation Rate**

7   **University of Michigan Consumer Research**

8   (Data Source: http://research.stlouisfed.org/fred2/series/MICH/98)
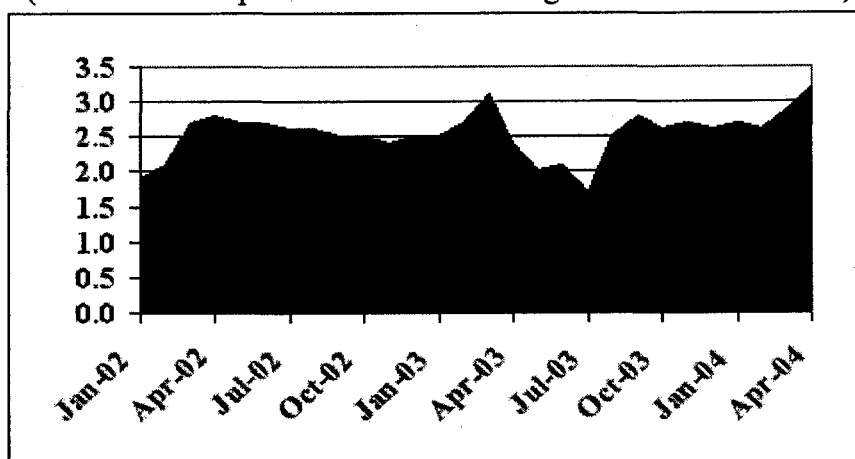
9
10
11   D/P – As shown in the graph below, the dividend yield on the S&P 500 has decreased

12   gradually over the past decade. Today, it is far below its norm of 4.3% over the 1926-2000

13   time period. Whereas the S&P dividend yield bottomed out at less than 1.4% in 2000, it is

14   currently at 2.1% which I use in the ex ante risk premium analysis.

1
2
3

S&P 500 Dividend Yield
(Data Source: http://www.barra.com/Research/fund_charts.asp)

4
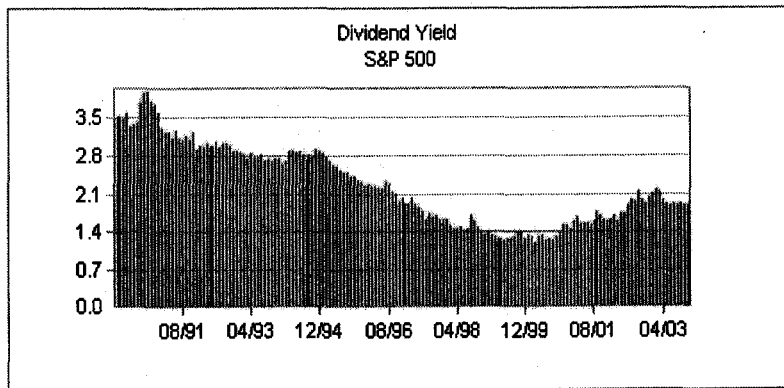
5   RG – Previously, it was shown that over the 1960-2003 period, nominal growth in EPS for

6   the S&P 500 was 6.88%. On page 2 of Attachment JRW-6, real EPS growth is computed

7   using the CPI as a measure of inflation. Over the 1926-2000 period, real earnings growth

8   was 1.8%. The real growth figure over 1960-2003 period for the S&P 500 is 2.5%, which I

9   use in the ex ante risk premium analysis.

10

11 PEGAIN – the repricing gains associated with increases in the P/E ratio accounted for 1.3%

12 of the 10.7% annual stock return in the 1926-2000 period. In estimating an ex ante

13 expected stock market return, one issue is whether investors expect P/E ratios to increase

14 from their current levels. The graph below shows the P/E ratios for the S&P 500 over the

15 past 25 years. The run-up and eventual peak in P/Es is most notable in the chart. The

16 relatively low P/E ratios (in the range of 10) over two decades ago are also quite notable. As

17 of May, 2004 the P/E for the S&P 500, using the trailing 12 months EPS, is 22.89

18 according to www.investor.reuters.com.

1   Given the current economic and capital markets environment, I do not believe that investors

2   expect even higher P/E ratios.   Therefore, a PEGAIN would not be appropriate in

3   estimating an ex ante expected stock market return. There are two primary reasons for this.

4   First, the average historic S&P 500 P/E ratio is 15 – thus the current P/E exceeds this figure

5   by nearly 50%. Second, while the high current P/Es reflect the fact that interest rates are

6   relatively low, given their current levels, investors probably do not expect to get a big stock

7   market gain from lower interest rates.

8   **S&P 500 P/E Ratios**

9   (Data Source: http://www.barra.com/Research/fund_charts.asp)

Price/Earnings (Incl Negative)
S&P 500
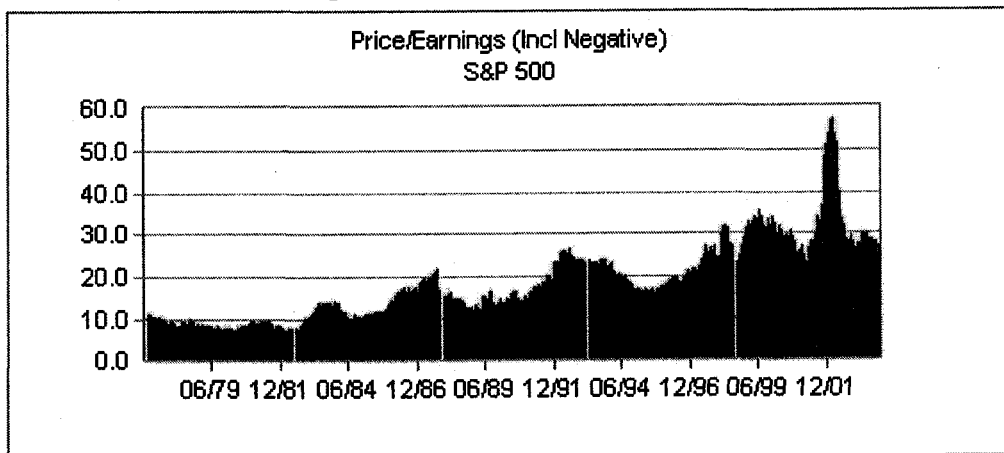
10
11

