ORIGINAL

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September 25, 2003

BY HAND DELIVERY
Ms. Blanca Bayó, Director
The Commission Clerk and Administrative Services
Room 110, Easley Building
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850

Re: Docket Nos. 981834-TP and 990321-TP

Dear Ms. Bayó:

Enclosed for filing is an original and fifteen copies of Terry L. Murray's Surrebuttal Testimony filed on behalf of AT&T Communications of the Southern States, LLC and TCG South Florida, Inc.

Please acknowledge receipt of this letter by stamping the extra copy of this letter "filed," and return to me at the time of filing.

Thank you for your assistance.

Sincerely yours,

Tracy Hatch | las

Tracy W. Hatch

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CERTIFICATE OF SERVICE
DOCKET NOS. 981834 & 990321

I HEREBY CERTIFY that a copy of the foregoing has been furnished via

U.S. Mail this 25th day of September, 2003, to the following parties of record:

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Tracy Hatch /los

Tracy W. Hatch

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition of competitive carriers for Commission action to support local competition in BellSouth Telecommunications, Inc.'s service territory.	))))	Docket No. 981834-TP
	))	
In re: Petition of ACI Corp. d/b/a Accelerated Connections, Inc. for generic investigation to ensure that BellSouth Telecommunications, Inc., Sprint-Florida, Incorporated, and GTE Florida Incorporated comply with obligation to provide alternative local exchange carriers with flexible, timely, and cost-efficient physical collocation.	))))))))))	Docket No. 990321-TP

SURREBUTTAL TESTIMONY

OF

TERRY L. MURRAY

ON BEHALF OF

AT&T COMMUNICATIONS OF THE SOUTHERN STATES, LLC, AND TCG SOUTH FLORIDA, INC.

DATED: September 25, 2003

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I. INTRODUCTION AND SUMMARY

1 **I.   INTRODUCTION AND SUMMARY**

2 **Q.   Please state your name, title and business address.**

3 A.   My name is Terry L. Murray. I am President of the consulting firm Murray &

4   Cratty, LLC. My business address is 8627 Thors Bay Road. El Cerrito, CA

5   94530.

6 **Q.   Please describe your qualifications and experience as they pertain to this**

7   **proceeding.**

8 A.   I am an economist specializing in analysis of regulated industries. I received

9   an M.A. and M.Phil. in Economics from Yale University and an A.B. in

10   Economics from Oberlin College. At Yale, I was admitted to doctoral

11   candidacy and completed all requirements for the Ph.D. except the

12   dissertation. My fields of concentration at Yale were industrial organization

13   (including an emphasis on regulatory and antitrust economics) and energy and

14   environmental economics.

15   My professional background includes employment and consulting

16   experiences in the fields of telecommunications, energy, and insurance

17   regulation. I have testified on cost of capital matters in each of these fields.

18   As a consultant, I have testified or served as an expert on telecommunications

19   issues in proceedings before state regulatory commissions in Alaska,

20   California, Connecticut, Delaware, the District of Columbia, Florida, Georgia,

21   Hawaii, Illinois, Indiana, Kansas, Maryland, Massachusetts, Michigan,

22   Minnesota, Missouri, Nevada, New Jersey, New York, North Carolina, Ohio,

1   Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia,

2   Washington, and Wisconsin, and before the Federal Communications

3   Commission ("FCC").

4   Before I became a consultant in 1990, I was employed for

5   approximately six years at the California Public Utilities Commission in a

6   variety of positions, beginning as a cost of capital analyst and culminating in

7   my service as Director of the Division of Ratepayer Advocates. In virtually

8   all of these positions, I had significant responsibility for telecommunications

9   matters. I have also taught economics and regulatory policy at both the

10   undergraduate and graduate levels. My curriculum vitae, included as Exhibit

11   TLM-1 to this testimony, provides more detail concerning my qualifications

12   and experience.

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

14   A.   AT&T Communications of the Southern States, LLC, and TCG South Florida,

15   Inc. (collectively, "AT&T") have asked me to respond to the rebuttal

16   testimony of Florida Public Service Commission Staff ("Staff") witness Pete

17   Lester on cost of capital and to discuss the cost of capital that should be used

18   in a forward-looking economic cost study of collocation services for Verizon

19   in Florida.

20   Q.   **What role does the weighted-average cost of capital ("WACC") play in**

21   **an analysis of collocation costs?**

1   A.   Collocation cost studies employ the same Total Element Long Run

2   Incremental Cost ("TELRIC") principles as do cost studies of unbundled

3   network elements. Among the most significant inputs into a forward-looking

4   economic cost analysis for a provider of unbundled network elements

5   ("UNEs") and collocation services is the assumed cost of capital. "The

6   TELRIC of a network element is the sum of three components—operating

7   expenses, depreciation expense, and cost of capital." [Report and Order and

8   Order on Remand and Further Notice of Proposed Rulemaking, *In the Matter*

9   *of Review of the Section 251 Unbundling Obligations of Incumbent Local*

10   *Exchange Carriers (CC Docket No. 01-338); Implementation of the Local*

11   *Competition Provisions of the Telecommunications Act of 1996 (CC Docket*

12   *No. 96-989); Deployment of Wireline Services Offering Advanced*

13   *Telecommunications Capability (CC Docket No. 98-147)*, FCC No. 03-36,

14   (rel. Aug. 21, 2003)**Error! Bookmark not defined.Error! Bookmark not**

15   **defined.,** ¶ 682 (hereinafter, *"Triennial Review Order"*).] Therefore, the

16   TELRIC methodology requires that "the forward-looking costs of capital

17   (debt and equity) needed to support investments required to produce a given

18   element shall be included in the forward-looking direct cost of that element."

19   [FCC 96-325, *First Report and Order*, in CC Docket No. 96-98,

20   Implementation of the Local Competition Provisions in the

21   Telecommunications Act of 1996, , 11 FCC Rcd 15499, 15813 ¶ 690 (1996)

22   (hereinafter, *"Local Competition Order"*).]

1   The overall cost of capital is a weighted average of the costs of debt

2   and equity, where the weighting is derived from the capital structure.

3                    $WACC = W_D \cdot k_D + W_E \cdot k_E$

4   where:

5   W_D = weight of debt in the capital structure;

6   k_D = cost of debt capital;

7   W_E = weight of equity in the capital structure; and

8   k_E = cost of equity capital.

9   This weighted-average cost of capital represents the compensation investors

10   require, on a forward-looking basis, to hold claims on assets deployed to

11   provide unbundled network elements. "*Cost of capital* reflects the rate of

12   return required to attract capital, *i.e.*, the rate of return that investors expect to

13   receive from alternative investments that have the same risk." [*Triennial*

14   *Review Order*, ¶ 682.]

15   Q.   **How have the parties approached the cost of capital inputs for collocation**

16   **cost studies in this proceeding?**

17   A.   BellSouth and Sprint have both proposed to use the cost of capital inputs that

18   the Commission adopted in its most recent UNE pricing case for each

19   company, and all parties apparently agree with those proposals. Verizon,

20   however, has put forward a new and much higher recommended cost of

21   capital through the testimony of its witness Dr. Vander Weide. In the rebuttal

22   testimony of AT&T witness Steven E. Turner, AT&T objected to Verizon's

23   proposal, instead recommending that the cost of capital inputs for Verizon

1		also be drawn from the Commission's most recent UNE pricing decision for
2		that company. Staff also took issue with Verizon's proposed cost of capital
3		inputs; however, through the testimony of Mr. Lester, Staff proposed an
4		overall cost of capital that lies between Dr. Vander Weide's proposal and the
5		last Commission-authorized cost of capital for Verizon.
6	**Q.**	**Please summarize your testimony in response to Mr. Lester.**
7	A.	Although I agree with Mr. Lester that the Commission should not adopt the
8		cost of capital proposed by Verizon witness Dr. Vander Weide, I disagree
9		with Mr. Lester's recommended alternative. Mr. Lester's recommendation
10		shares many of the methodological flaws of Dr. Vander Weide's original
11		analysis. In particular, neither approach correctly implements the FCC's
12		"clarification" that the cost of capital in a TELRIC study should reflect the
13		risks of a market in which there is competition from other facilities-based
14		carriers. [*Triennial Review Order*, ¶ 682.]
15		Specifically, I disagree with Mr. Lester's proposed cost of equity.
16		Although his recommendation is lower than Dr. Vander Weide's, it still
17		exceeds the cost of equity that would result from the methodology that the
18		FCC's own Wireline Competition Bureau applied in a recent arbitration
19		decision that interpreted the new FCC *Triennial Review Order* cost of capital
20		mandate. [Memorandum Opinion and Order, *In the Matter of In the Matter of*
21		*Petition of WorldCom, Inc. Pursuant to Section 252(e)(5) of the*
22		*Communications Act for Preemption of the Jurisdiction of the Virginia State*
23		*Corporation Commission Regarding Interconnection Disputes with Verizon*

1   *Virginia Inc. and for Expedited Arbitration (CC Docket No. 00-218); In the*

2   *Matter of Petition of AT&T Communications of Virginia Inc., Pursuant to*

3   *Section 252 Preemption of the Jurisdiction of the Virginia State Corporation*

4   *Commission Regarding Interconnection Disputes with Verizon Virginia*

5   *Inc. (CC Docket No. 00-251)*, DA 03-2738 (rel. August 29, 2003) (hereinafter

6   "*Virginia Arbitration Order*").]

7   I also disagree with Mr. Lester's proposed cost of debt, which is the

8   same as Dr. Vander Weide's recommendation. Both proposals exceed the

9   current cost of debt that would be calculated pursuant to the methodology

10   used in the *Virginia Arbitration Order*. Moreover, neither proposal

11   recognizes that Verizon and other incumbents rely in part on significant

12   amounts of very low cost short-term debt to finance their operations.

13   I further disagree with Mr. Lester's primary recommendation

14   concerning capital structure, which is only slightly different from Dr. Vander

15   Weide's proposal for a market-based capital structure. Market-based

16   capitalization can fluctuate significantly from day-to-day and does not

17   necessarily provide a good guide to investors' expectations about a firm's

18   long-run capitalization.

19   I do, however, agree that Mr. Lester's secondary recommendation

20   concerning capital structure is appropriate, for reasons somewhat different

21   from those that he advanced. Mr. Lester's alternative 60% equity/ 40% debt

22   capital structure closely replicates the available information concerning the

23   target capital structure of incumbent local exchange carriers. Target capital

1   structure is the most appropriate basis for developing a forward-looking cost

2   of capital.

3   I also agree with Mr. Lester that there is no need for an additional risk

4   premium to account for collocation-specific risks.

5   Based on the analysis and conclusions described above, I conclude

6   overall that the cost of capital that the Commission adopted in the last Verizon

7   UNE proceeding (9.63%) is more than adequate as an estimate of a TELRIC-

8   based cost of capital. Indeed, as AT&T witness Mr. Turner observed in his

9   rebuttal testimony, if I were making a "blank slate" recommendation to the

10   Commission in this proceeding, I would recommend a cost of capital even

11   lower than the previous adopted cost of capital for Verizon.

12   **II.   COST OF EQUITY**

13   **Q.   What approach did Mr. Lester use to estimate cost of equity?**

14   A.   Like Verizon witness Dr. Vander Weide, Mr. Lester used a Discounted Cash

15   Flow ("DCF") method to estimate the cost of equity. [Lester Rebuttal, pp. 3

16   *et seq.*] A DCF model calculates investors' required rates of return for

17   holding stock under the assumption that today's stock price for a company is

18   equal to the present value of the cash outlays accruing to that company's

19   stockholders. These cash outlays include both dividend payments and capital

20   appreciation in the value of shares held. According to the DCF logic,

21   investors implicitly require high returns from stocks with large current

1   dividend yields (the dividend paid to shareholders divided by the stock price)

2   and high dividend growth rates.

3 Q. **Is the DCF method that Mr. Lester (and Dr. Vander Weide) use to**

4   **estimate cost of equity reasonable?**

5 A. No. Like Dr. Vander Weide, Mr. Lester has used a form of the DCF model

6   that employs particularly unrealistic assumptions under current financial

7   market conditions.

8   The DCF model requires strong assumptions about the future

9   dividends and growth rate of the firms included in the study group. Strictly

10   speaking, a researcher employing the DCF model must make guesses about

11   the cash flows accruing to each of these firms' shareholders that extend into

12   the *indefinite* future.

13   Both Mr. Lester and Dr. Vander Weide rely on what is called the

14   constant-growth or one-stage DCF model (one-stage meaning that the analysis

15   assumes that there is a single, constant growth rate in perpetuity) to estimate

16   the cost of equity. A one-stage DCF analysis of cost of equity adopts the

17   unrealistic assumption that a company can continue to grow forever at a rate

18   different from the economy—*i.e.*, the current dividend yield on the company's

19   stock and current forecast of the company's growth will continue to be valid

20   forever.

21   As a logical matter, a company cannot forever grow at a rate different

22   from the economy unless the company either shrinks to an infinitesimally

23   small and insignificant fraction of the economy or it eventually takes over the

1		entire economy. In its recent *Virginia Arbitration Order*, the FCC Wireline
2		Competition Bureau recognized this flaw in the constant-growth DCF model,
3		which Dr. Vander Weide presented on behalf of Verizon Virginia, Inc., in that
4		arbitration. The Bureau rejected the constant-growth DCF unequivocally:
5		If the growth rate used in the [constant growth DCF] model is
6		substantially inconsistent with this assumption [*i.e.*, the long-
7		term growth rate of the economy as a whole], however, the
8		finance literature concludes without exception that the model is
9		unlikely to produce an accurate cost of equity capital estimate.
10		Verizon's use of the constant growth DCF model to estimate
11		the cost of growth for its S&P proxy group stretches the
12		reasonable limits of its use. .... As AT&T/WorldCom
13		demonstrate, however, no company can grow forever at a
14		greater rate than the economy as a whole, and therefore we
15		conclude that Verizon's assumption is not reasonable.
16		[*Virginia Arbitration Order*, ¶ 73.]
17	**Q.**	**Does Mr. Lester's assumed growth rate exceed long-term expected**
18		**economic growth?**
19	A.	Yes. A particularly useful public forecast of long-term expected economic
20		growth over the next 10 years appears in the Philadelphia Federal Reserve
21		Bank's *Survey of Professional Forecasters*. This reputable government
22		source makes its *Survey* results available, without charge, over the Internet.
23		The Bank's website describes the *Survey* as follows:

1	The *Survey of Professional Forecasters* is the oldest quarterly
2	survey of macroeconomic forecasts in the United States. The
3	survey began in 1968 and was conducted by the American
4	Statistical Association and the National Bureau of Economic
5	Research. The Federal Reserve Bank of Philadelphia took over
6	the survey in 1990.
7	[http://www.phil.frb.org/econ/spf/]
8	Although the *Survey* is published quarterly, long-term (10-year)
9	forecasts appear only in the first quarterly release each year. Therefore, the
10	most recent 10-year forecast for the average annual S&P 500 return appears in
11	the first-quarter 2003 *Survey*, which was released on February 24, 2003. A
12	copy of this forecast is included in Exhibit TLM-2. 37 professional
13	forecasters participated in that *Survey*; 34 of them provided a ten-year forecast
14	of the real Gross Domestic Product ("GDP") growth rate. The average (mean)
15	annual forecasted real GDP growth rate was 3.206%, as shown on the last
16	page of Exhibit TLM-2.
17	To convert this figure into a nominal growth rate, which is the relevant
18	growth rate for comparison to the growth rates that Mr. Lester and Dr. Vander
19	Weide used in their constant-growth DCF growth analyses, one must add back
20	expected inflation. The last page of Exhibit TLM-2 also reports the average
21	(mean) annual forecasted Consumer Price Index ("CPI") inflation rate, which
22	is the form of inflation projected over the next ten years by 34 forecasters.
23	Adding this average annual inflation rate of 2.474% to the 3.206% average

1   annual real GDP growth forecast produces a forecasted average annual

2   nominal economic growth rate of 5.68%.