12   **Q44.   GIVEN THIS DISCUSSION, WHAT IS YOUR EX ANTE EXPECTED MARKET**

13   **RETURN AND EQUITY RISK PREMIUM USING THE "BUILDING BLOCKS**

14   **METHODOLOGY"?**

15   A44. My expected market return is represented by the last column on the right in the graph

16   entitled "Decomposing Equity Market Returns The Building Blocks Methodology" found

17   earlier in my testimony. I believe that the appropriate expected market return is 8.1% which

1   is composed of 3.5% inflation, 2.1% dividend yield, and 2.5% real earnings growth rate.

2

3   Previously I noted that I am using a risk-free interest rate of 4.76%. This is 10-year

4   Treasury yield as of the 3rd week of May, 2004. My ex ante equity risk premium is simply

5   the expected market return from the "building blocks methodology" minus this risk-free

6   rate:

7   Ex Ante Equity Risk Premium   =   8.10%   -   4.76%   = 3.34%

8

9   **Q45.   WHAT EQUITY COST RATE IS INDICATED BY YOUR CAPM ANALYSIS?**

10 A45.   This is summarized on page 1 of Attachment JRW-6. My ex ante CAPM equity risk

11   premium is the average of the Derrig-Orr mean (4.00%) and my building blocks approach

12   (3.34%), or 3.67%. Using a risk-free rate of 4.76% and a beta of 1.0, my CAPM estimate

13   cost rate is 8.38%.

14

15 **D.   EQUITY COST RATE SUMMARY**

16
17 **Q46.   PLEASE SUMMARIZE YOUR EQUITY COST RATE STUDY.**

18 A46.   My DCF analysis for the comparable group indicates an equity cost rate of 10.21%. My

19   CAPM study suggests an equity cost rate of 8.38%.

1   **Q47. GIVEN THESE RESULTS, WHAT EQUITY COST RATE RECOMMENDATION**

2   **ARE YOU MAKING FOR SBC OHIO?**

3   A47. Since I primarily employ the DCF model to estimate an equity cost rate, I am

4   recommending the DCF equity cost rate of 10.00% for SBC Ohio.

5

6   **Q48. ISN'T YOUR RECOMMENDED RETURN LOW BY HISTORIC STANDARDS?**

7   A48. Yes it is. My recommended rate of return is low by historic standards for three reasons.

8   First, as discussed above, capital costs are very low by historic standards. Second, the 2003

9   tax law, which reduces the tax rates on dividend income and capital gains, lowers the pre-

10   tax return required by investors. And third, as discussed below, the equity or market risk

11   premium has declined.

12

13   **Q49. FINALLY, PLEASE DISCUSS THIS RECOMMENDATION IN LIGHT OF**

14   **RECENT YIELDS ON BONDS.**

15   A49. In recent months the yields on SBC Communications, Inc.'s 'A' rated corporate bonds have

16   been in the 5.5–6.0 percent range. My equity return recommendation of 10.0% must be

17   viewed in the context of the significant shift in the risk and return characteristics of bonds

18   and stocks over the past two decades. This change and its implications for equity risk

19   premiums are discussed further in my critique of Dr. Avera's testimony. In short, the

20   relative risk of stocks and bonds has changed in recent years as stocks have become less

21   volatile and risky while bonds have become more volatile and risky. Accordingly, the

1   return premium that equity investors require over bond yields is much lower than it was

2   when stock returns were much more volatile than bond returns.

3

4 **V.   CRITIQUE OF DR. AVERA'S COST OF CAPITAL TESTIMONY**

5

6 **Q50. PLEASE SUMMARIZE DR. AVERA'S COST OF CAPITAL RECOMMENDATION.**

7 A50. As summarized below, Dr. Avera's overall rate of return recommendation is 11.91%.

Capital Source	Ratio	Cost Rate	Weighted Cost Rate
L-T Debt	19.0%	6.18%	1.17%
Common Equity	81.0%	13.25%	10.73%
Cost of Capital			11.91%

14 **Q51. WHAT CRITICISMS DO YOU HAVE OF DR. AVERA'S RECOMMENDED**

15   **COST OF CAPITAL FOR THE COMPANY?**

16 A51. I address the three major areas of disagreement I have with Dr. Avera: (1) the appropriate

17   capital structure, (2) the debt cost rate, and (3) the equity cost rate.

18

19 **Q52. PLEASE REVIEW THE DIFFERENCES YOU HAVE WITH DR. AVERA ON THE**

20   **APPROPRIATE CAPITAL STRUCTURE FOR THE COMPANY.**

21 A52. Dr. Avera employs a market value capitalization as of a point in time, whereas I use an

22   average market value – book value capitalization over five years. As discussed, market

23   value capitalizations tend to vary significantly over the years due to their sensitivity of the

24   capitalization ratios to the stock price. Using the average market value – book value

1 capitalization over five years provides for a forward-looking, more stable capitalization

2 that is not overly affected by the current stock price and one-time financings and/or

3 significant economic events. In addition, book value capitalizations are important in that

4 they are the most common form of capitalization reported in financial reports and

5 publications. Finally, it is important to note that book and market value capitalizations

6 tend to converge over time.

7

8 In summary, my proposed 5-year average book and market value capitalization provides

9 the more appropriate forward-looking market capitalization for SBC Ohio.

10

11 **Q53. HOW DO YOU AND DR. AVERA DIFFER IN TERMS OF SBC'S DEBT COST**

12 **RATE?**

13 A53. Dr. Avera used a debt cost rate of 6.18% which is the yield on Moody's long-term, 'A'

14 rated industrial bonds as of December 8, 2003. I used the current 10-year Treasury yield of

15 4.76% and then added 104 BPs which is the median yield difference between 10-year

16 Treasuries and 'A' rated corporate bonds over the past ten years.

17

18 I have two major concerns with Dr. Avera's debt cost rate: (1) his "snapshot" approach to

19 measuring the debt cost rate, and (2) his failure to account for the maturity structure of

20 SBC's debt in that his debt cost rate is long-term, while SBC Communications, Inc.'s debt

21 is primarily medium term.

1   First, as with the capital structure issue, Dr. Avera measures SBC Communications, Inc.'s

2   forward-looking debt cost rate at just one point in time. It is my opinion that Dr. Avera's

3   "snapshot" approach to determining SBC's capital structure and debt cost rate does not

4   provide for an appropriate forward-looking capitalization and debt cost for SBC Ohio. My

5   evaluation of capital structure over five years and average yield differentials over ten years

6   is more representative of a forward-looking capital structure and debt cost rate than Dr.

7   Avera's "snapshot" approach.

8

9   Second, Dr. Avera's debt cost rate reflects the rates on long-term "A" rated debt. However,

10   as previously documented, the vast majority of SBC Communications, Inc.'s debt is

11   cheaper short- and medium- term financings. This is due, in large part, to the very

12   aggressive medium-term note financing program of SBC Communications, Inc. and its

13   subsidiaries. Medium-term notes have maturities of 5-12 years and usually have lower

14   coupon rates than long-term bonds. As such, Dr. Avera's debt cost rate is clearly excessive

15   and is not reflective of SBC's forward-looking financing strategy and debt cost rate.

1 **Q54. PLEASE REVIEW DR. AVERA'S EQUITY COST RATE APPROACHES.**

2 A54. Dr. Avera estimates an equity cost rate for SBC by applying a nonconstant growth DCF

3 model and the CAPM to the group of telecommunications companies. His equity cost rate

4 estimates are summarized below:

5
6 <u>Summary of Approaches and Results</u>
7 .

	Telecommunications Group
Non-Constant DCF	
Average	13.6%
Excluding High and Low	13.9%
CAPM	
Forward-Looking Returns	13.8%
Historical Returns	11.8%

8
9 Based on these figures, he arrives at an equity cost rate estimate for SBC Ohio of 13.25%.

10

11 The primary errors in his equity cost rate studies are (1) the use of an inappropriate

12 nonconstant DCF model that is highly sensitive to one analyst's forecast of future stock

13 prices and (2) biased and outdated equity risk premium estimates for his CAPM analyses.

14 These errors are discussed in detail below.

15

16 **Q55. PLEASE SUMMARIZE DR. AVERA'S DCF ESTIMATE.**

17 A55. Dr. Avera claims to apply a nonconstant-growth DCF model to the group of

18 telecommunications companies and arrives at an equity cost rate estimate of 13.6%. For

19 each company in the group, he uses as future cash flows (1) *Value Line's* projected dividend

1   over the next four years, and (2) the projected stock price at the end of four years (computed

2   as the average of the high and low projections).

3

4   **Q56.   PLEASE EXPRESS YOUR CONCERNS WITH DR. AVERA'S DCF STUDY.**

5   A56.   I have two concerns with Dr. Avera's DCF equity cost rate study.

6

7   First, I disagree with Dr. Avera claims this is a nonconstant-growth DCF approach. I have

8   previously discussed nonconstant-growth DCF models, and his application is not a

9   traditional nonconstant-growth DCF. Nonconstant-growth DCF models involve projecting

10   future dividends over different stages of a company's life cycle and then, in this case, using

11   these projections to find the discount rate that equates the current stock price with all future

12   dividends. Instead of using all future dividends, Dr. Avera is utilizing an estimate of the

13   future stock price.

14

15   Second, Dr. Avera's DCF approach is highly sensitive to the projected future stock price.

16   This is especially questionable since (a) it relies on the estimate of only one individual, and

17   thus it is not a consensus of the market, (b) Dr. Avera has provided no empirical support

18   that this one individual at *Value Line*, or even *Value Line* itself, is proficient at predicting

19   future stock prices, and (c) predicting future stock prices, as opposed to fundamental firm

20   variables such as earnings and dividends, is highly speculative given the many

21   macroeconomic forces that affect stock prices.

1 **Q57.** **PLEASE DISCUSS YOUR UPDATE TO DR. AVERA'S NONCONSTANT-**

2 **GROWTH DCF MODEL.**

3 A57. *Value Line* is updated quarterly, and therefore an updated *Value Line* was published for

4 the telecommunications group on April 2, 2004. We have moved ahead almost six

5 months from when Dr. Avera prepared his testimony, and *Value Line* is now forecasting

6 forward one additional year. In Attachment JRW-8, I have updated Dr. Avera's

7 nonconstant growth DCF, using the updated *Value Line* estimates and moving the

8 analysis forward one year. The ending period is now the years 2007-2009 which is a more

9 accurate four-year projection. Reflecting my earlier comments concerning the sensitivity

10 of the results to the projections, the average DCF equity cost rate has decreased to

11 10.20%, which is consistent with my DCF equity cost rate estimate for the group.

12

13 **Q58.** **PLEASE DESCRIBE DR. AVERA'S USE OF THE CAPM.**

14 A58. Dr. Avera applies the CAPM to the telecommunications group to estimate an equity cost

15 rate for the Company. Dr. Avera performs two CAPM analyses, the difference being in the

16 manner in which the equity risk premium is calculated. In both cases, he uses a 20-year

17 risk-free rate of 5.10% and a beta of 1.01. The first equity risk premium is based on the 5-

18 year projected EPS growth for the S&P 500, and the second uses historic stock and bond

19 returns. These two CAPM analyses provide equity cost rate estimates of 13.8% and 11.8%.