3   This 5.68% long-term annual average economic growth rate forecast is

4   far below the annual average growth rate of 9.72% used in Mr. Lester's DCF

5   analysis, which I have calculated from the Staff workpapers underlying Mr.

6   Lester's Exhibit PL-1. Hence, Mr. Lester's DCF analysis runs afoul of the

7   fundamental financial principles that led the Wireline Competition Bureau to

8   reject Dr. Vander Weide's similar constant-growth DCF analysis in the

9   Virginia arbitration.

10   Given Mr. Lester's unrealistic assumption that the firms in his sample

11   will grow forever at a rate far higher than the expected growth for the

12   economy as a whole, it is no wonder that Mr. Lester's DCF produces an

13   estimated cost of equity (12.64%, as reported on page 1 of Exhibit PL-1) that

14   far exceeds projected long-term returns for the average stock in the S&P 500.

15   The Philadelphia Federal Reserve's *Survey of Professional Forecasters*

16   reports an average (mean) annual expected return for the S&P 500 of only

17   7.47%. [*See* Exhibit TLM-2, last page.] This projection of overall stock

18   market returns provides an important benchmark for assessing the

19   reasonableness of the estimates of cost of equity in this proceeding. Mr.

20   Lester has provided no reason to believe that the investor-required return on

21   equity for a telecommunications carrier subject to facilities-based competition

22   exceeds the average return on the market. In fact, as I will explain in more

23   detail in subsequent answers, Mr. Lester's overall theory for selecting a proxy

1		group of companies for his analysis is consistent with the notion that the
2		return granted for Verizon in this proceeding should roughly equal the return
3		for the market as a whole.

4	Q.	**Are there other significant flaws in Mr. Lester's DCF analysis?**
5	A.	Yes. The group of firms included in his DCF analysis is inappropriate in two
6		respects: (1) the firms are not linked in any reasonable fashion to the risks of
7		a telecommunications carrier subject to facilities-based competition; and (2)
8		Mr. Lester's method of excluding firms from his sample creates an upward
9		bias in his analysis.

10	Q.	**How did Mr. Lester select his proxy group of firms?**
11	A.	Mr. Lester chose to analyze the returns for a proxy group of 657 firms covered
12		by the *Value Line Investment Survey*, which he selected by restricting his
13		sample to firms that had positive projected dividend and earnings growth over
14		the next five years and then throwing out what he deemed to be outliers on
15		both the low and high ends of the DCF results. [Lester Rebuttal, pp. 4-5.] He
16		deliberately aimed to select a group of firms even larger and more inclusive
17		than the S&P Industrials analyzed by Dr. Vander Weide. [Lester Rebuttal, p.
18		4.]

19	Q.	**Why do you say that the firms in Mr. Lester's proxy group are not**
20		**reasonably linked to the risks of a telecommunications carrier facing**
21		**facilities-based competition?**

1 A. Visual inspection of Exhibit PL-1 reveals the enormous diversity of the firms

2   included in Mr. Lester's proxy group. The range of firms includes

3   pharmaceutical companies (*e.g.*, GlaxoSmithKline ADR); ice cream

4   manufacturers (*e.g.*, Dreyer's Grand); retail outlets (*e.g.*, The Gap, Inc.);

5   newspaper publishers (*e.g.*, The New York Times); and foreign financial

6   institutions (*e.g.*, Bank of Nova Scotia).

7   Mr. Lester makes no attempt to link the risks that these diverse firms

8   face to the risks of a telecommunications carrier subject to facilities-based

9   competition other than to argue that the firms are a broad proxy group of

10   "competitive companies." [Lester Rebuttal, p. 4.] That rationale is not

11   sufficient to justify basing the cost of equity for a hypothetical efficient

12   collocation provider on the simple average cost of equity (as calculated using

13   Mr. Lester's constant-growth DCF model) for this highly diversified group of

14   companies.

15   If the mere fact of being a "competitive company" were determinative

16   of the cost of equity, one would expect the results for Mr. Lester's 657 firms

17   to cluster tightly around an average "competitive firm" cost of equity. They

18   do not. The estimated cost of equity for these firms reported in Exhibit PL-1

19   is all over the map, ranging from a low of 7.91% to a high of 26.44%.

20   The FCC's Wireline Competition Bureau took exception to Verizon's

21   use of a similarly diverse group of companies, the S&P 500, in the cost of

22   capital study put forward in the Virginia arbitration. According to the Bureau,

1   The businesses of most of Verizon's S&P 500 based proxy

2   group of companies have no obvious similarity to the provision

3   of local exchange services, and Verizon did not describe any.

4   Consequently, there is no basis on which to conclude that this

5   proxy group best represents the risks that Verizon would face it

6   if faced facilities-based competition.

7   [*Virginia Arbitration Order*, ¶ 90.]

8   The Commission should reject Mr. Lester's 657-firm proxy group on the same

9   basis.

10   Indeed, Mr. Lester's group is even less appropriate than the S&P 500

11   as a whole. The S&P 500 at least includes the major Regional Bell Operating

12   Companies ("RBOCs"), Sprint and AT&T. Mr. Lester's 657-firm proxy

13   group, by contrast, excludes the very firm whose cost of equity he is

14   attempting to estimate, Verizon, as well as the closely comparable firm SBC

15   Communications. Significantly, Mr. Lester calculates a cost of equity of only

16   8.36% for BellSouth Corp., the only RBOC included in his proxy group.

17   [Exhibit PL-1, p. 1.] His workpapers also show (unused) calculations of the

18   cost of equity of 6.58% for Verizon and 6.60% for SBC Communications.

19   The inclusion of these obviously relevant data points would have lowered Mr.

20   Lester's average DCF result.

21 Q.   **Why do you say that Mr. Lester's method for excluding firms from his**

22   **sample introduced an upward bias into his results?**

1   A.   My response to the previous question provided an excellent illustration of this

2   point. Mr. Lester excluded results for Verizon and SBC (along with many

3   other firms for which he calculated a low cost of equity), apparently because

4   the estimated cost of equity for these firms fell below the forecasted BBB

5   bond return. There were 75 such firms excluded from the analysis. On the

6   other hand, his rule for excluding results at the high end of his range of

7   calculated equity costs was to eliminate firms more than three standard

8   deviations from the mean. There were only 11 such firms excluded. [Lester

9   Rebuttal, pp. 4-5.] The disparity between the number of firms eliminated on

10   the low end (75) versus the number of firms eliminated on the high end (11)

11   immediately suggests that the "outlier" elimination systematically increased

12   the average result. Mr. Lester's workpapers bear out this surmise, showing a

13   12.16% average return for the group before he eliminated his supposed

14   "outliers."

15   This increase lacked a solid and symmetric rationale. Although I agree

16   with Mr. Lester that the cost of equity generally does not fall below the cost of

17   debt [Lester Rebuttal, p. 4], use of the projected return for the BBB bond (the

18   riskiest category of investment-grade bonds) is too high a cutoff for less risky

19   companies with higher bond ratings. Notably, both Verizon and SBC have

20   much better than BBB bond ratings. In fact, Mr. Lester's lower-bound cutoff

21   is much more stringent than his upper-bound cutoff. His workpapers show

22   that the standard deviation of the estimated cost of equity was 4.45%, not

23   surprising given the large variability shown in Exhibit PL-1, even after the

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1   elimination of "outliers." Had Mr. Lester applied the same "three standard

2   deviations from the mean" cutoff for both the upper and lower bounds of his

3   analysis, he literally could not have eliminated *any* results at the low end.

4   Three standard deviations equals 13.36%, which, when subtracted from the

5   mean result for the entire sample (12.16%), would produce a negative cost of

6   equity.

7   Mr. Lester's other rule for exclusion ensured that there would not be

8   any firms in the analysis with an estimated negative cost of equity.

9   Specifically, he only included dividend-paying firms in the *Value Line*

10   database that had both positive projected dividend growth and positive

11   projected earnings growth. [Lester Rebuttal, p. 3.] This rule further increases

12   the overall estimate of the cost of equity relative to the estimate from an

13   unbiased sample of what Mr. Lester deemed to be "competitive companies."

14   Taken in combination, therefore, these rules for excluding companies

15   from the *Value Line* database introduced a systematic upward bias in Mr.

16   Lester's cost of equity calculation.

17   **Q.   Are the flaws that you have described above the only aspects of Mr.**

18   **Lester's DCF analysis with which you disagree?**

19   A.   No. There are other aspects of his analysis (specifically, the use of the

20   quarterly form of the DCF model and the inclusion of a flotation cost

21   premium) with which I disagree. But, these flaws pale in comparison to the

22   overarching errors that I have discussed above. Similar errors, and a general

23   concern about the ability to estimate appropriate growth rates for use in the

1   DCF model, led the FCC's Wireline Competition Bureau to give no weight

2   whatsoever to the parties' DCF results in its *Virginia Arbitration Order*, and

3   to give exclusive weight to a Capital Asset Pricing Model ("CAPM") analysis.

4   [*Virginia Arbitration Order*, ¶ 90.]

5 **Q.   What are the basic assumptions of the CAPM?**

6 A.   The CAPM assumes investors require high returns for stocks that are sensitive

7   to fluctuations in the overall stock market. The most common measure of a

8   stock's market sensitivity is its beta—a number that equals the covariance of a

9   stock's return with the market return divided by the total variance of the

10   stock's return. (Covariance refers to the tendency of two variables to move

11   together, independent of where the two variables happen to be centered—that

12   is, their average absolute value. In this case, the two variables are the return

13   on the stock of a particular company and the return on the market as a whole.)

14   Specifically, the CAPM requires three inputs to estimate the investor-

15   required rate of return for a given stock: a stock's sensitivity to the market,

16   the market risk premium and the riskless rate of return. Thus, the CAPM

17   estimate of the investor-required return on a stock can be expressed as:

18        $k_E = r_f + (\beta \cdot ERP)$

19   where:

20   k_E = the cost of equity for the company;

21   r_f = the expected return of the riskless asset;

22   β = the beta of the company's stock; and

23   ERP = the expected equity risk premium.

1	Q.	How did the Wireline Competition Bureau apply the CAPM in its
2		*Virginia Arbitration Order?*
3	A.	The Bureau averaged two different CAPM calculations, one using the 30-day
4		Treasury bill rate as the risk-free interest rate and the other using the 20-year
5		Treasury bond as the risk-free interest rate. [*Virginia Arbitration Order*, ¶
6		80.] In each case, the Bureau applied the pertinent historical equity risk
7		premium based on results published by Ibbotson Associates. [*Id.*, ¶ 83.] In
8		both cases, the Bureau used a beta of 1, the beta for the market as a whole,
9		which it found to be "a useful benchmark for the risk faced on average by
10		established companies in competitive markets." [*Id.*, ¶ 90.]
11	Q.	**How does the cost of equity using the Wireline Competition Bureau's**
12		**CAPM approach compare to the cost of equity estimates proposed in this**
13		**proceeding?**
14	A.	Applying the CAPM approach adopted in the *Virginia Arbitration Order* to
15		current data, I estimate a cost of equity of 10.70%. Exhibit TLM-3 shows the
16		details of this calculation and provides the supporting documents for the risk-
17		free interest rate and equity risk premium. This result demonstrates the
18		unreasonableness of Mr. Lester's proposed 12.64% cost of equity, and even
19		greater unreasonableness of Dr. Vander Weide's recommended 14.13% cost
20		of equity.
21	Q.	**Is the CAPM estimate that you have produced using the most literal**
22		**application of the methodology employed in the *Virginia Arbitration***

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1   ***Order*** **your best estimate of the forward-looking cost of equity for a**

2   **telecommunications carrier subject to facilities-based competition?**

3   A. No. Literally applying the Bureau's CAPM methodology required me to use

4   the estimated equity risk premiums that Ibbotson Associates produces using

5   historical data going back to 1926. There is a substantial body of literature,

6   which was not referenced or considered in the *Virginia Arbitration Order*,

7   showing that such historical averages no longer provide an accurate estimate

8   of the equity risk premium that investors demand on a forward-looking basis.

9   For example, Fama and French argue that estimates of the equity

10   premium based on historical returns are biased upwards because the expected

11   premium has declined over the past 50 years. [Eugene Fama and Kenneth

12   French, 2002, "The Equity Premium," *Journal of Finance* **57**(2), 637-59.]

13   When investors' discount rates decline unexpectedly, realized stock returns

14   will exceed expected returns, thereby biasing historical estimates of the equity

15   premium. The Fama and French models published in 2002 suggest the current

16   equity premium is around 4% relative to the 6-month LIBOR interest rate.

17   Another prominent study by Claus and Thomas, published in 2001,

18   applies a DCF model to stock returns to determine investors' required rates of

19   return. [James Claus and Jacob Thomas, 2001, "Equity Premia as Low as

20   Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic

21   and International Stock Markets," *Journal of Finance* **56**(5), 1629-1666.]

22   Similar to a standard DCF analysis, Claus and Thomas use information from

23   analyst forecasts to calculate firms' expected growth rates, enabling the

1   authors to infer the equity premium from observed stock prices. Consistent

2   with Fama and French, they estimate that the current equity premium is much

3   lower than historical returns would suggest—around 3% relative to the 10-

4   year Treasury bond rate.