1   **Q59. WHAT IS YOUR ASSESSMENT OF DR. AVERA'S TWO CAPM ANALYSES?**

2   A59.   I have concerns with the calculation and magnitude of the equity risk premium of each.

3

4   **Q60. PLEASE ADDRESS DR. AVERA'S FIRST CAPM ANALYSIS.**

5   A60.   In his first CAPM, Dr. Avera estimated an equity risk premium of 8.6%. The first equity

6   risk premium was computed in the following manner: (1) he started with the dividend yield

7   for the S&P 500 of 1.6%, (2) added an expected return for the market analysts' estimated 5-

8   year EPS forecast of 12.1%, and (3) then subtracted the 20-year risk-free of 5.1%, to arrive

9   at an equity risk premium of 8.6%. His CAPM equity cost rate of 13.8% is then calculated

10   as the risk-free rate (5.1%) plus beta (1.01) times his equity risk premium (8.6%).

11

12   The primary issue here is the manner in which he calculated the equity risk premium. As I

13   have discussed previously in this testimony, analysts' 5-year projected EPS growth rates

14   have consistently been well above the EPS growth rates that the S&P 500 companies have

15   actually produced. As such, investors are wise enough to know that these are biased

16   forecasts and therefore are not meaningful measures of market expectations. As previously

17   noted, these growth rate forecasts are collected and published by Zacks, Yahoo First Call

18   and Reuters. These services retrieve and compile 5-year EPS forecasts from Wall Street
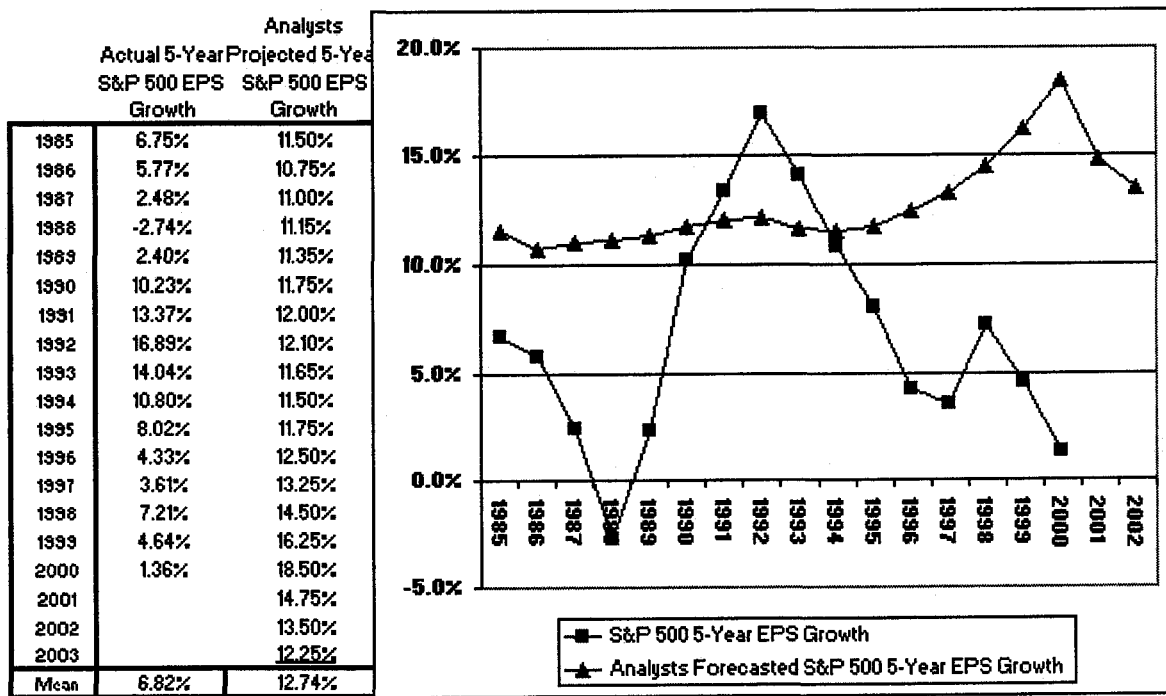
1   Analysts. These analysts come from both the sell side (Merrill Lynch, Paine Webber) and

2   the buy side (Prudential Insurance, Fidelity Investments) investment firms. It is well known

3   that the EPS forecasts of these analysts, especially those on the sell side, are overly

4   optimistic and therefore biased upwards.

5

6   **Q61.   WHAT IS THE MAGNITUDE OF THE BIAS IN ANALYSTS' 5-YEAR EPS**

7   **FORECASTS?**

8   A61.   It is significant. The long-term annual EPS growth for the S&P 500 is 6.88%. I previously

9   showed a graph of analysts' 5-year EPS projections for the S&P 500. In the graph on page

10   55 labeled Actual versus Forcasted 5-year EPS Growth for the S&P 500 1985-2003, I have

11   overlayed these results on the actual 5-year EPS growth that the S&P 500 firms actually

12   produced. For example, the 1995, analysts were projecting 5-Year compounded annual

13   EPS growth of 11.75%, but companies only generated annual compounded EPS growth

14   over the next five years of 8.02%. The differences are dramatic.   Whereas Wall Street

15   analysts have continually forecasted 5-year EPS growth for the S&P 500 in the 11-16

16   percent range, these firms have delivered EPS growth in the 7.0 percent range. The only

17   years when firms met analysts' expectations were in the early 1990s. Over the entire period,

1   on average, analysts' 5-year forecasted EPS growth was 12.74% per year, but companies

2   only produced 5-year EPS growth of 6.82%. Therefore, the bias is obvious and significant.

3

4   **Actual Versus Forecasted 5-Year EPS Growth for the S&P 500**

5   **1985-2003**

	Actual 5-Year S&P 500 EPS Growth	Analysts Projected 5-Year S&P 500 EPS Growth	
1985	6.75%	11.50%	
1986	5.77%	10.75%	
1987	2.48%	11.00%	
1988	-2.74%	11.15%	
1989	2.40%	11.35%	
1990	10.23%	11.75%	
1991	13.37%	12.00%	
1992	16.89%	12.10%	
1993	14.04%	11.65%	
1994	10.80%	11.50%	
1995	8.02%	11.75%	
1996	4.33%	12.50%	
1997	3.61%	13.25%	
1998	7.21%	14.50%	
1999	4.64%	16.25%	
2000	1.36%	18.50%	
2001		14.75%	
2002		13.50%	
2003		12.25%	
Mean	6.82%	12.74%	

6

7

8   **Q62.   WHAT OTHER OBSERVATIONS DO YOU HAVE ABOUT ANALYSTS AND**

9   **THEIR PROJECTIONS?**

10   A62.   The value of Wall Street research has diminished in the wake of New York Attorney

11   General Elliot Spitzer's investigation and the fact that nine major brokerage firms have

12   paid over $1.5B in the Global Research Regulatory Settlement. With these admitted

13   biases in analysts' research, it seems highly unlikely that investors today would focus

1   squarely on the forecasts of securities analysts in arriving at expected growth. Clearly,

2   investors have learned to be suspicious of the upwardly biased forecasts and stock

3   recommendations of securities analysts. In the academic world, the fact that the EPS

4   forecasts of securities' analysts are biased upwards is common knowledge.

5

6   **Q63.   DO YOU BELIEVE THAT THE CRACKDOWN ON WALL STREET FIRMS HAS**

7   **LED TO MORE HONEST AND LESS BIASED FORECASTS AND**

8   **RECOMMENDATIONS?**

9   A63. No. The fact is that analysts continue to provide overly positive outlooks for their stocks.

10   Two recent *Wall Street Journal* articles focus on this very issue. The first article ("Stock

11   Analysts Still Put Their Clients First") highlights the fact that that despite the recent

12   reforms, analysts still give higher ratings to companies that employ their firms for

13   investment banking services.[13] In the second article, the title says it all -- "Analysts Still

14   Coming Up Rosy – Over-Optimism on Growth Rates is Rampant – and the Estimates Help

15   to Buoy the Market's Valuation." The following quote also provides insight into the

16   continuing bias in analysts' forecasts:[14]

17   Hope springs eternal, says Mark Donovan, who manages Boston
18   Partners Large Cap Value Fund. 'You would have thought that,
19   given what happened in the last three years, people would have
20   given up the ghost. But in large measure they have not.'

---

[13] Randall Smith, "Stock Analysts Still Put Their Clients First" *Wall Street Journal*, (April 7, 2003), p. C1.

[14] Ken Brown, "Analysts Still Coming Up Rosy – Over-Optimism on Growth Rates is Rampant – and the Estimates Help to Buoy the Market's Valuation." *Wall Street Journal*, (January 27, 2003), p. C1.

1   These overly optimistic growth estimates also show that, even with

2   all the regulatory focus on too-bullish analysts allegedly influenced

3   by their firms' investment-banking relationships, a lot of things

4   haven't changed: Research remains rosy and many believe it always

5   will.

6

7 **Q64. PLEASE CRITIQUE DR. AVERA'S SECOND CAPM ANALYSIS.**

8 A64. In his second CAPM, Dr. Avera estimates an equity risk premium of 6.6%. This represents

9 the difference between the arithmetic mean returns on the S&P 500 and long-term Treasury

10 bonds. This uses data from 1926 to 2003, and uses the so-called 'Ibbotson approach'

11 discussed previously. Dr. Avera's second CAPM equity cost rate of 11.8% is then

12 calculated as the risk-free rate (5.1%) plus beta (1.01) times his equity risk premium (6.6%).

13

14 The issue here again is the calculation of the equity risk premium. In this second CAPM

15 application he is using historic ex post returns to compute the ex ante expected risk

16 premium. In deriving my ex ante expected equity risk premium, I discussed some of the

17 general issues with using ex post historic return data to measure the expected ex ante equity

18 risk premium. I will expand on that discussion now.

19

20 **Q65. PLEASE DISCUSS THE ERRORS IN USING HISTORIC STOCK AND BOND**

21 **RETURNS TO ESTIMATE AN EQUITY RISK PREMIUM.**

22 A65. Using the historic relationship between stock and bond returns to measure an expected

23 equity risk premium is erroneous and, especially in this case, overstates the true market

1 equity risk premium. There are a number of flaws in using historic returns over long time

2 periods to estimate expected equity risk premiums. These issues include:

3 (A) Biased historic bond returns;

4 (B) The arithmetic versus the geometric mean return;

5 (C) Unattainable and biased historic stock returns;

6 (D) Survivorship bias;

7 (E) The "Peso Problem;"

8 (F) Market conditions today are significantly different than the past; and

9 (G) Changes in risk and return in the markets.

10 These issues will be addressed in order.

11

12 **Biased Historic Bond Returns**

13 **Q66. HOW ARE HISTORIC BOND RETURNS BIASED?**

14 A66. An essential assumption of these studies is that over long periods of time investors'

15 expectations are realized. However, the experienced returns of bondholders in the past

16 violate this critical assumption. Historic bond returns are biased downward as a measure of

17 expectancy because of capital losses suffered by bondholders in the past. As such, risk

18 premiums derived from this data are biased upwards.