5   A recent study by Gebhardt, Lee and Swaminathan confirms the

6   findings of Claus and Thomas using a different version of the DCF model

7   called the residual-income valuation model. [William Gebhardt, Charles Lee

8   and Bhaskaram Swaminathan, 2001, "Toward an Implied Cost of Capital,"

9   *Journal of Accounting Research* **39**, 135-76.] Their estimates of the equity

10   premium are just under 3%, also relative to the 10-year Treasury bond rate.

11   Finally, as I noted above, the estimates of expected equity returns from

12   the *Survey of Professional Forecasters* conducted by the Federal Reserve

13   Bank of Philadelphia average 7.47%. [Exhibit TLM-2, last page.] This

14   average forecast implies an equity premium between 3% and 4%, based on

15   current bond returns.

16   Although there is a growing consensus among academics and other

17   experts that the equity premium is slightly below 4%, many practitioners still

18   use historical equity premium data from Ibbotson Associates. Measured over

19   the horizon 1926-2002, the Ibbotson Associates historical premium equals

20   approximately 7% for the "long-horizon" version and 8.4% for the "short-

21   horizon" version used in the Wireline Competition Bureau's CAPM

22   calculations [*see* Exhibit TLM-3]—significantly higher numbers than the

23   forward-looking figure of around 4% advocated by most experts.

1   Significantly, Roger Ibbotson, President of Ibbotson Associates and Professor

2   of Finance at Yale, has expressed the opinion that the historical equity

3   premium estimates no longer reflect investors' expectations and that the

4   forward-looking risk premium is around 4%. [Roger G. Ibbotson, "Building

5   the Future from the Past," *TIAA-CREF Investment Forum: Idea Exchange*,

6   June 2002, p. 12.] Based on this risk premium, he estimates the long-run

7   return for the stock market at something over 9 percent. [*Id.*]

8   Moreover, in the same publication, respected Harvard finance

9   professor John W. Campbell echoed Dr. Ibbotson's belief that investors'

10   expectations going forward are much different from the historical averages.

11   Professor Campbell, however, anticipates a shakeout period in which actual

12   equity returns are somewhat *below* debt returns, leading to a long-term

13   expected equity risk premium of only about 1-1.5%. This corresponds to a

14   compound average real (*i.e.*, holding the value of the currency constant) return

15   for stocks in general of 5.0-5.5%. [John Y. Campbell, "Stock Returns for a

16   New Century," *TIAA-CREF Investment Forum: Idea Exchange*, June 2002, p.

17   12.] Adding the roughly 2.5% average annual inflation rate forecasted over

18   the next ten years, as reported in the *Survey of Professional Forecasters*

19   [Exhibit TLM-2], would convert this figure into an average nominal return of

20   7.5%-8.0%, which comports closely with the 10-year S&P 500 return

21   projected in the same forecast.

22   Therefore, my own best estimate of the cost of equity would

23   incorporate these forward-looking estimates of the equity risk premium, while

1   giving some weight to the results of a CAPM calculation using the historical

2   risk premium estimates from Ibbotson Associates. Specifically, I would

3   calculate an average of the CAPM results based on the four prominent recent

4   sources described above (not including the recent opinions expressed by

5   Professors Ibbotson and Campbell), and then average this "forward-looking"

6   CAPM result with the result I described above based on applying a literal

7   interpretation of the *Virginia Arbitration Order*, using the Ibbotson Associates

8   historical risk premium estimates.

9   Q.   **What result would you obtain using your "best estimate" approach?**

10   A.   My "best estimate" approach produces an estimated cost of equity of 8.77%,

11   using current interest rates. (Exhibit TLM-4 provides the calculations

12   supporting this estimate.) I note that this estimate falls between the long-term

13   forecasts of Professors Ibbotson and Campbell, which I did not incorporate in

14   my analysis. Their independent forecasts provide corroboration of the

15   reasonableness of my "best estimate" approach.

16   III.   **COST OF DEBT**

17   Q.   **What cost of debt did Mr. Lester use in his cost of capital calculations?**

18   A.   Mr. Lester accepted Verizon Florida witness Dr. Vander Weide's

19   recommended 7.54% cost of debt. [Lester Rebuttal, p. 8.] Dr. Vander

20   Weide's recommendation is based on the average yield-to-maturity on

21   Moody's A-rated industrial bonds for April 2002. [Vander Weide Direct at

22   55.]

1	Q.	Is it appropriate to use a debt cost of 7.54% in cost of capital estimates
2		for this proceeding?
3	A.	No. The Lester/Vander Weide recommended debt cost is inappropriate for at
4		least three reasons.

First, it is too outdated to use in current cost of capital estimates.
Long-term debt costs have decreased since Dr. Vander Weide's analysis, on which Mr. Lester relies. In fact, even Verizon Florida's embedded debt costs are lower. Verizon provided a Verizon-Florida specific embedded yield-to-maturity as of March 31, 2003, which was 6.92%. [Verizon Florida Response to AT&T's 2nd Set of Interrogatories, Request No. 4.] Given the downward trend in interest rates, embedded debt costs should exceed forward-looking yields-to-maturity; therefore, Verizon's embedded debt cost illustrates that the 7.54% figure is excessive.

Second, it represents a generic debt cost for A-rated debt, rather than a debt cost specific to telecommunications carriers such as Verizon. The FCC Wireline Competition Bureau's recent order in the Virginia arbitration between AT&T Communications of Virginia, Inc. and WorldCom Inc. and Verizon Virginia Inc. endorses the use of current yield-to-maturity for ILEC-specific debt, rather than generic debt of a particular bond rating. [*Virginia Arbitration Order*, ¶ 67.]

The yield-to-maturity data available as of September 22, 2003, show that the yield-to-maturity for the Verizon companies' publicly traded bonds ranges from 4.676% to 6.160%, depending largely on the maturity date of the

1	bond (bonds with longer maturities have higher yields). (The data reviewed
2	are provided in Exhibit TLM-4.) The weighted-average of these forward-
3	looking yields-to-maturity is 4.97% (this calculation is also provided in
4	Exhibit TLM-4), which provides a better estimate of the forward-looking
5	long-term debt cost for a carrier such as Verizon.
6	Third, Dr Vander Weide's analysis of debt costs inappropriately
7	ignored short-term debt. By accepting Dr. Vander Weide's figure, Mr. Lester
8	likewise failed to take into account short-term debt, even though Mr. Lester
9	did include short-term in his proposed capital structure calculation. Short-
10	term debt is *very* inexpensive. Verizon's response to AT&T's Second
11	Interrogatories, No. 5, indicates that the company's cost of short-term debt
12	was only 1.285% as of March 31, 2003. The huge discrepancy between this
13	figure and the yield-to-maturity for publicly traded long-term debt makes use
14	of the long-term yield-to-maturity a conservatively high statement of debt
15	cost.

16 **IV.   CAPITAL STRUCTURE**

17 **Q.   What approach does Mr. Lester support for estimating the overall capital**

18 **structure, or mix of debt and equity financing?**

19 A.   Mr. Lester supports a "market value capital structure" for use in a weighted

20 cost of capital calculation. [Lester Rebuttal, p. 6.] A market-based analysis of

21 capital structure estimates the equity share of total capital by looking at the

1 total market value of equity divided by the sum of the market value of equity

2 plus the value of debt.

3 The estimation of total debt does not usually vary between a market-

4 and a book-based analysis of capital structure. In practice, most economists

5 estimate the value of debt in the capital structure by looking at its book value,

6 as Mr. Lester has done [Lester Rebuttal, p. 7], because so little debt is publicly

7 traded.

8 Q. **Is a market-based capitalization appropriate for estimating the overall**

9 **capital structure of a hypothetical efficient carrier providing UNEs in**

10 **Verizon Florida's service territory?**

11 A. No. The relevant capital structure for determining the cost of capital at which

12 investors will provide an efficient amount of funds for the firm's investment

13 projects is the firm's *target* capital structure, not its market-based capital

14 structure. A market-based valuation fluctuates too much to represent

15 investors' long-term expectations. Ibbotson Associates states: "Ideally, a

16 firm's target or optimal capital structure should be used in weighting the cost

17 of equity and cost of debt." [Ibbotson Associates, *SBBI: Valuation Edition,*

18 *2003 Yearbook,* at 14 (hereinafter, "Ibbotson *2003 Yearbook*").] Ibbotson

19 recommends market value weights only in the absence of target capital

20 structure information.

21 Market capitalization can change radically in a matter of days or

22 weeks as stock prices fluctuate, whereas both book capitalization and target

23 capital structures change much more slowly. By the time of its decision in

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1   this proceeding, the Commission could easily find that the average market

2   capitalization for the companies in my comparison group is far different from

3   any value in the record of this proceeding, which would result in drastic shifts

4   in the final adopted cost of capital. These dramatic shifts would not

5   necessarily have anything to do with investors' expectations about the long-

6   run or optimal capital structure for a hypothetical efficient carrier that

7   provides collocation.

8   For this very reason, the District of Columbia Public Service

9   Commission found target capital structures to be preferable to current market

10 capital structures. "Target capital structures," the DC PSC correctly found,

11 "are based more on careful management consideration of risks than on current

12 market prices, which can fluctuate for reasons not specifically related to the

13 entity in question." [DC PSC Order No. 12610, ¶ 161.] (The findings of the

14 DC PSC are particularly pertinent because that commission chose to base its

15 adopted cost of capital on risk assumptions that closely parallel the

16 requirements subsequently "clarified" in the FCC's *Triennial Review Order*.

17 [*Id.*, ¶¶ 182, 183, 185, 186, and 189.])

18   Rational investors may well expect that, in the long run, market equity

19 will tend to move toward book equity. That expectation would be consistent

20 with the findings of respected researchers in economics and finance. [Eugene

21 F. Fama and Kenneth R. French, 1992, "The Cross-Section of Expected

22 Equity Returns," *Journal of Finance* **47**, at 441; Josef Lakonishok, Andrei

1		Shleifer, and Robert W. Vishny, 1994, "Contrarian Investment, Extrapolation
2		and Risk," *Journal of Finance* **49**, 1541-78.]
3		For all of these reasons, it is far better to attempt to identify a target
4		capital structure than to rely solely on current market capitalization. By
5		definition, in an efficient market, a firm's capital structure will adjust toward
6		its target structure in the long-run.
7	Q.	**How can one identify the "target" capital structure of an efficient**
8		**carrier?**
9	A.	Unfortunately, when one is dealing with the capital structure of a hypothetical
10		efficient firm, one cannot simply "ask" the hypothetical firm to identify its
11		target capital structure. Moreover, few firms provide public information about
12		their target capital structures, so it can be very difficult to "average" the target
13		capital structures of firms in a comparable group. For example, Verizon
14		Florida claimed in response to discovery by AT&T that neither it nor its
15		parent has a target structure. [Verizon Florida Responses to AT&T's Second
16		Interrogatories, Nos. 10 and 11.]
17		However, both Sprint and BellSouth provided specific figures in
18		response to AT&T requests regarding their target capitalization. Sprint
19		indicated that its target capital structure is 60% equity and 40% debt (while
20		denying its applicability to the cost of capital determination). [Sprint
21		Response to AT&T's Second Interrogatories, No. 13.] BellSouth placed its
22		target structure at between 65% equity and 35% debt and 55% equity and 45%
23		debt. [BellSouth Response to AT&T's Sixth Interrogatories, No. 48.] The

| 1 | | mid-point of BellSouth's range is a capital structure of 60% equity and 40% |
| 2 | | debt. |

3 **Q. Has Mr. Lester offered an alternative to his market value capital**

4 **structure?**

5 A. Yes. Although Mr. Lester derived a market-based capital structure, he

6 recommends a "conservative approach." He acknowledges that "market

7 values for equity vary considerably and can result in very high levels of equity

8 in the capital structure" [Lester Rebuttal, p. 7] and notes that "ILECs evidently

9 use significant amounts of debt to finance their networks" [*Id.*]. Mr. Lester

10 also points out that "[m]arket value structures have not been widely employed

11 in UNE proceedings." [*Id.*] Based on these observations, should the

12 Commission reject a market value capital structure, Mr. Lester recommends

13 an alternative capital structure of 60% equity and 40% debt. He notes that this

14 would be consistent with this Commission's previous decisions regarding the

15 appropriate capital structure for UNEs. [*Id.*, pp. 7-8.]

16 **Q. Is a capital structure of 60% equity and 40% debt reasonable?**

17 A. Yes. I find Mr. Lester's alternative to be more reasonable than his market

18 value capital structure of 71% equity and 29% debt. Based on the target

19 capital structure information provided by Sprint and BellSouth, as well as

20 Commission precedent on capital structure, I recommend that the Commission

21 use a capital structure of 60% equity and 40% debt in this proceeding.

1	Q.	Even if the Commission were to adopt Mr. Lester's market value capital
2		structure, would the forward-looking cost of capital be as high as Mr.
3		Lester has calculated?
4	A.	No. As I have explained, both the equity and debt component costs should be
5		lower than Mr. Lester has proposed. Therefore, even using the unreasonably
6		high 71% equity ratio, the forward-looking cost of capital would not be as
7		high as Mr. Lester calculates. Based on a 10.70% cost of equity and a 4.97%
8		average cost of debt, the weighted-average cost of capital would be only
9		9.04% (applying the most literal interpretation of the *Virginia Arbitration*
10		*Order*). Substituting my "best estimate" of the cost of equity (8.77%) for the
11		10.70% "literal" interpretation of the *Virginia Arbitration Order* reduces the
12		weighted-average cost of capital to 7.67%—again, still using Mr. Lester's
13		market-value capital structure.
14		In fact, adjusting only the cost of equity to 10.70% (which, again, is
15		the most literal possible interpretation of the *Virginia Arbitration Order*) and
16		retaining the (outdated) cost of debt and market capital structure that Mr.
17		Lester recommends would produce a weighted-average cost of capital of
18		9.78%, which is trivially different from the 9.63% cost of capital adopted in
19		the last Verizon UNE decision. Exhibit TLM-3 shows the derivation of all of
20		these figures, each of which independently supports a Commission decision to
21		apply the 9.63% cost of capital adopted in the last Verizon UNE decision.

| 1 | V. | **RISK PREMIUM** |

2 **Q.** **Mr. Lester contends that Dr. Vander Weide's proposed required risk**

3 **premium is unnecessary. [Lester Rebuttal, p. 11.] Do you agree?**

4 A. Yes. Mr. Lester concludes that new technology has little effect on

5 collocation. [Lester Rebuttal, pp. 9-10.] In addition, he finds the risk of a

6 competitor canceling its collocation lease to be comparable to the risk faced

7 by companies in competitive markets of a customer not buying a product or

8 service. [*Id.* at 11.] As such, this risk is already captured by a cost of capital

9 for companies in competitive markets. [*Id.*] Finally, Mr. Lester observes that

10 "a cost of capital that reflects the risks associated with a competitive market is

11 consistent with the intent of TELRIC pricing, which is to simulate a

12 competitive market for UNEs." [*Id.*]

13 I agree with Mr. Lester's reasoning and his conclusion.

14 **Q.** **Are the risks associated with providing collocation somehow unique**

15 **within the competitive market?**

16 A. No. Much of the capital cost associated with collocation is for buildings,

17 power, *etc.*, which are shared with other UNEs and therefore constitute no

18 unique risk for collocation. Indeed, if anything, the risk for collocation

19 buildings is much lower than the risk associated with other UNEs and the risk

20 for competitive firms in general because, as Mr. Lester points out [*Id.*, p. 10],

21 Verizon need only rent spare space and is not required to add building space

22 to meet additional demand. Moreover, there are no long-term contracts for

1   any UNE, so Dr. Vander Weide's attempt to distinguish collocation risk from

2   the risk associated with UNEs in general is misguided.

3   **VI.   CONCLUSION AND RECOMMENDATIONS**

4   **Q.   Please summarize your conclusions.**

5   A.   I conclude that the Commission should reject Mr. Lester's recommended cost

6   of capital and instead use the most recent Commission-approved UNE cost of

7   capital inputs for Verizon to calculate collocation costs, as recommended in

8   the rebuttal testimony of AT&T witness Mr. Turner. The 9.63% weighted-

9   average cost of capital is a conservatively high estimate of the current

10   forward-looking cost of capital for a telecommunications carrier subject to

11   facilities-based competition. Indeed, if I were to recalculate the cost of capital

12   on a blank slate, I would recommend a much lower figure, such as the 7.25%

13   weighted-average cost of capital that results from applying my best estimates

14   of the forward-looking cost of equity and debt (8.77% and 4.97%,

15   respectively) to the 60% equity and 40% debt "target" capital structures

16   supported by the BellSouth and Sprint responses to AT&T's interrogatories.

17   [*See* Exhibit TLM-3 for the derivation of the 7.25% figure.]

18   **Q.   Does that conclude your testimony at this time?**

19   A.   Yes, it does.

Curriculum Vitae of Terry L. Murray

President, Murray & Cratty, LLC
January 1998 - present
Economic consulting and expert witness testimony specializing in regulatory and antitrust matters.

Principal, Murray and Associates
April 1992 - December 1997
Economic consulting and expert witness testimony, primarily in the fields of telecommunications, energy and insurance regulation and antitrust.

Director, Regulatory Economics, Morse, Richard, Weisenmiller & Associates, Inc.
April 1990 - April 1992
Economic consulting and expert witness testimony, primarily in the fields of telecommunications and energy regulation.

California Public Utilities Commission
June 1984 - March 1990
Director, Division of Ratepayer Advocates (DRA)
March 1989 - March 1990

Headed a staff of over 200 analysts who provided expert witness testimony on behalf of California ratepayers in contested proceedings involving telecommunications, electric, gas, water and transportation utilities.

Program Manager, Energy Rate Design and Economics Branch, DRA
October 1987 - March 1989
Managed a staff of over 30 analysts who testified on electric and gas rate design and costing issues, sales forecasts and productivity analyses. Testified as lead policy witness in electric utility incentive ratemaking and transportation policy proceedings.

Senior Policy Analyst, Policy and Planning Division
March 1987 - October 1987
Organized *en banc* hearing and drafted notice of investigation for major telecommunications incentive regulation proceeding. Headed Commission task force on open network architecture.

Commissioner's Advisor
July 1985 - March 1987
Lead advisor on independent power industry and cost of capital issues. Analyzed proposed decisions on energy, telecommunications, water and transportation issues and made recommendations for Commission action.

Staff Economist, Public Staff Division
June 1984 - July 1985
Testified on cost of capital and telecommunications bypass issues. Served on telecommunications strategy task force charged with developing recommendations for post-divestiture regulatory policies.

Instructor, Golden Gate University
1986 - 1987
Taught courses on telecommunications regulation to students in the Masters in Telecommunications Management program and students in a special program for federal government telecommunications managers.

Acting Assistant Professor of Economics, Wesleyan University
July 1981 - June 1982
Taught undergraduate courses in microeconomics, macroeconomics, econometrics, and economics and policy of regulation.

SELECTED TESTIMONY (SINCE 1/1/97)

Alaska, Regulatory Commission of
- Docket No. U-96-89, In the Matter of the Petition by GCI Communications Corp. d/b/a General Communication, Inc. and GCI for Arbitration Under Section 252 of the Communications Act of 1996 with the Municipality of Anchorage d/b/a ATU Telecommunications a/k/a ATU Telecommunications for the Purpose of Instituting Local Competition, 8/29/03.

California Public Utilities Commission
- Case No. 02-09-045, Mpower Communications Corp. (U-5859-C), Complainant, *v.* Pacific Bell Telephone Company (U-1001-C), Defendant, 5/23/03, 6/4/03.
- R.01-09-001/ I.01-09-002, Orders Instituting Rulemaking/Investigation on the Commission's Own Motion to Assess and Revise the New Regulatory Framework for Pacific Bell and Verizon California Incorporated, 6/21/02, 7/19/02.
- R.93-04-003/I.93-04-002, Rulemaking and Investigation on the Commission's Own Motion to Govern Open Access to Bottleneck Services and Establish and Framework for Network Architecture Development of Dominant Carrier Networks, and R. 95-04-043/I.95-04-044, Rulemaking and Investigation on the Commission's Own Motion into Competition for Local Exchange Service (consolidated for purposes of evaluating Pacific Bell's Section 271 application), 8/23/01.
- A.01-02-024, Joint Application of AT&T Communications of California, Inc. (U 5002 C) and WorldCom, Inc. for the Commission to Reexamine the Recurring Costs and Prices of Unbundled Switching in Its First Annual Review of Unbundled Network Element Costs Pursuant to Ordering Paragraph 11 of D.99-11-050, and A.01-02-035, Application of AT&T Communications of California, Inc. (U 5002 C) and WorldCom, Inc. for the Commission to Reexamine the Recurring Costs and Prices of Unbundled Loops in Its First Annual Review of Unbundled Network Element Costs Pursuant to Ordering Paragraph 11 of D.99 11-050, 2/21/01, 2/28/01, 8/20/01, 10/30/01, 11/9/02, 2/28/02, 10/18/02, 2/7/03, 3/12/03.
- A.01-01-010, Application by Pacific Bell Telephone Company (U 1001 C) for Arbitration of an Interconnection Agreement with MCImetro Access Transmission Services, L.L.C. (U 5253 C) Pursuant to Section 252(b) of the Telecommunications Act of 1996, 2/2/01.
- A.00-01-022, Application of AT&T Communications of California, Inc., *et al.*, for Arbitration of an Interconnection Agreement with Pacific Bell Pursuant to Section 252(b) of the Telecommunications Act of 1996, 1/24/00, 3/5/00.
- A.00-01-012, In the Matter of Covad Communications Company's (U 5752 C) Petition for Arbitration of Interconnection Agreement with Roseville Telephone Company (U 1015 C), 1/7/00.

- A.98-12-005, In the Matter of the Joint Application of GTE Corporation ("GTE") and Bell Atlantic Corporation ("Bell Atlantic") to Transfer Control of GTE's California Utility Subsidiaries to Bell Atlantic Which Will Occur Indirectly as a Result of GTE's Merger with Bell Atlantic, 6/7/99.
- A.99-03-047, In the Matter of the Petition by Pacific Bell (U 1001 C) for Arbitration of an Interconnection Agreement with Metropolitan Fiber Systems/ Worldcom Technologies, Inc. (MFS/Worldcom) Pursuant to Section 252(b) of the Telecommunications Act of 1996, 4/16/99, 5/24/99.
- A.98-05-038, In the Matter of the Application of Pacific Bell for Authority for Pricing Flexibility and to Increase Certain Operator Services, to Reduce the Number of Monthly Directory Assistance Call Allowances, and Adjust Prices for Four Centrex Optional Features, 11/17/98.
- A.98-06-052, In the Matter of the Petition of PDO Communications, Inc. for Arbitration Pursuant to Section 252 of the Federal Telecommunications Act of 1996 to Establish an Interconnection Agreement with Pacific Bell, 8/14/98.
- R.93-04-003/I.93-04-002, Rulemaking and Investigation on the Commission's Own Motion to Govern Open Access to Bottleneck Services and Establish and Framework for Network Architecture Development of Dominant Carrier Networks, 3/18/97, 12/19/97, 2/11/98, 4/8/98, 4/27/98, 5/1/98, 6/5/98, 12/18/98, 1/11/99, 2/8/99, 3/15/00, 3/27/00, 4/5/00, 5/2/00, 6/11/01, 6/25/01, 7/24/01, 7/30/02, 8/20/02, 9/9/02.

Delaware Public Service Commission
- Docket No. 96-324, Bell Atlantic - Delaware Statement of Terms and Conditions Under Section 252(F) of the Telecommunications Act of 1996, 2/4/97.

District of Columbia Public Service Commission
- Formal Case No. 962, In the Matter of the Implementation of the District of Columbia Telecommunications Act of 1996 and Implementation of the Telecommunications Act of 1996, 3/24/97, 5/2/97, 5/9/97, 1/11/02.

Federal Communications Commission
- WC Docket No. 02-306, In the Matter of Application by SBC Communications Inc., Pacific Bell Telephone Company, and Southwestern Bell Communications Services, Inc. for Provision of In-Region, InterLATA Services in California, 10/9/02.
- CC Docket No. 01-338, In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, 7/17/02.
- File No. EB-02-MD-017, WorldCom, Inc., Complainant, v. Verizon New England Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a Verizon Enterprise Solutions), and Verizon Global Networks, Inc., Defendants, 5/7/02.
- CC Docket Nos. 00-218, 00-249 and 00-251, In the Matter of the Petition of WorldCom, Inc., Pursuant to Section 252(e)(5) of the Communications Act for Expedited Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia, Inc., and for Expedited Arbitration, *et al.*, 7/31/01, 8/27/01, 9/21/01.
- File No. E-98-12, MCI Telecommunications Corp. and MCImetro Access Transmission Services, Inc., Complainants, v. Bell Atlantic Corp., Defendant, 12/19/97, 3/25/98.

Florida Public Service Commission
- Docket No. 990649-TP, In re: Investigation into the Pricing of Unbundled Network Elements, 8/11/99, 9/10/99, 10/15/99, 6/8/00, 7/31/00, 8/28/00.

Georgia Public Service Commission
- Docket No. 14361-U, In re: Generic Proceeding to Review Cost Studies, Methodologies, Pricing Policies and Cost Based Rates for Interconnection and Unbundling of BellSouth Telecommunications, Inc.'s Network, 4/5/02.
- Docket No. 11900-U, In re: Investigation of BellSouth Telecommunications, Inc.'s Provision of Unbundled Network Elements for xDSL Service Providers, 11/13/00, 12/20/00.

Hawaii Public Service Commission
- Docket No. 7702, In the Matter of Public Utilities Commission Instituting a Proceeding on Communications, Including an Investigation of the Communications Infrastructure of the State of Hawaii, 7/3/97, 8/29/97, 6/2/00.

Illinois Commerce Commission
- Docket No. 02-0864, Illinois Bell Telephone Company Filing to Increase Unbundled Loop And Nonrecurring Rates (Tariffs filed December 24, 2002), 5/6/03.
- Docket No. 00-0393, Illinois Bell Telephone Company Proposed Implementation of High Frequency Portion of Loop (HFPL) / Line Sharing Service, 9/1/00, 9/20/00, 10/4/00.
- Docket Nos. 00-0312 and 00-0313, Petitions of Covad Communications Company and Rhythms Links Inc. for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Amendment for Line Sharing to the Interconnection Agreement with Illinois Bell Telephone Company d/b/a Ameritech Illinois, and for an Expedited Arbitration Award on Certain Core Issues, 5/15/00, 6/22/00, 11/21/00, 12/12/00, 12/21/00, 7/13/00.
- Docket No. 98-0396, Investigation into the Compliance of Illinois Bell Telephone Company with the Order in Docket 96-0486/0569 Consolidated Regarding the Filing of Tariffs and the Accompanying Cost Studies for Interconnection, Unbundled Network Elements and Local Transport and Termination and Regarding End to End Bundling Issues, 3/29/00, 5/5/00, 7/12/00.
- Docket No. 99-0593, Investigation of Construction Charges, 2/17/00, 3/8/00, 3/22/00.

Indiana Utility Regulatory Commission
- Cause No. 42393, In the Matter of the Commission Investigation and Generic Proceeding of Rates and Unbundled Network Elements and Collocation for Indiana Bell Telephone Company, Incorporated, D/B/A SNV Indiana Pursuant to the Telecommunications Act of 1996 and Related Indiana Statutes, 8/15/03.

Kansas Corporation Commission
- Docket No. 00-DCIT-997-ARB, In the Matter of the Petition of Covad Communications Company for Arbitration of Interconnection Rates, Terms, Conditions and Related Arrangements for Line Sharing with Southwestern Bell Telephone Company, 6/12/00.
- Docket No. 00-DCIT-389-ARB, In the Matter of the Petition of DIECA Communications, Inc. d/b/a Covad Communications Company for Arbitration of Interconnection Rates, Terms, Conditions and Related Arrangements with Southwestern Bell Telephone Company, 1/7/00, 1/25/00, 2/21/00.

Maryland Public Service Commission
- Case No. 8918, In the Matter of the Review of Verizon Maryland Inc.'s Price Cap Regulatory Plan, 9/13/02.
- Case No. 8921, In the Matter of the Review by the Commission into Verizon Maryland Inc.'s Compliance with the Conditions of 47 U.S.C. § 271(c), 7/15/02.