1   **The Arithmetic versus the Geometric Mean Return**

2   **Q67. PLEASE DISCUSS THE ISSUE RELATING TO THE USE OF THE**

3   **ARITHMETIC VERSUS THE GEOMETRIC MEAN RETURNS IN THE**

4   **IBBOTSON METHODOLOGY.**

5   A67.   The measure of investment return has a significant effect on the interpretation of the risk

6   premium results.   When analyzing a single security price series over time (i.e., a time

7   series), the best measure of investment performance is the geometric mean return. Using

8   the arithmetic mean overstates the return experienced by investors. In a study entitled "Risk

9   and Return on Equity: The Use and Misuse of Historical Estimates," Carleton and

10   Lakonishok make the following observation: "The geometric mean measures the changes in

11   wealth over more than one period on a buy and hold (with dividends invested) strategy."[15]

12   Since Dr. Avera's study covers more than one period (and he assumes that dividends are

13   reinvested), he should be employing the geometric mean and not the arithmetic mean.

---

[15] Willard T. Carleton and Josef Lakonishok, "Risk and Return on Equity: The Use and Misuse of Historical Estimates," *Financial Analysts Journal* (January-February, 1985), pp. 38-47.

1 **Q68. PLEASE PROVIDE AN EXAMPLE DEMONSTRATING THE PROBLEM WITH**

2 **USING THE ARITHMETIC MEAN RETURN.**

3 A68. To demonstrate the upward bias of the arithmetic mean, consider the following example.

4 Assume that you have a stock (that pays no dividend) that is selling for $100 today,

5 increases to $200 in one year, and then falls back to $100 in two years. The table below

6 shows the prices and returns.

7

Time Period	Stock Price	Annual Return
0	$100	
1	$200	100%
2	$100	-50%

8

9 The arithmetic mean return is simply (100% + (-50%))/2 = 25% per year. The geometric

10 mean return is $((2 * .50)^{(1/2)}) - 1 = 0\%$ per year. Therefore, the arithmetic mean return

11 suggests that your stock has appreciated at an annual rate of 25%, while the geometric mean

12 return indicates an annual return of 0%. Since after two years, your stock is still only worth

13 $100, the geometric mean return is the appropriate return measure. For this reason, when

14 stock returns and earnings growth rates are reported in the financial press, they are generally

15 reported using the geometric mean. This is because of the upward bias of the arithmetic

16 mean. Therefore, Dr. Avera's arithmetic mean return measures are biased and should be

17 disregarded.

1   **Unattainable and Biased Historic Stock Returns**

2   **Q69. YOU NOTE THAT HISTORIC STOCK RETURNS ARE BIASED USING THE**

3   **IBBOTSON METHODOLOGY. PLEASE ELABORATE.**

4   A69. Returns developed using Ibbotson's methodology are computed on stock indexes and

5   therefore (1) cannot be reflective of expectations because these returns are unattainable to

6   investors, and (2) produce biased results. This methodology assumes (a) monthly portfolio

7   rebalancing and (b) reinvestment of interest and dividends. Monthly portfolio rebalancing

8   presumes that investors rebalance their portfolios at the end of each month in order to have

9   an equal dollar amount invested in each security at the beginning of each month. The

10   assumption would obviously generate extremely high transaction costs and, as such, these

11   returns are unattainable to investors. In addition, an academic study demonstrates that the

12   monthly portfolio rebalancing assumption produces biased estimates of stock returns.[16]

13

14   Transaction costs themselves provide another bias in historic versus expected returns. The

15   observed stock returns of the past were not the realized returns of investors due to the much

16   higher transaction costs of previous decades. These higher transaction costs are reflected

17   through the higher commissions on stock trades, and the lack of low cost mutual funds like

18   index funds.

19

---

[16] See Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics* (1983), pp. 371-86.

1   **Survivorship Bias**

2   **Q70.   HOW DOES SURVIVORSHIP BIAS TAINT DR. AVERA'S HISTORIC EQUITY**

3   **RISK PREMIUM?**

4   A70.   Using historic data to estimate an equity risk premium suffers from survivorship bias.

5   Survivorship bias results when using returns from indexes like the S&P 500. The S&P 500

6   includes only companies that have survived. That returns of others that did not perform so

7   well were dropped from these indexes are not reflected. Therefore these stock returns are

8   upwardly biased because they only reflect the returns from more successful companies.

9

10   **The "Peso Problem"**

11 **Q71.   WHAT IS THE "PESO PROBLEM" AND HOW DOES IT AFFECT HISTORIC**

12   **RETURNS AND EQUITY RISK PREMIUMS?**

13 A71.   Dr. Avera's use of historic return data also suffers from the so-called "peso problem." This

14   issue involves the fact that past stock market returns were higher than were expected at the

15   time because despite war, depression, and other social, political, and economic events, the

16   US economy survived and did not suffer hyperinflation, invasion, and the calamities of

17   other countries. Therefore, historic stock returns are overstated as measures of expected

18   returns.

19

1   **Market Conditions Today are Significantly Different than in the Past**

2   **Q72.** **FROM AN EQUITY RISK PREMIUM PERSPECTIVE, PLEASE DISCUSS HOW**

3   **MARKET CONDITIONS ARE DIFFERENT TODAY.**

4   **A72.** The equity risk premium is based on expectations of the future. When past market

5   conditions vary significantly from the present, historic data does not provide a realistic or

6   accurate barometer of expectations of the future. As noted previously, stock valuations (as

7   measured by P/E) are relatively high and interest rates are relatively low, on a historic basis.

8   Therefore, given the high stock prices and low interest rates, expected returns are likely to

9   be lower on a going forward basis.

10

11   **Changes in Risk and Return in the Markets**

12   **Q73.** **PLEASE DISCUSS THE NOTION THAT HISTORIC EQUITY RISK PREMIUM**

13   **STUDIES DO NOT REFLECT THE CHANGE IN RISK AND RETURN IN**

14   **TODAY'S FINANCIAL MARKETS.**

15   A73. The historic equity risk premium methodology is unrealistic in that it makes the explicit

16   assumption that risk premiums do not change over time. Simply stated, using historic

17   returns to measure the equity risk premium masks the dramatic change in the risk and return

18   relationship between stocks and bonds. The nature of the change is that bonds have

19   increased in risk relative to stocks. This change suggests that the equity risk premium has

20   declined in recent years.