- Case No. 8879, In the Matter of the Investigation into Rates for Unbundled Network Elements Pursuant to the Telecommunications Act of 1996, 5/25/01, 9/5/01, 10/15/01.
- Case No. 8745, In the Matter of the Provision of Universal Service to Telecommunications Consumers, 5/21/01, 6/11/01.
- Case No. 8842, In the Matter of Rhythms Links Inc. and Covad Communications Company vs. Bell Atlantic-Maryland, Inc., pursuant to Section 252(B) of the Telecommunications Act of 1996, 5/5/00, 7/14/00, 10/27/00.
- Case No. 8820, In the Matter of the Investigation into Affiliated Activities, Promotional Practices and Codes of Conduct of Regulated Gas and Electric Companies, 10/1/99, 10/26/99, 12/10/99.
- Docket No. 8797, In the Matter of The Potomac Edison Company's Proposed: (a) Stranded Cost Quantification Mechanism; (b) Price Protection Mechanism; (c) and Unbundled Rates, 1/26/99.
- Docket No. 8795, In the Matter of Delmarva Power and Light Company's Proposed Stranded Cost Quantification Mechanism, Price Protection Mechanism, and Unbundled Rates, 12/28/98.
- Docket No. 8794, In the Matter of Baltimore Gas and Electric (BGE)'s Proposed Stranded Cost Quantification Mechanism, Price Protection Mechanism, and Unbundled Rates, 12/22/98, 7/23/99, 8/3/99.
- Docket No. 8786, In the Matter of the Investigation of Non-Recurring Charges for Telecommunications Interconnection Service, 5/27/98, 11/16/98, 12/18/98.
- Docket No. 8731, Phase II, In the Matter of the Petitions for Approval of Agreements and Arbitration of Unresolved Issues Arising Under §252 of the Telecommunications Act of 1996, 3/7/97.

Massachusetts Department of Telecommunications and Energy
- Docket No. DTE 98-57, Investigation by the Department on its own motion as to the propriety of the rates and charges set forth in the following tariffs: M.D.T.E. Nos. 14 and 17, filed with the Department on April 2, 1999, to become effective May 2, 1999, by New England Telephone and Telegraph Company d/b/a Bell Atlantic – Massachusetts, 7/26/99, 11/9/99.

Michigan Public Service Commission
- Case No. U-12540, In the Matter of the Application of Ameritech Michigan for Approval of Cost Studies and Resolution of Disputed Issues Related to Certain New UNE Offerings, 9/15/00, 10/13/00.

Minnesota Public Utilities Commission
- PUC Docket No. P-421/CI-01-1371, In the Matter of a Commission Investigation into Qwest's Compliance with Section 272(c)(2)(B) of the Telecommunications Act of 1996; Checklist Items 1.2, 4, 5, 6, 11, 13, and 14, 6/10/02, 8/2/02, 8/29/02, 9/10/02.
- PUC Docket No. P-421/CI-01-1370, In the Matter of a Commission Investigation into Qwest's Compliance with Section 272(c)(2)(B) of the Telecommunications Act of 1996; Checklist Items 3, 7, 8, 9, 10 and 12, 1/28/02, 2/22/02.

Missouri Public Service Commission
- Case No. TO-2001-439, In the Matter of the Determination of Prices, Terms, and Conditions of Conditioning for xDSL-Capable Loops, 6/22/01, 7/13/01.
- Case No. TO-2000-322, In the Matter of the Petition of DIECA Communications, Inc. d/b/a Covad Communications Company for Arbitration of Interconnection Rates, Terms,

Conditions and Related Arrangements with Southwestern Bell Telephone Company, 1/7/00, 1/27/00, 2/10/00.

Nevada Public Service Commission
- In re a Petition of the Staff of the Public Utilities Commission to Open a Docket to Investigate Costing and Pricing Issues Related to Industry-Wide Collocation Costs Pursuant to the Telecommunications Act of 1996 and the Commission's Regulations, 11/3/00.
- Docket No. 96-9035, In re a Petition by the Regulatory Operations Staff to Open an Investigation into the Procedures and Methodologies that Should Be Used to Develop Costs for Bundled or Unbundled Telephone Services or Service Elements in the State of Nevada, 5/8/97, 5/23/97.

New Jersey Board of Public Utilities
- Docket No. TO00060356, In the Matter of the Board's Review of Unbundled Network Elements Rates, Terms and Conditions of Bell Atlantic – New Jersey, 10/12/00.

New York Public Service Commission
- Case No. 98-C-1357, Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements, 9/23/99, 10/18/99, 10/22/99, 2/7/00, 2/22/00, 3/31/00, 4/17/00, 6/26/00, 10/19/00, 11/13/00.

Ohio Public Utilities Commission
- Case No. 96-922-TP-UNC, In the Matter of the Review of Ameritech Ohio's Economic Costs for Interconnection, Unbundled Network Elements, and Reciprocal Compensation for Transport and Termination of Local Telecommunications Traffic, 10/6/00.

Oklahoma Corporation Commission
- Cause No. PUD 200000192, Applicant: Southwestern Bell Telephone Company; Relief Sought: Approval of Nonrecurring Rates for Conditioning Unbundled Digital Subscriber Line ("DSL") Capable Loops, 7/12/00, 8/1/00.

Oregon Public Utility Commission
- Case No. UM-731, Phase IV, In the Matter of the Investigation of Universal Service in the State of Oregon, 1/17/00.

Pennsylvania Public Utility Commission
- Docket No. R-00016683, Generic Investigation of Verizon Pennsylvania, Inc.'s Unbundled Network Element Rates, 12/7/01, 1/11/02, 2/8/02.
- Docket No. M-00001353, Re Structural Separation of Verizon-Pennsylvania Inc. Wholesale and Retail Operations, 10/10/00.
- Docket No. R-00005261, In re: Further Pricing of Bell Atlantic Pennsylvania, Inc.'s Unbundled Network Elements, 10/4/00.
- Docket Nos. R-00994697 and R-994697C0001, Pennsylvania Public Utility Commission v. Bell Atlantic – Pennsylvania, Inc./ Rhythms Links Inc., Complainant v. Bell Atlantic – Pennsylvania, Inc., Respondent, 12/21/99, 1/14/00.
- Docket Nos. P-00991648, Joint Application of NEXTLINK Pennsylvania, Inc., *et al.* and P-00991649, Joint Application of Bell Atlantic – Pennsylvania, Inc., *et al.*, 4/22/99, 6/11/99.
- Docket Nos. A-310200F0002 *et al.*, In re the Joint Application of Bell Atlantic Corporation and GTE Corporation for Approval of Agreement and Plan of Merger, 3/23/99, 5/19/99.

- Docket No. I-00960066, Generic Investigation of Intrastate Access Charge Reform, 6/30/97, 7/29/97, 8/27/97.
- Docket No. A-310203F002, Application of MFS Intelenet of Pennsylvania, Inc., for Approval to Operate as a Local Exchange Telecommunications Company, 1/13/97, 2/97.

Tennessee Regulatory Authority
- Docket No. 97-00309, In Re: BellSouth Telecommunications, Inc.'s Entry into Long Distance (interLATA) Service in Tennessee Pursuant to Section 271 of the Telecommunications Act of 1996, 7/11/02.

Texas Public Utility Commission
- Docket No. 25834, Proceeding on Cost Issues Severed from P.U.C. Docket No. 24542, 11/4/02, 2/14/03.
- Docket Nos. 22168, Petition of IP Communications Corporation to Establish Public Utility Commission of Texas Oversight Concerning Line Sharing Issues and 22469, Complaint of Covad Communications Company and Rhythms Links, Inc. against Southwestern Bell Telephone Company and GTE Southwest Inc. for Post-Interconnection and Arbitration under the Telecommunications Act of 1996 Regarding Rates, Terms, Conditions and Related Arrangements for Line-Sharing, 5/17/00, 9/5/00 (rev. 10/6/00), 10/20/00.
- Docket Nos. 20226, Petition of Accelerated Connections, Inc. d/b/a ACI Corp. for Arbitration to Establish an Interconnection Agreement with Southwestern Bell Telephone Company, and 20272, Petition of DIECA Communications, Inc., d/b/a Covad Communications Company for Arbitration of Interconnection Rates, Terms and Conditions and Related Arrangements with Southwestern Bell Telephone Company, 2/19/99, 4/8/99.

Washington Utilities and Transportation Commission
- Docket No. UT-960639 *et al.*, Phase II, In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale, 8/20/98, 9/11/98.

EDUCATION

A.B., Oberlin College, Oberlin, Ohio. Major: Economics. National Merit Scholar, recipient of Hanson Prize in Economics, elected to Phi Beta Kappa.

M.A., M.Phil., Yale University, New Haven, Connecticut. Economics. Admitted to Ph.D. candidacy and completed all Ph.D. requirements except dissertation. Fields of specialization included industrial organization and energy and environmental economics. Honorable mention, National Science Foundation Fellowship; recipient of University Fellowship and Sloan Foundation dissertation research fellowship.

FIRST QUARTER 2003

Forecasters See Growth Accelerating Over the Next Five Quarters
Slow growth over the first half of the year characterizes the outlook for the U.S. economy, according to 37 forecasters surveyed by the Federal Reserve Bank of Philadelphia. Over the first half of 2003, the forecasters expect the economy to expand at an annual rate of just 2.5 percent, but they see growth a full percentage point stronger (3.5 percent) over the third and fourth quarters. The forecasters' quarterly forecasts suggest that growth will accelerate gradually over each of the next five quarters, from 2.2 percent in the current quarter to 3.8 percent at the beginning of 2004. On a year-over-year basis, real GDP is expected to grow at a rate of 2.5 percent this year—about the same rate expected in the survey of three months ago—and 3.5 percent in 2004.

The acceleration in growth over the second half of the year will be accompanied by a falling rate of unemployment, from an expected steady rate of 6.0 percent in the first half to 5.7 percent by year's end. For the year, the forecasters project the unemployment rate will average 5.9 percent, up a bit from their projection of 5.7 percent in the last survey. The unemployment rate will fall to 5.5 percent in 2004.

The forecasters see little reason to change their projections for inflation in 2003. Measured by the fourth-quarter over fourth-quarter rate of change in the CPI, inflation will average 2.2 percent in 2003, the same rate projected in the last survey. On a year-over-year basis, inflation in the GDP price index will average 1.7 percent in 2003, also unchanged from the projection of three months ago. Both measures of inflation are projected to rise slightly in 2004, to 2.4 percent for the CPI measure and 2.0 percent for the GDP measure.

The following table compares forecasts for selected variables from the current survey with those from three months ago.

	Real GDP (%)		Unemployment Rate (%)		CPI Inflation (%)	
	Previous	*New*	*Previous*	*New*	*Previous*	*New*
Quarterly data:						
2003: Q1	2.6	2.2	5.9	6.0	2.2	2.5
Q2	3.1	2.7	5.8	6.0	2.2	2.1
Q3	3.3	3.4	5.6	5.9	2.2	2.0
Q4	4.2	3.6	5.6	5.7	2.2	2.2
2004: Q1	N.A.	3.8	N.A.	5.6	N.A.	2.2
Annual average data:						
2003	2.6	2.5	5.7	5.9	2.2	2.2
2004	N.A.	3.5	N.A.	5.5	N.A.	2.4

Forecasters Anticipate an Upward Trajectory for Interest Rates

The forecasters expect short- and long-term interest rates to rise over the coming quarters—although these rates are predicted to be at levels lower than projected in the survey of three months ago. The forecasters see short-term rates, as measured by the rate on three-month Treasury bills, holding roughly constant over the first half of the year, averaging about 1.25 percent, then rising as growth accelerates over the second half of 2003, reaching 1.8 percent in the fourth quarter. Additional increases are expected throughout 2004. Similarly, long-term rates, as measured by the rate on 10-year Treasury bonds, are expected to rise from 4.0 percent in the current quarter to 4.6 percent by year's end. The forecasters project that over the next two years short-term rates will average 1.4 percent in 2003, down slightly from their previous projection of 1.6 percent, and 2.8 percent in 2004. Long-term rates will average 4.3 percent in 2003 and rise to 5.1 percent in 2004, as the following table shows.

	3-Month Treasury Bill (%)		10-Year Treasury Bond (%)	
	Previous	New	Previous	New
Quarterly data:				
2003: Q1	1.3	1.2	4.1	4.0
Q2	1.4	1.3	4.2	4.2
Q3	1.8	1.5	4.5	4.4
Q4	2.1	1.8	4.7	4.6
2004: Q1	N.A.	2.3	N.A.	4.9
Annual average data:				
2003	1.6	1.4	4.4	4.3
2004	N.A.	2.8	N.A.	5.1

Forecasters See a One-in-Five Chance of a Negative Quarter in the First Half

The forecasters are assigning a risk of about 20 percent to the chance that the U.S. economy will contract in the first or second quarter of 2003. Although the risk assigned to the current quarter is down 4 percentage points from that assigned in the last survey, the risk assigned for the second quarter of 2003 is up 3 percentage points from that assigned previously. The forecasters see a declining risk over the next three quarters, as the table below shows.

	Risk of a Negative Quarter (%)	
	Previous Survey	New Survey
Quarterly data:		
2003: Q1	24	20
Q2	18	21
Q3	15	18
Q4	14	14
2004: Q1	N.A.	12

Long-Term Forecasts Are Little Changed

In first-quarter surveys, we ask the forecasters to provide long-term forecasts for an expanded set of variables, including growth in real GDP and productivity and returns on financial assets. As the table below shows, these forecasts are little changed from those of the first-quarter survey of 2002. Over the next 10 years, real GDP and productivity are expected to increase at annual average rates of 3.2 percent and 2.3 percent, respectively, marking increases of 0.2 percentage point for both over the forecasts of one year ago. The long-term forecast for inflation stands at 2.50 percent, unchanged from the forecast of one year ago (but marking an uptick of 0.05 percentage point from the survey of three months ago). The return to equities, as measured by the S&P 500 index, is currently projected to be 8.00 percent, up from 7.00 percent previously. Ten-year Treasury bonds and three-month Treasury bills are expected to return an annual average of 5.43 percent and 4.00 percent, respectively, over the next 10 years.

Long-Term (10-year) Forecasts (%)

	First-Quarter 2002	*Current Survey*
Real GDP Growth	3.00	3.20
Productivity Growth	2.10	2.30
CPI Inflation	2.50	2.50
Stock Returns (S&P 500)	7.00	8.00
Bond Returns (10-year)	5.50	5.43
Bill Returns (3-month)	3.75	4.00

The Federal Reserve Bank of Philadelphia thanks the following forecasters for their participation in the surveys this year:

Joseph T. Abate, Lehman Brothers; **David W. Berson**, Fannie Mae; **Brian A. Bethune**, Caterpillar, Inc.; **Joel I. Brest** and **Brian P. O'Connor**, MarketView Publishing Corp.; **Gary Ciminero, CFA**, Independent Economic Advisory; **Michael Cosgrove**, Econoclast; **Louis Crandall**, Wrightson ICAP LLC; **Richard DeKaser**, National City Corporation; **Rajeev Dhawan**, Georgia State University; **Michael R. Englund**, Standard & Poor's MMS; **Gerard F. Fuda**, Independent Economist; **James Glassman**, JP Morgan Chase & Co.; **James M. Goldberg**, Trust Company of the West; **William B. Hummer**, Wayne Hummer Investments; **Saul Hymans, Joan Crary**, and **Janet Wolfe**, RSQE, The University of Michigan; **Kurt Karl**, Swiss Re; **Dr. Irwin Kellner**, Hofstra University/CBS MarketWatch/North Fork Bank; **John Lonski**, Moody's Investors Service; **Edward F. McKelvey**, Goldman Sachs; **Joel L. Naroff**, Naroff Economic Advisors; **Herbert E. Neil**, Financial and Economic Strategies Corp.; **Mark Nielson, Ph.D.**, MacroEcon Global Advisors; **Michael P. Niemira**, Bank of Tokyo-Mitsubishi, Ltd.; **Jacob I. Pasternak**, Chmura Economics & Analytics; **Martin A. Regalia**, U.S. Chamber of Commerce; **David Resler**, Nomura Securities International, Inc.; **David F. Seiders** and **Stanley F. Duobinis**, National Association of Home Builders; **Bruce Steinberg**, Merrill Lynch; **Susan M. Sterne**, Economic Analysis Associates, Inc.; **Lea Tyler**, Oxford Economics USA, Inc.; **Richard Yamarone**, Argus Research Group; **Mark Zandi**, Economy.com.

This is a partial list of participants. We also thank those who wish to remain anonymous.

The Philadelphia Fed's Survey of Professional Forecasters was formerly conducted by the American Statistical Association (ASA) and the National Bureau of Economic Research (NBER) and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.

For further information about the Survey of Professional Forecasters, contact:

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To subscribe to the survey, contact the Publications Desk at (215) 574-6428. This writeup contains partial results of the survey. More detailed tables are available. These tables can be accessed on the Internet at: http://www.phil.frb.org/econ/spf/index.html.

NEXT SURVEY RELEASE (2003Q2): May 20, 2003

SURVEY OF PROFESSIONAL FORECASTERS
MAJOR MACROECONOMIC INDICATORS, 2003-2004

	2003 Q1	Q2	Q3	Q4	2004 Q1	ANNUAL AVERAGE 2003	2004
PERCENT GROWTH AT ANNUAL RATES							
1. REAL GDP (BILLIONS, CHAIN WEIGHTED)	2.2	2.7	3.4	3.6	3.8	2.5	3.5
2. GDP PRICE INDEX (1996=100)	2.0	1.7	1.6	1.9	2.1	1.7	2.0
3. GROSS DOMESTIC PRODUCT (GDP) ($ BILLIONS)	4.1	4.6	5.1	6.2	6.0	4.2	5.7
4. CONSUMER PRICE INDEX (CPI-U) (ANNUAL RATE)	2.5	2.1	2.0	2.2	2.2	2.2	2.4
VARIABLES IN LEVELS							
5. UNEMPLOYMENT RATE (PERCENT)	6.0	6.0	5.9	5.7	5.6	5.9	5.5
6. 3-MONTH TREASURY BILL RATE (PERCENT)	1.2	1.3	1.5	1.8	2.3	1.4	2.8
7. 10-YEAR TREASURY BOND YIELD (PERCENT)	4.0	4.2	4.4	4.6	4.9	4.3	5.1

NOTES: THE FIGURES ON EACH LINE ARE MEDIANS OF 37 INDIVIDUAL FORECASTS.
N.A. = NOT APPLICABLE.

SURVEY OF PROFESSIONAL FORECASTERS

First Quarter 2003

Tables

Note: Data in these tables listed as "actual" are the data that were available to the forecasters when they were sent the survey questionnaire on January 30; the tables do not reflect subsequent revisions to the data. All forecasts were received on or before February 14.

TABLE ONE

MAJOR MACROECONOMIC INDICATORS, 2003-2004
MEDIANS OF FORECASTER PREDICTIONS
QUARTERLY DATA

		ACTUAL 2002	FORECASTS 2003				2004
	NO.	Q4	Q1	Q2	Q3	Q4	Q1
1. GROSS DOMESTIC PRODUCT (GDP) ($ BILLIONS)	37	10572.3	10680.0	10799.8	10934.9	11099.9	11264.0
2. GDP PRICE INDEX (1996=100)	37	111.24	111.79	112.26	112.71	113.24	113.84
3. CORPORATE PROFITS AFTER TAXES ($ BILLIONS)	25	N.A.	467.6	478.0	489.8	499.1	513.2
4. UNEMPLOYMENT RATE (PERCENT)	37	5.9	6.0	6.0	5.9	5.7	5.6
5. INDUSTRIAL PRODUCTION (1997=100)	36	110.7	111.2	112.0	113.0	114.4	115.7
6. NEW PRIVATE HOUSING STARTS (ANNUAL RATE, MILLIONS)	36	1.75	1.70	1.67	1.66	1.65	1.64
7. CONSUMER PRICE INDEX (CPI-U) (ANNUAL RATE)	37	2.4	2.5	2.1	2.0	2.2	2.2
8. 3-MONTH TREASURY BILL RATE (PERCENT)	35	1.33	1.20	1.25	1.45	1.80	2.30
9. AAA CORPORATE BOND YIELD (PERCENT)	29	6.28	6.20	6.22	6.26	6.35	6.45
10. 10-YEAR TREASURY BOND YIELD (PERCENT)	36	4.01	4.01	4.20	4.40	4.63	4.88
11. REAL GDP (BILLIONS, CHAIN WEIGHTED)	36	9503.2	9554.3	9619.0	9700.5	9785.8	9878.0
12. TOTAL CONSUMPTION EXPENDITURES (BILLIONS, CHAIN WEIGHTED)	36	6625.7	6658.6	6702.2	6761.0	6811.6	6869.3
13. NONRESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	35	1183.2	1189.7	1203.6	1222.3	1247.3	1274.5
14. RESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	35	393.6	395.6	396.0	395.3	396.0	396.5
15. FEDERAL GOVERNMENT C & I (BILLIONS, CHAIN WEIGHTED)	33	630.2	641.1	650.0	656.9	665.6	667.0
16. STATE AND LOCAL GOVT C & I (BILLIONS, CHAIN WEIGHTED)	33	1105.3	1108.9	1112.0	1115.9	1119.4	1126.0
17. CHANGE IN PRIVATE INVENTORIES (BILLIONS, CHAIN WEIGHTED)	34	3.3	15.1	16.5	26.1	35.2	39.6
18. NET EXPORTS (BILLIONS, CHAIN WEIGHTED)	35	-506.9	-508.2	-509.0	-515.2	-515.0	-521.0

NOTE: THE COLUMN HEADED NO. SHOWS THE NUMBER OF FORECASTERS RESPONDING.

MAJOR MACROECONOMIC INDICATORS, 2003-2004
MEDIANS OF FORECASTER PREDICTIONS
ANNUAL DATA

	NUMBER OF FORE-CASTERS	ACTUAL 2002	FORECAST 2003	FORECAST 2004
1. GROSS DOMESTIC PRODUCT (GDP) ($ BILLIONS)	37	10442.1	10879.0	11502.8
2. GDP PRICE INDEX (1996=100)	37	110.66	112.51	114.77
3. CORPORATE PROFITS AFTER TAXES ($ BILLIONS)	25	N.A.	483.0	547.0
4. UNEMPLOYMENT RATE (PERCENT)	37	5.8	5.9	5.5
5. INDUSTRIAL PRODUCTION (1997=100)	36	110.4	113.1	118.0
6. NEW PRIVATE HOUSING STARTS (ANNUAL RATE, MILLIONS)	36	1.71	1.67	1.63
7. CONSUMER PRICE INDEX (CPI-U) (ANNUAL RATE)	37	2.3	2.2	2.4
8. 3-MONTH TREASURY BILL RATE (PERCENT)	35	1.60	1.40	2.80
9. AAA CORPORATE BOND YIELD (PERCENT)	29	6.49	6.28	6.75
10. 10-YEAR TREASURY BOND YIELD (PERCENT)	36	4.61	4.34	5.10
11. REAL GDP (BILLIONS, CHAIN WEIGHTED)	36	9436.1	9672.0	10010.2
12. TOTAL CONSUMPTION EXPENDITURES (BILLIONS, CHAIN WEIGHTED)	36	6573.0	6736.3	6942.3
13. NONRESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	35	1182.8	1214.9	1301.3
14. RESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	35	387.6	396.2	398.5
15. FEDERAL GOVERNMENT C & I (BILLIONS, CHAIN WEIGHTED)	33	612.9	653.4	675.0
16. STATE AND LOCAL GOVT C & I (BILLIONS, CHAIN WEIGHTED)	33	1100.0	1114.7	1131.5
17. CHANGE IN PRIVATE INVENTORIES (BILLIONS, CHAIN WEIGHTED)	34	-0.5	21.8	38.1
18. NET EXPORTS (BILLIONS, CHAIN WEIGHTED)	35	-482.2	-511.5	-515.5

TABLE TWO

MAJOR MACROECONOMIC INDICATORS, 2003-2004
PERCENTAGE CHANGES AT ANNUAL RATES

	Q4 2002 TO Q1 2003	Q1 2003 TO Q2 2003	Q2 2003 TO Q3 2003	Q3 2003 TO Q4 2003	Q4 2003 TO Q1 2004	2002 TO 2003	2003 TO 2004
1. GROSS DOMESTIC PRODUCT (GDP) ($ BILLIONS)	4.1	4.6	5.1	6.2	6.0	4.2	5.7
2. GDP PRICE INDEX (1996=100)	2.0	1.7	1.6	1.9	2.1	1.7	2.0
3. CORPORATE PROFITS AFTER TAXES ($ BILLIONS)	10.9	9.2	10.2	7.8	11.8	7.6	13.3
4. UNEMPLOYMENT RATE (PERCENT)	0.1	0.0	-0.1	-0.2	-0.1	0.1	-0.4
5. INDUSTRIAL PRODUCTION (1997=100)	1.9	3.0	3.5	4.8	4.8	2.4	4.3
6. NEW PRIVATE HOUSING STARTS (ANNUAL RATE, MILLIONS)	-10.3	-7.4	-2.0	-2.2	-2.0	-1.9	-2.4
7. CONSUMER PRICE INDEX (CPI-U) (ANNUAL RATE)	0.1	-0.4	-0.1	0.2	0.0	-0.1	0.2
8. 3-MONTH TREASURY BILL RATE (PERCENT)	-0.13	0.05	0.20	0.35	0.50	-0.20	1.40
9. AAA CORPORATE BOND YIELD (PERCENT)	-0.08	0.02	0.04	0.09	0.10	-0.21	0.47
10. 10-YEAR TREASURY BOND YIELD (PERCENT)	-0.01	0.19	0.20	0.23	0.24	-0.28	0.76
11. REAL GDP (BILLIONS, CHAIN WEIGHTED)	2.2	2.7	3.4	3.6	3.8	2.5	3.5
12. TOTAL CONSUMPTION EXPENDITURES (BILLIONS, CHAIN WEIGHTED)	2.0	2.6	3.6	3.0	3.4	2.5	3.1
13. NONRESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	2.2	4.8	6.4	8.4	9.0	2.7	7.1
14. RESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	2.0	0.5	-0.7	0.7	0.5	2.2	0.6
15. FEDERAL GOVERNMENT C & I (BILLIONS, CHAIN WEIGHTED)	7.1	5.7	4.3	5.4	0.8	6.6	3.3
16. STATE AND LOCAL GOVT C & I (BILLIONS, CHAIN WEIGHTED)	1.3	1.1	1.4	1.3	2.4	1.3	1.5
17. CHANGE IN PRIVATE INVENTORIES (BILLIONS, CHAIN WEIGHTED)	11.8	1.5	9.5	9.1	4.4	22.3	16.3
18. NET EXPORTS (BILLIONS, CHAIN WEIGHTED)	-1.3	-0.8	-6.2	0.2	-6.0	-29.3	-4.0

NOTE: FIGURES FOR UNEMPLOYMENT RATE, PERCENT CHANGE IN CONSUMER PRICE INDEX,
      TREASURY BILL RATE, AAA CORPORATE BOND YIELD, AND 10-YEAR TREASURY BOND
      YIELD ARE CHANGES IN THESE RATES, IN PERCENTAGE POINTS.
      ALL OTHERS ARE PERCENTAGE CHANGES AT ANNUAL RATES.
      FIGURES FOR PRIVATE INVENTORIES AND NET EXPORTS ARE CHANGES IN
      BILLIONS OF CHAIN-WEIGHTED DOLLARS.

TABLE THREE

ESTIMATED PROBABILITY OF DECLINE IN REAL GDP

ESTIMATED PROBABILITY (CHANCES IN 100)	Q4 2002 TO Q1 2003	Q1 2003 TO Q2 2003	Q2 2003 TO Q3 2003	Q3 2003 TO Q4 2003	Q4 2003 TO Q1 2004
	NUMBER OF FORECASTERS				
10 OR LESS	16	12	15	21	23
11 TO 20	6	10	10	5	7
21 TO 30	4	5	4	6	2
31 TO 40	4	3	3	0	1
41 TO 50	2	2	1	1	0
51 TO 60	0	2	1	1	1
61 TO 70	0	0	0	0	0
71 TO 80	2	0	0	0	0
81 TO 90	0	0	0	0	0
91 AND OVER	0	0	0	0	0
NOT REPORTING	3	3	3	3	3
MEDIAN PROBABILITY	18	20	15	10	10
MEAN PROBABILITY	20	21	18	14	12

NOTE: TOTAL NUMBER OF FORECASTERS REPORTING IS 34.

TABLE FOUR

MEAN PROBABILITY OF CHANGES IN GDP AND PRICES
2002-2003 AND 2003-2004

MEAN PROBABILITY ATTACHED TO POSSIBLE
PERCENT CHANGES IN REAL GDP:

	2002-2003	2003-2004
6.0 OR MORE	0.39	1.45
5.0 TO 5.9	1.06	4.70
4.0 TO 4.9	4.61	16.85
3.0 TO 3.9	18.30	37.15
2.0 TO 2.9	41.58	25.64
1.0 TO 1.9	21.64	8.15
0.0 TO 0.9	8.06	3.73
-1.0 TO -0.1	2.85	1.36
-2.0 TO -1.1	0.85	0.45
LESS THAN -2.0	0.67	0.52

MEAN PROBABILITY ATTACHED TO POSSIBLE
PERCENT CHANGES IN GDP PRICE INDEX:

	2002-2003	2003-2004
8.0 OR MORE	0.00	0.06
7.0 TO 7.9	0.00	0.19
6.0 TO 6.9	0.13	0.44
5.0 TO 5.9	0.59	0.97
4.0 TO 4.9	1.84	2.78
3.0 TO 3.9	7.41	9.00
2.0 TO 2.9	30.31	35.94
1.0 TO 1.9	48.38	39.88
0.0 TO 0.9	9.69	9.44
WILL DECLINE	1.66	1.31

NOTE: TOTAL NUMBER OF FORECASTERS REPORTING IS 33.