63

1   Page 1 of Attachment JRW-9 provides the annual market risk premiums for the 1926 to

2   2002 period where the annual premium is defined as the return on common stock minus

3   the return on long-term Treasury Bonds. There is considerable variability in this series

4   and a clear decline in recent decades. The high was 54% in 1933 and the low was -38%

5   in 1931. Evidence of a change in the relative riskiness of bonds and stocks is provided on

6   page 2 of Attachment JRW-9 which plots the standard deviation of annual stock and bond

7   returns since 1926. The plot shows that, whereas stock returns were much more volatile

8   than bond returns from the 1920s to the 1970s, bond returns became more variable than

9   stock returns during the 1980s. In recent years stocks and bonds have become much more

10   similar in terms of volatility. The decrease in the volatility of stocks relative to bonds has

11   been attributed to several stock related factors: the impact of technology on productivity

12   and the new economy; the role of information (see Federal Reserve Chairman

13   Greenspan's comments referred to earlier in this testimony) on the economy and markets;

14   better cost and risk management by businesses; and several bond related factors;

15   deregulation of the financial system; inflation fears and interest rates; and the increase in

16   the use of debt financing. Further evidence of the greater relative riskiness of bonds is

17   shown on page 3 of Attachment JRW-9, which plots real interest rates (the nominal

18   interest rate minus inflation) from 1926 to 2002. Real rates have been well above historic

19   norms during the past 10-15 years. These high real interest rates reflect the fact that

20   investors view bonds as riskier investments.

21

1 The net effect of the change in risk and return has been a significant decrease in the return

2 premium that stock investors require over bond yields. In short, the equity or market risk

3 premium has declined in recent years. This decline has been discovered in studies by

4 leading academic scholars and investment firms, and has been acknowledged by

5 government regulators. As such, using a historic equity risk premium analysis is simply

6 outdated and not reflective of current investor expectations and investment fundamentals.

7

8 **Q74. DOES THE INVESTMENT COMMUNITY ALSO RECOGNIZE THAT THE**

9 **EQUITY RISK PREMIUM HAS DECLINED?**

10 A74. Yes. One of the first studies in this area was by Stephen Einhorn, one of Wall Street's

11 leading investment strategists.[17] His study showed that the market or equity risk premium

12 had declined to the 2.0 to 3.0 percent range by the early 1990s. Among the evidence he

13 provided in support of a lower equity risk premium is the inverse relationship between real

14 interest rates (observed interest rates minus inflation) and stock prices. He noted that the

15 decline in the market risk premium has led to a significant change in the relationship

16 between interest rates and stock prices. One implication of this development was that stock

17 prices had increased higher than would be suggested by the historic relationship between

18 valuation levels and interest rates.

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[17] Steven G. Einhorn, "The Perplexing Issue of Valuation: Will the Real Value Please Stand Up?" *Financial Analysts Journal* (July-August 1990), pp. 11-16.

1   The equity risk premiums of some of the other leading investment firms today support the

2   result of the academic studies. An article in *The Economist* indicated that some other firms

3   like J.P. Morgan are estimating an equity risk premium for an average risk stock in the 2.0

4   to 3.0 percent range above the interest rate on U.S. Treasury bonds.[18]

5

6 **Q75. HAVE CORPORATE CFOs ALSO RECOGNIZED THAT THE EQUITY RISK**

7   **PREMIUM HAS DECLINED?**

8 A75. Yes. John Graham and Campbell Harvey of Duke University survey CFOs to ascertain

9   their ex ante equity risk premium. In Graham and Harvey's 2003 survey, the average ex

10   ante 10-year equity risk premium of the CFOs was 3.8%.[19]

11

12 **Q76. DOES THIS CONCLUDE YOUR TESTIMONY AT THIS TIME?**

13 A76. Yes it does.

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[18] For example, see "Welcome to Bull Country," *The Economist* (July 18, 1998), pp. 21-3, and "Choosing the Right Mixture," *The Economist* (February 27, 1999), pp. 71-2.

[19] John R. Graham and Campbell Harvey, "Expectations of Equity Risk Premia, Volatility, and Asymmetry," Duke University Working Paper, 2003.

QUALIFICATIONS OF DR. J. RANDALL WOOLRIDGE

EDUCATIONAL BACKGROUND, RESEARCH, AND RELATED BUSINESS EXPERIENCE

J. RANDALL WOOLRIDGE

J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State University in University Park, PA. In addition, Professor Woolridge is Director of the Smeal College Trading Room. He is also a Vice President of the Columbia Group, a public utility consulting firm based in Ridgefield, CT and serves on the Investment Committee of ARIS Corporation, an asset management firm based in State College, PA.

Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina, a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. At Iowa he received a Graduate Fellowship and was awarded membership in Beta Gamma Sigma, a national business honorary society. He has taught Finance courses at the University of Iowa, Cornell College, and the University of Pittsburgh, as well as the Pennsylvania State University. These courses include corporation finance, commercial and investment banking, and investments at the undergraduate, graduate, and executive MBA levels.

Professor Woolridge's research has centered on the theoretical and empirical foundations of corporation finance and financial markets and institutions. He has published over 25 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business Review.* His research has been cited extensively in the business press. His work has been featured in the *New York Times, Forbes, Fortune, The Economist, Financial World, Barron's, Wall Street Journal, Business Week, Washington Post, Investors' Business Daily, Worth Magazine, USA Today*, and other publications. In addition, Dr. Woolridge has appeared as a guest on CNN's *Money Line* and CNBC's *Morning Call* and *Business Today.*

The second edition of Professor Woolridge's popular stock valuation book, *The StreetSmart Guide to Valuing a Stock* (McGraw-Hill, 2003), was recently released. He has also co-authored *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation, 1999) as well as a new textbook entitled *Modern Corporate Finance, Capital Markets, and Valuation* (Kendall Hunt, 2003). Dr. Woolridge is a founder and a managing director of www.valuepro.net - a stock valuation website.