TABLE FIVE

LONG-TERM (10 YEAR) FORECASTS

SERIES: CPI INFLATION RATE

STATISTIC	
MINIMUM	1.750
LOWER QUARTILE	2.300
MEDIAN	2.500
UPPER QUARTILE	2.663
MAXIMUM	3.000
MEAN	2.474
STD. DEV.	0.289
N	34
MISSING	3

SERIES: REAL GDP GROWTH RATE

STATISTIC	
MINIMUM	2.000
LOWER QUARTILE	3.000
MEDIAN	3.200
UPPER QUARTILE	3.500
MAXIMUM	4.250
MEAN	3.206
STD. DEV.	0.413
N	34
MISSING	3

SERIES: PRODUCTIVITY GROWTH

STATISTIC	
MINIMUM	1.300
LOWER QUARTILE	2.000
MEDIAN	2.300
UPPER QUARTILE	2.675
MAXIMUM	3.800
MEAN	2.370
STD. DEV.	0.562
N	33
MISSING	4

SERIES: STOCK RETURNS (S&P 500)

STATISTIC	
MINIMUM	4.500
LOWER QUARTILE	6.000
MEDIAN	8.000
UPPER QUARTILE	8.075
MAXIMUM	11.000
MEAN	7.461
STD. DEV.	1.560
N	28
MISSING	9

SERIES: BOND RETURNS (10-YEAR)

STATISTIC	
MINIMUM	2.000
LOWER QUARTILE	4.850
MEDIAN	5.430
UPPER QUARTILE	6.000
MAXIMUM	6.750
MEAN	5.263
STD. DEV.	0.917
N	33
MISSING	4

SERIES: BILL RETURNS (3-MONTH)

STATISTIC	
MINIMUM	2.500
LOWER QUARTILE	3.000
MEDIAN	4.000
UPPER QUARTILE	4.150
MAXIMUM	6.000
MEAN	3.893
STD. DEV.	0.936
N	32
MISSING	5

Alternative Estimates of Cost of Capital Applicable to Verizon-Florida Collocation Cost Study

WACC with Forecasted Target Capital Structure (Literal VA Arb Version)

Component	Cost	% of Total	Weighted Cost
Common equity	10.70%	60.00%	6.42%
Long-term debt	4.98%	40.00%	1.99%
Short-term debt		0.00%	0.00%
Total		100.00%	

WACC with Lester Market Value Capital Structure (Literal VA Arb Version)

Component	Cost	% of Total	Weighted Cost
Common equity	10.70%	71.00%	7.60%
Long-term debt	4.98%	29.00%	1.44%
Short-term debt		0.00%	0.00%
Total		100.00%	

WACC with Forecasted Target Capital Structure (Best Estimate of Cost of Equity)

Component	Cost	% of Total	Weighted Cost
Common equity	8.77%	60.00%	5.26%
Long-term debt	4.98%	40.00%	1.99%
Short-term debt		0.00%	0.00%
Total		100.00%	

WACC with Lester Market Value Capital Structure (Best Estimate of Cost of Equity)

Component	Cost	% of Total	Weighted Cost
Common equity	8.77%	71.00%	6.23%
Long-term debt	4.98%	29.00%	1.44%
Short-term debt		0.00%	0.00%
Total		100.00%	

WACC with Lester Market Value Capital Structure (Literal VA Arb Version) and Lester Debt Cost

Component	Cost	% of Total	Weighted Cost
Common equity	10.70%	71.00%	7.60%
Long-term debt	7.54%	29.00%	2.19%
Short-term debt		0.00%	0.00%
Total		100.00%	

CAPM Source	BLS	VZ	SBC	Applies to All	Info Date
Historical Average Long-Horizon Equity Premium				7.00%	1/1/2003
Historical Average Short-Horizon Equity Premium				8.40%	1/1/2003
Equity Premium1				3.40%	10/1/2001
Equity Premium2				4.32%	4/1/2002
Equity Premium3				2.70%	6/1/2001
Current 1-month Treasury rate				0.88%	9/19/2003
Current 20-year Treasury rate				5.12%	9/19/2003
Current 10-year Treasury Rate				4.17%	9/19/2003
Current 6-month LIBOR Rate				1.15%	9/19/2003
Current 3-month Treasury Rate				0.95%	9/19/2003
10-yr S&P 500 Expected Returns				7.46%	2/24/2003

Source Info
Ibbotson Associates, "Valuation Edition: 2003 Yearbook"
Ibbotson Associates, "Valuation Edition: 2003 Yearbook"
James Claus and Jacob Thomas, "Equity Premia as Low as 3%: Evidence from Analysts' Earnings Forecasts for Domestic and International Markets", Journal of Finance, Vol. 56, no. 5.
Eugene Fama and Kenneth French, "The Equity Premium," Journal of Finance, Vol. 57, no. 2.
Willam Gebhardt, Charles Lee and Bhaskaram Swaminathan, "Toward an Implied Cost of Capital," Journal of Accounting Research, Vol. 39..
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Federal Reserve Board of Governors, Statistical Release
Federal Reserve Board of Governors, Statistical Release
Federal Reserve Board of Governors, Statistical Release
Federal Reserve Board of Governors, Statistical Release
Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters

CAPM calculation per Virginia Arbitration Order

Levered beta	1
Long-horizon Ibbotson risk premium	7.00%
Short-horizon Ibbotson risk premium	8.40%
Long-term (20-year) Treasury bond yield	5.12%
Short-term (30-day) Treasury bill yield	0.88%
Long-horizon CAPM cost of equity	12.12%
Short-horizon CAPM cost of equity	9.28%
Average CAPM cost of equity	10.70%

CAPM with beta of 1 and forward-looking market risk premiums

	MRP	Risk-free rate	Expected stock returns (market as a whole, beta = 1)
Fama and French (2002)	4.32%	1.15%	5.47%
Claus and Thomas	3.40%	4.17%	7.57%
Gebhardt, Lee and Swaminathan	2.70%	4.17%	6.87%
Survey of Professional Forecasters			7.46%
Average			6.84%

Average of CAPMs based on historical and forward-looking market risk premiums   8.77%

FEDERAL RESERVE statistical release

These data are released each Monday. The availability of the release is announced on (202) 452-3206.

H.15 (519)
SELECTED INTEREST RATES
Yields in percent per annum

For immediate release
September 22, 2003

Instruments	2003 Sep 15	2003 Sep 16	2003 Sep 17	2003 Sep 18	2003 Sep 19	Week Ending Sep 19	Week Ending Sep 12	2003 Aug
Federal funds (effective) [1][2][3]	1.11	0.97	0.97	1.00	0.99	1.02	0.96	1.03
Commercial paper [3][4][5][6]								
Nonfinancial								
1-month	1.01	1.03	1.03	1.02	1.03	1.02	1.01	1.03
2-month	1.04	1.03	1.03	1.02	1.00	1.02	1.03	1.03
3-month	1.03	1.04	1.04	1.05	1.03	1.04	1.04	1.04
Financial								
1-month	1.04	1.04	1.04	1.03	1.03	1.04	1.04	1.04
2-month	1.05	1.06	1.05	1.05	1.04	1.05	1.05	1.05
3-month	1.06	1.06	1.05	1.04	1.05	1.05	1.06	1.06
CDs (secondary market) [3][7]								
1-month	1.07	1.07	1.07	1.06	1.06	1.07	1.07	1.07
3-month	1.08	1.08	1.08	1.07	1.07	1.08	1.08	1.08
6-month	1.12	1.12	1.12	1.11	1.12	1.12	1.12	1.13
Eurodollar deposits (London) [3][8]								
1-month	1.06	1.06	1.06	1.10	1.10	1.08	1.06	1.05
3-month	1.09	1.08	1.08	1.12	1.12	1.10	1.07	1.07
6-month	1.12	1.12	1.11	1.15	1.15	1.13	1.12	1.12
Bank prime loan [2][3][9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Discount window primary credit [2][10]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
U.S. government securities								
Treasury bills (secondary market) [3][4]								
4-week	0.89	0.89	0.88	0.87	0.86	0.88	0.92	0.93
3-month	0.94	0.91	0.93	0.94	0.93	0.93	0.94	0.95
6-month	1.01	1.00	1.00	1.00	1.00	1.00	1.01	1.03
Treasury constant maturities [11]								
1-month	0.91	0.91	0.90	0.89	0.88	0.90	0.94	0.95
3-month	0.96	0.93	0.95	0.96	0.95	0.95	0.96	0.97
6-month	1.03	1.02	1.02	1.02	1.02	1.02	1.03	1.05
1-year	1.20	1.22	1.19	1.23	1.23	1.21	1.22	1.31
2-year	1.63	1.63	1.63	1.68	1.70	1.65	1.69	1.86
3-year	2.17	2.16	2.13	2.16	2.20	2.16	2.25	2.44
5-year	3.12	3.12	3.06	3.09	3.11	3.10	3.23	3.37
7-year	3.71	3.72	3.64	3.66	3.66	3.68	3.79	3.96
10-year	4.28	4.29	4.20	4.19	4.17	4.23	4.34	4.45
20-year	5.24	5.26	5.15	5.15	5.12	5.18	5.27	5.39
Treasury long-term average (25 years and above) [12][13]	5.28	5.29	5.19	5.18	5.15	5.22	5.30	5.41
Interest rate swaps [14]								
1-year	1.32	1.32	1.30	1.33	1.33	1.32	1.33	1.42
2-year	1.94	1.93	1.89	1.95	1.97	1.93	1.99	2.15
3-year	2.59	2.57	2.52	2.56	2.59	2.57	2.66	2.84
4-year	3.14	3.12	3.05	3.07	3.08	3.09	3.22	3.38
5-year	3.58	3.56	3.49	3.49	3.49	3.52	3.66	3.82
7-year	4.18	4.18	4.10	4.09	4.06	4.12	4.25	4.42
10-year	4.73	4.74	4.66	4.63	4.57	4.66	4.76	4.95
30-year	5.54	5.56	5.47	5.44	5.38	5.48	5.54	5.71
Corporate bonds								
Moody's seasoned								
Aaa [15]	5.76	5.80	5.71	5.69	5.65	5.72	5.78	5.88
Baa	6.83	6.86	6.76	6.73	6.69	6.77	6.86	7.01
State & local bonds [16]					4.84		4.84	4.94	5.10
Conventional mortgages [17]					6.01	6.01	6.16	6.26

See overleaf for footnotes

FOOTNOTES

1. The daily effective federal funds rate is a weighted average of rates on brokered trades.
2. Weekly figures are averages of 7 calendar days ending on Wednesday of the current week; monthly figures include each calendar day in the month.
3. Annualized using a 360-day year or bank interest.
4. On a discount basis.
5. Interest rates interpolated from data on certain commercial paper trades settled by The Depository Trust Company. The trades represent sales of commercial paper by dealers or direct issuers to investors (that is, the offer side). See Board's Commercial Paper Web pages (www.federalreserve.gov/releases/cp) for more information.
6. The 1-, 2-, and 3-month rates are equivalent to the 30-, 60-, and 90-day dates reported on the Board's Commercial Paper Web page.
7. An average of dealer offering rates on nationally traded certificates of deposit.
8. Bid rates for Eurodollar deposits collected around 9:30 a.m. Eastern time.
9. Rate posted by a majority of top 25 (by assets in domestic offices) insured U.S.-chartered commercial banks. Prime is one of several base rates used by banks to price short-term business loans.
10. The rate charged for discounts made and advances extended under the Federal Reserve's primary credit discount window program, which became effective January 9, 2003. This rate replaces that for adjustment credit, which was discontinued after January 8, 2003. For further information, see www.federalreserve.gov/boarddocs/press/bcreg/2002/200210312/default.htm. The rate reported is that for the Federal Reserve Bank of New York. Historical series for the rate on adjustment credit is available at www.federalreserve.gov/releases/h15/data.htm.
11. Yields on actively traded issues adjusted to constant maturities. Source: U.S. Treasury.
12. Based on the unweighted average of the bid yields for all Treasury fixed-coupon securities with remaining terms to maturity of 25 years and over.
13. A factor for adjusting the daily long-term average in order to estimate a 30-year rate can be found at www.treas.gov/offices/domestic-finance/debt-management/interest-rate/ltcompositeindex.html.
14. International Swaps and Derivatives Association (ISDA) mid-market par swap rates. Rates are for a Fixed Rate Payer in return for receiving three month LIBOR, and are based on rates collected at 11:00 a.m. by Garban Intercapital plc and published on Reuters Page ISDAFIX1. Source: Reuters Limited.
15. Moody's Aaa rates through December 6, 2001 are averages of Aaa utility and Aaa industrial bond rates. As of December 7, 2001, these rates are averages of Aaa industrial bonds only.
16. Bond Buyer Index, general obligation, 20 years to maturity, mixed quality; Thursday quotations.
17. Contract interest rates on commitments for fixed-rate first mortgages. Source: FHLMC.

Note: Weekly and monthly figures are averages of business days unless otherwise noted.

Current and historical H.15 data are available on the Federal Reserve Board's web site (www.federalreserve.gov/). For information about individual copies or subscriptions, contact Publications Services at the Federal Reserve Board (phone 202-452-3244, fax 202-728-5886). For paid electronic access to current and historical data, call STAT-USA at 1-800-782-8872 or 202-482-1986.

DESCRIPTION OF THE TREASURY CONSTANT MATURITY SERIES

Yields on Treasury securities at "constant maturity" are interpolated by the U.S. Treasury from the daily yield curve. This curve, which relates the yield on a security to its time to maturity, is based on the closing market bid yields on actively traded Treasury securities in the over-the-counter market. These market yields are calculated from composites of quotations obtained by the Federal Reserve Bank of New York. The constant maturity yield values are read from the yield curve at fixed maturities, currently 1, 3 and 6 months and 1, 2, 3, 5, 7, 10 and 20 years. This method provides a yield for a 10-year maturity, for example, even if no outstanding security has exactly 10 years remaining to maturity.