Professor Woolridge has also consulted with and prepared research reports for major corporations, financial institutions, and investment banking firms, and government agencies. In addition, he has directed and participated in over 500 university- and company- sponsored professional development programs for executives in 25 countries in North and South America, Europe, Asia, and Africa.

Dr. Woolridge has prepared testimony and/or provided consultation services in the following cases:

Pennsylvania: Dr. Woolridge has prepared testimony on behalf of the Pennsylvania Office of Consumer Advocate in the following cases before the Pennsylvania Public Utility Commission:

Bell Telephone Company (R-811819), Peoples Natural Gas Company (R-832315), Pennsylvania Power Company (R-832409), Western Pennsylvania Water Company (R-832381), Pennsylvania Power Company (R-842740), Pennsylvania Gas and Water Company (R-850178), Metropolitan Edison Company (R-860384), Pennsylvania Electric Company (R-860413), North Penn Gas Company (R-860535), Philadelphia Electric Company (R-870629), Western Pennsylvania Water Company (R-870825), York Water Company (R-870749), Pennsylvania-American Water

Company (R-880916), Equitable Gas Company (R-880971), the Bloomsburg Water Co. (R-891494), Columbia Gas of Pennsylvania, Inc. (R-891468), Pennsylvania-American Water Company (R-90562), Breezewood Telephone Company (R-901666), York Water Company (R-901813), Columbia Gas of Pennsylvania, Inc. (R-901873), National Fuel Gas Distribution Company (R-911912), Pennsylvania-American Water Company (R-911909), Borough of Media Water Fund (R-912150), UGI Utilities, Inc. - Electric Utility Division (R-922195), Dauphin Consolidated Water Supply Company - General Waterworks of Pennsylvania, Inc, (R-932604), National Fuel Gas Distribution Company (R-932548), Commonwealth Telephone Company (I-920020), Conestoga Telephone and Telegraph Company (I-920015), Peoples Natural Gas Company (R-932866), Blue Mountain Consolidated Water Company (R-932873), National Fuel Gas Company (R-942991), UGI - Gas Division (R-953297), UGI - Electric Division (R-953534), Pennsylvania-American Water Company (R-973944), Pennsylvania-American Water Company (R-994638), Philadelphia Suburban Water Company (R-994868;R-994877;R-994878; R-9948790), Philadelphia Suburban Water Company (R-994868), Wellsboro Electric Company (R-00016356), Philadelphia Suburban Water Company (R-00016750), National Fuel Gas Distribution Company (R-00038168), Pennsylvania-American Water Company (R-00038304).

New Jersey: Dr. Woolridge prepared testimony for the New Jersey Department of the Public Advocate, Division of Rate Counsel: New Jersey-American Water Company (R-91081399J), New Jersey-American Water Company (R-92090908J), and Environmental Disposal Corp (R-94070319).

Hawaii: Dr. Woolridge prepared testimony for the Hawaii Office of the Consumer Advocate: East Honolulu Community Services, Inc. (Docket No. 7718).

Delaware: Dr. Woolridge prepared testimony for the Delaware Division of Public Advocate: Artesian Water Company (R-00-649).

New York: Dr. Woolridge prepared testimony for the County of Nassau in New York State: Long Island Lighting Company (PSC Case No. 942354).

Connecticut: Dr. Woolridge prepared testimony for the Office of Consumer Counsel in Connecticut: United Illuminating (Docket No. 96-03-29).

Washington, D.C.: Dr. Woolridge prepared testimony for the Office of the People's Counsel in the District of Columbia: Potomac Electric Power Company (Formal Case No. 939).

Washington: Dr. Woolridge consulted with trial staff of the Washington Utilities and Transportation Commission on the following cases: Puget Energy Corp. (Docket Nos. UE-011570 and UG-011571); and Avista Corporation (Docket No. UE-011514).

Kansas: Dr. Woolridge prepared testimony on behalf of the Kansas Citizens' Utility Ratepayer Board Utilities in the following case: Western Resources Inc. (Docket No. 01-WSRE-949-GIE).

FERC: Dr. Woolridge has prepared testimony on behalf of the Pennsylvania Office of Consumer Advocate in the following cases before the Federal Energy Regulatory Commission: National Fuel Gas Supply Corporation (RP-92-73-000) and Columbia Gulf Transmission Company (RP97-52-000).

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<u>**Academic Experience**</u>

Professor of Finance, the Smeal College of Business Administration, the Pennsylvania State University (July 1, 1990 to the present).

> **Director, the Smeal College Trading Room** (January 1, 2001 to the present)
> **Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration** (July 1, 1987 to the present).

Associate Professor of Finance, College of Business Administration, the Pennsylvania State University (July 1, 1984 to June 30, 1990).

> **Director, the Blankman Strategic Decision-Making Program** (March 1, 1985 to June 30, 1987).

Assistant Professor of Finance, College of Business Administration, the Pennsylvania State University (September, 1979 to June 30, 1984).

<u>**Education**</u>

Doctor of Philosophy in Business Administration, the University of Iowa (December, 1979). Major field: Finance.

Master of Business Administration, the Pennsylvania State University (December, 1975).

Bachelor of Arts, the University of North Carolina (May, 1973) Major field: Economics.

<u>**Books**</u>

James A. Miles and J. Randall Woolridge, *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation), 1999

Patrick Cusatis, Gary Gray, and J. Randall Woolridge, *The StreetSmart Guide to Valuing a Stock* (2nd Edition, McGraw-Hill), 2003.

J. Randall Woolridge and Gary Gray, *The New Corporate Finance, Capital Markets, and Valuation: An Introductory Text* (Kendall Hunt, 2003).