Stocks, Bonds, Bills,
and Inflation

SBBI

Valuation Edition
2003 Yearbook

IbbotsonAssociates

Additional copies of this Yearbook may be obtained for $110, plus shipping and handling, by calling or writing to the address above. Additional product information can be found at the end of this publication or at our Cost of Capital Center, http://valuation.ibbotson.com. Order forms are provided inside the back cover. Information about volume discounts, companion publication and consulting services may also be obtained.

Weighted Average Cost of Capital

Since free cash flow represents the cash flow stream flowing from the entire entity, the appropriate discount rate to use in the income approach model is the weighted average cost of capital (WACC). The WACC is represented by the following equation:

$$WACC = W_b k_b (1-t) + W_e k_E$$

where:

W_b = weight of debt in the capital structure;
k_b = cost of debt capital;
t = effective tax rate for the company;
W_E = weight of equity in the capital structure; and
k_r = cost of equity capital.

Ideally, a firm's target or optimal capital structure should be used in weighting the cost of equity and cost of debt. Unfortunately, many companies are either not able to obtain their target capital structure, or information to support the target capital structure is not available (as may be the case for a minority-interest shareholder). In the absence of a reliable target capital structure, the capital structure weights should be market value weighted. While it is typically a straightforward process to measure the market value of equity capital for a public company, it usually is not so simple for debt capital because so little debt is publicly traded. Therefore, in most cases the market value of debt in the capital structure is assumed to be the book value of debt. The weights are calculated from the market values as follows:

$$W_b = \frac{D}{D+E}, \quad W_E = \frac{E}{D+E}$$

where:

W_b = weight of debt in the capital structure;
W_e = weight of equity in the capital structure;
D = the market value of debt outstanding; and
E = the market value of equity outstanding.

Together the weights should add up to 100 percent. An excellent source for industry average capital structure weights is the Ibbotson *Cost of Capital Yearbook*.

The WACC formula above is primarily applicable to a controlling interest valuation. For a minority interest, adjustments may be made to both the numerator and the denominator of the present value formula. The free cash flow in the numerator should be adjusted to remove the effect of debt, as a minority owner does not have the power to influence capital structure and the issuance of debt. For this reason, net changes in long-term debt should be added (add new debt principal in and subtract debt principal out). If tax-effected interest expense has been added to the formula, make sure to subtract it back out. Once free cash flow has been recalculated to remove the effect of debt, the cost of capital must be calculated independent of debt as well. One way to do this is to simply discount using the cost

Quarterly Dividend Adjustment

When valuing a stock, one should remember that even though dividends grow and are declared annually, they are usually paid in equal quarterly installments. In order to account for this in the discounted cash flow model, each cash flow can be replaced by the following term:

$$CF_i \times \frac{1 + (1+k)^{1/4} + (1+k)^{1/2} + (1+k)^{3/4}}{4}$$

If we look at the same example that was used for the two-stage discounted cash flow model but use the quarterly dividend adjustment, the cost of equity estimate becomes 9.95 percent instead of 9.78 percent. The higher discount rate reflects the difference in timing of the cash flows.

Year	Growth Rate	Annual Dividend	Periodic Dividend	Reinvestment	Total Dividend	Present Value Factor @ 9.95 Percent	Present Value of Dividend
0		$2.00				1.00	
1	8.0%	$2.16	$0.54	$0.08	$2.24	0.91	$2.04
2	8.0%	$2.33	$0.58	$0.09	$2.42	0.83	$2.00
3	8.0%	$2.52	$0.63	$0.09	$2.61	0.75	$1.96
4	8.0%	$2.72	$0.68	$0.10	$2.82	0.68	$1.93
5	8.0%	$2.94	$0.73	$0.10	$3.05	0.62	$1.90
6-forever	5.0%	$3.09	$0.77	$0.11	$3.20	12.56	$40.17

Total $50.00

Estimating Growth Rates

One of the advantages of a three-stage discounted cash flow model is that it fits with life cycle theories in regards to company growth. In these theories, companies are assumed to have a life cycle with varying growth characteristics. Typically, the potential for extraordinary growth in the near term eases over time and eventually growth slows to a more stable level.

In Ibbotson's *Cost of Capital Yearbook* publication the three-stage growth model is used. In the first stage (the first five years), analysts' consensus estimates of earnings growth are used. These should reflect any extraordinary near-term growth potential. Over years 6 through 10, an average of the analysts' consensus estimates of growth for the entire industry is used. (We assume that over a middle horizon, growth of any particular company will lie more in line with the industry as a whole.) Finally, in years 11 and beyond, a growth rate estimate for the entire economy is used, reflecting the belief that even in a rapidly growing industry there will come a time when growth slows to be more in line with the overall economy.

Short-term growth rates are generally available from security analysts who follow a particular company or industry. Long-term growth rates can be estimated in a number of ways. One rudimentary estimate of long-term growth is the sustainable-growth model. This model relies on two accounting concepts: return on equity and the plow-back ratio.

Sustainable growth is then given by:

$$g_s = b_s \times ROE$$

where:

g_s = the sustainable growth rate for company s;

b_s = the plow-back ratio of company s calculated as follows:

$$\frac{\text{Annual Earnings} - \text{Annual Dividends}}{\text{Annual Earnings}} \; ; \text{and}$$

ROE_s = the return on book equity of company s calculated as follows:

$$\frac{\text{Annual Earnings}}{\text{Book Value of Equity}}$$

This model relies on a number of assumptions that may or may not hold. The first of these assumptions is that ROE and the plow-back of earnings are constant over time. That is, there exists a forecast of these two accounting ratios that is sustainable in the long term. Though the model appears simple to implement at first glance, finding a forecast of the ratios that is sustainable indefinitely is extremely difficult. Dividend policy and potential investment opportunities change over time and have a direct impact on these ratios.

The model assumes that the only possible source of corporate earnings growth is the reinvestment of earnings into the existing business and that any investment of funds in the firm will earn the same rate of return as existing projects. However, firms generally seek projects that have a higher return than existing projects. The sustainable growth model may therefore underestimate a firm's future growth. Other problems may arise because the model relies on accounting practices that can distort earnings.

In addition, other sources of growth may exist that do not require the plow-back of earnings. Changes in technology can advance growth with little capital expenditure by a firm. For instance, efficiency in the transfer of information has improved tremendously over the years as a result of internet technology. Many companies benefit from this increased efficiency with little directly investing in the Internet. A company may also grow at the rate of inflation without retaining any earnings. The growth rate that the model estimates is a nominal growth rate, not a real growth rate. If retained earnings are zero, the model predicts zero growth; however, a firm could still grow at the general rate of inflation.

Another approach to estimating long-term growth rates is to focus on estimating the overall economic growth rate. Again, this is the approach used in Ibbotson's *Cost of Capital Yearbook* publication. To obtain the economic growth rate, a forecast is made of the growth rate's component parts. Expected growth can be broken into two main parts: expected inflation and expected real growth. By analyzing these components separately, it is easier to see the factors that drive growth.

There are numerous approaches to estimate expected inflation. Surveys tend to focus on the short term and therefore are not representative of long-term expectations. Inflation-indexed bonds are a relatively new investment vehicle. In theory, the yield on these bonds is equal to the real default-

Table 6-10

Full Information versus Pure Play Beta Analysis for SIC 352
October 1997 through September 2002

Pure Play Beta	0.44
Full Information Beta	0.37

Levered Beta

A levered beta measures the systematic risk for the equity shareholders of a company and is therefore commonly referred to as the equity beta. It is measured directly from the company's returns with no adjustment made for the debt financing undertaken by the company. Therefore, a levered equity beta incorporates the business and financing risks undertaken by the company and borne by the equity shareholders.

The levered beta is the measure that should be used in calculating the cost of equity. It is also a helpful tool in examining the effects of changes in financing or leverage on a company's cost of equity. This will be examined further in the following section.

Unlevered Beta

The unlevered beta (also known as asset beta) removes a company's financing decisions from the beta calculation. In other words, the unlevered beta represents the risk of the firm excluding the risks implicit in the financial structure of the company. The calculation of the unlevered beta therefore attempts to isolate the business risk of a firm. The unlevered beta is a weighted average of the debt and equity beta, and it is therefore appropriately used in the calculation of the overall cost of capital.

Understanding the relationship between levered and unlevered beta can be a powerful tool in evaluating financing decisions. Debt generally has a beta equal to or close to zero. Assuming that the beta of debt is zero allows for some simplification in the calculation. The unlevered beta is equal to the levered beta divided by the tax-adjusted debt shield, computed as follows:

$$\beta_{U_i} = \frac{\beta_{L_i}}{1 + \frac{D_i}{E_i}(1 - t_i)}$$

where:

b_{U_i} = the unlevered beta for company i;

b_{L_i} = the levered beta for company i;

D_i = total debt for company i;

E_i = total equity capitalization for company i; and

t_i = marginal tax rate for company i.

Table C-1

Key Variables in Estimating the Cost of Capital

	Value
Yields (Riskless Rates)[1]	
Long-term (20-year) U.S. Treasury Coupon Bond Yield	4.8%
Intermediate-term (5 year) U.S. Treasury Coupon Note Yield	2.6
Short-term (30-day) U.S. Treasury Bill Yield	1.2
Equity Risk Premium[2]	
Long-horizon expected equity risk premium: large company stock total return minus long-term government bond income returns	7.0
Intermediate-horizon expected equity risk premium: large company stock total returns minus intermediate-term government bond income returns	7.4
Short-horizon expected equity risk premium: large company stock total returns minus U.S. treasury bill total returns	8.4

Size Premium[3]

Decile	Market Capitalization of Smallest Company (in millions)		Market Capitalization of Largest Company (in millions)	Size Premium (Return in Excess of CAPM)
Mid-Cap, 3-5	$1,144,452	-	$6,012,705	0.82%
Low-Cap, 6-8	$314,174	-	$1,143,845	1.52
Micro-Cap, 9-10	$0.001	-	$314,042	3.53
Breakdown of Deciles 1-10				
1-Largest	$11,636,618	-	$293,137,304	-0.32
2	$5,018,316	-	$11,628,735	0.42
3	$2,886,479	-	$5,012,705	0.66
4	$1,691,463	-	$2,880,573	0.05
5	$1,144,452	-	$1,691,210	1.16
6	$791,017	-	$1,143,845	1.48
7	$521,400	-	$791,336	1.35
8	$314,174	-	$521,298	2.06
9	$141,529	-	$314,042	2.56
10 Smallest	$0.501	-	$141,459	5.67
Breakdown of the 10th Decile				
10a	$64,798	-	$141,450	3.98
10b	$0.501	-	$64,767	9.16

[1] As of December 31, 2002. Maturities are approximate.

[2] Expected risk premia for equities are based on the differences of historical arithmetic mean returns from 1926–2002 using the S&P 500 as the market benchmark.

[3] See chapter 7 for complete methodology.

Note: Examples on how these variables can be used are found in Chapters 3 and 4

Weighted Average Yield to Maturity of Verizon's Publicly Traded Bonds
as of 9/22/03

Qty	Price	MktValue	YTM	Product	Wtd Avg
3	110.922	332.766	4.832	1607.925	.
97	111.62	10827.14	4.732	51234.03	
230	106.039	24388.97	4.746	115750.1	
1	106.522	106.522	4.676	498.0969	
250	109.103	27275.75	4.799	130896.3	
116	109.247	12672.65	4.779	60562.6	
100	109.332	10933.2	4.767	52118.56	
178	97.932	17431.9	4.9	85416.29	
250	98.079	24519.75	4.88	119656.4	
146	85.951	12548.85	6.16	77300.89	
70	86.103	6027.21	6.148	37055.29	
		147064.7		732096.4	4.978057
					5.038091 Unweighted average

Source: BondsOnline

Total Items in List : **11**

Ratings	Qty	Min	Ticker	Description	Coupon	Maturity	YTC/YTM	Price
Aa3/A+	3			Verizon New England Inc 92344RAA0 Make-Whole	6.500	09-15-2011	4.832	110.922
Aa3/A+	97			Verizon New England Inc 92344RAA0 Make-Whole	- 6.500	09-15-2011	4.732	111.62
Aa3/A+	230			Verizon Pennsylvania 92344TAA6 Make-Whole	5.650	11-15-2011	4.746	106.039
Aa3/A+	1			Verizon Pennsylvania 92344TAA6 Make-Whole	5.650	11-15-2011	4.676	106.522
Aa3/A+	250			Verizon Md Inc 92344WAA9 Make-Whole	6.125	03-01-2012	4.799	109.103
Aa3/A+	116			Verizon Md Inc 92344WAA9 Make-Whole	6.125	03-01-2012	4.779	109.247
Aa3/A+	100			Verizon Md Inc 92344WAA9 Make-Whole	6.125	03-01-2012	4.767	109.332
Aa3/A+	178			Verizon Va Inc 92345NAA8 Make-Whole	4.625	03-15-2013	4.900	97.932
Aa3/A+	250			Verizon Va Inc 92345NAA8 Make-Whole	4.625	03-15-2013	4.880	98.079
Aa3/A+	146			Verizon Md Inc 92344WAB7 Make-Whole	5.125	06-15-2033	6.160	85.951
Aa3/A+	70			Verizon Md Inc 92344WAB7 Make-Whole	5.125	06-15-2033	6.148	86.103

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SURVEY OF PROFESSIONAL FORECASTERS
MAJOR MACROECONOMIC INDICATORS, 2003-2004

	2003 Q1	Q2	Q3	Q4	2004 Q1	ANNUAL AVERAGE 2003	2004
PERCENT GROWTH AT ANNUAL RATES							
1. REAL GDP (BILLIONS, CHAIN WEIGHTED)	2.2	2.7	3.4	3.6	3.8	2.5	3.5
2. GDP PRICE INDEX (1996=100)	2.0	1.7	1.6	1.9	2.1	1.7	2.0
3. GROSS DOMESTIC PRODUCT (GDP) ($ BILLIONS)	4.1	4.6	5.1	6.2	6.0	4.2	5.7
4. CONSUMER PRICE INDEX (CPI-U) (ANNUAL RATE)	2.5	2.1	2.0	2.2	2.2	2.2	2.4
VARIABLES IN LEVELS							
5. UNEMPLOYMENT RATE (PERCENT)	6.0	6.0	5.9	5.7	5.6	5.9	5.5
6. 3-MONTH TREASURY BILL RATE (PERCENT)	1.2	1.3	1.5	1.8	2.3	1.4	2.8
7. 10-YEAR TREASURY BOND YIELD (PERCENT)	4.0	4.2	4.4	4.6	4.9	4.3	5.1

NOTES: THE FIGURES ON EACH LINE ARE MEDIANS OF 37 INDIVIDUAL FORECASTS.
N.A. = NOT APPLICABLE.