The increasing risk that telecommunications investors are facing results not only from the competitive implications of pending mergers and acquisitions but from the additional uncertainty associated with the often lengthy regulatory approval process. For example, the impending $62 billion SBC / Ameritech merger that was announced in May of 1998 still awaits approval by the Commission, the Department of Justice, and state regulators. Such regulatory uncertainty enhances investment risk in the industry.

Q. Is there any capital market evidence that ILEC investors believe that the AT&T / TCI deal has increased competition and investment risk in the telecommunications industry?

A. Yes. The announcement of the deal was associated with a significant drop in the stock prices of some key LECs. This adverse reaction to the deal is described in a report by Bloomberg's business information site on the Internet (http://www.bloomberg.com, "Baby Bell Shares Fall as AT&T Targets Local Market," June 24, 1998):

> Shares of Bell Atlantic Corp., BellSouth Corp. and other local telephone companies fell after AT&T Corp., the largest U.S. long-distance telephone company, launched an assault on their market

> The Standard & Poor's Telephone Index, which tracks the performance of the local phone company stocks, dropped 23.60 points, or 3.8 percent, to 599.79, the biggest

one-day decline since Oct. 27 last year. Bell Atlantic fell most in the index, tumbling 5 5/8 to 92 ¾, while BellSouth fell 2 5/16 to 66 15/16. GTE Corp. slipped 13/16 to 56 11/16.

AT&T's move would give it direct access to TCI's 10 million customers in the U.S. and break the Baby Bell's stranglehold on the $100 billion-a-year local phone market. "This basically puts AT&T on their doorstep," said Mitchell Weisberg, an information technology consultant who, as an AT&T employee in the early 1980s, helped put together the company's divestiture plan. "There's significant revenue at risk" for the Baby Bells, Weisberg said.

The local phone companies stand to lose in two ways under the AT&T-TCI combination. Customers in regions where TCI operates cable systems will have the option of using AT&T for local calls, which means lost revenue for that region's Baby Bell. ... What's more, AT&T now has to pay access charges to the Baby Bells for using their network to complete long-distance calls. That won't be the case for calls routed through the TCI network. "It's a certainty this will slow down the earnings growth" of the Baby Bells, said Paul Wright, a telecommunications analyst at Loomis, Sayles & Co., which owned shares of Bell Atlantic and BellSouth as of the end of March. ... The [Baby Bell's] stocks also dropped after Merrill Lynch analyst Daniel Reingold cut his rating on Bell Atlantic, SBC and Ameritech. AT&T's move "increases the perception that the (Baby Bells) will face competitive risk from local entry on both the business and consumer sides," Reingold wrote in a report.

The fact that ILEC share prices fell in response to the announcement of the acquisition of TCI by AT&T without any apparent change in expected growth is capital market evidence that investors believe that the risk of investing in ILEC companies has increased significantly. The above Bloomberg report documents the primary source of concern to be a significant loss in both local call and access charge revenues. The investment community apparently views the deal as the advent of significantly greater competition in the consumer and business segments of the local telephone market.

Q. Is there any evidence that consumers are using wireless technology to bypass traditional ILEC wireline telephone services?

A. Yes. There is growing evidence that wireless is becoming a viable substitute for the traditional telephone services offered by the ILECs. Bloomberg's business information site on the Internet (http://www.bloomberg.com, "Surveys Show Wireless Phones and Effective Substitute for Wireline Phone Service, According to BellSouth" July 2, 1998, PRNewswire) recently reported the following:

> Consumers looking for choice in telecommunications are using wireless technology – specifically Personal Communications Service (PCS) – as a cost-effective replacement for the conventional wired telephone at home and in the office, recent studies conclude. "For heavy users, U.S. (PCS) carriers are commonly offering rates of 10 cents to 13 cents a minute," says Herschel Shosteck, president of the wireless

market research firm Herschel Shosteck Associates, Wheaton, Md. "At tariffs this low, subscribers are beginning to substitute mobile minutes for landline minutes – and, more importantly, mobile for landlines."

Even AT&T recognizes PCS is a viable competitor to landline service. AT&T says in its advertising: "with rates as low as 11-cents-a-minute, this could make your wireless phone your only phone."

... The FCC found that PCS providers added over 848,000 new subscribers in 1997's fourth quarter, up 53.4 percent from the third quarter and more than double the 406,000 added in the second quarter. "A number of wireless technologies have begun to take aim at services long thought of as the sole province of wireline operators," the FCC said in its third annual report on the wireless industry June 11. "Mobile telephone operators are beginning to go one step further by using aggressive pricing to position their services as true replacements for the wire-based services of (local exchange companies.)"

The above story by Bloomberg indicates that wireless is increasingly competing with traditional wireline telephone services as a cost-effective substitute. This implies that the LECs face an increasing risk of revenue loss due to the bypass of their local loops through wireless telephony.

Q. Does the regulatory process pose investment risks to the ILEC industry?

A. Yes. Regulatory constraints can severely limit the ability of the ILECs to adapt quickly to the increasing competition within the telecommunications industry. Further, the uncertainty about how regulations will actually be applied to the ILECs also imposes risks. For example, the uncertainties concerning how the Telecommunications Act will be implemented have increased the riskiness of investing in the ILEC business. A number of regulatory issues remain unsettled in key areas such as universal service support, separations reform, and access charge structural changes. While the Commission must take the time to carefully evaluate and settle these complex regulatory issues, the ILECs must nonetheless adapt to the uncertainties concerning what regulations they will ultimately face. Yet planning to meet such uncertainties requires expenditures that enhance investment risk.

Consider that the Supreme Court has only just recently (January 25, 1999) overturned a lower court decision that the Telecommunications Act of 1996 contains unconstitutional provisions restricting the RBOCs from entering the long-distance telephone market. While the judicial review of the Act has contributed to the regulatory uncertainty faced by the ILECs, the Supreme Court's decision does not end the uncertainty concerning how the Commission will proceed with its implementation of the Act. Indeed, even though the overall stock market closed higher the day that the Supreme Court decision was announced, the share prices of the RBOCs generally fell in response to the decision. For example, the shares of BellSouth fell almost 12%, Bell Atlantic fell almost 8%, SBC fell 4.26%, and Ameritech fell a bit over 1%. Further, state regulators have enacted a variety of differing

regulations in light of the uncertainty at the federal level. Thus, significant uncertainty remains concerning how the ILECs will be regulated during this period of vast structural change in the telecommunications industry. Such uncertainty has contributed to the increasing business risk in the industry and has increased the ILECs' capital costs.

Dr. William E. Avera has explained in this proceeding that regulatory decisions can lead to unintended consequences for an industry. Specifically, he discusses how past regulatory policies have enhanced the risks posed to the ILECs' during the current transition to competition (see Comments of Dr. William E. Avera, CFA, CC Docket No. 98-166, Filed on Behalf of the United States Telephone Association, et. al., January 19, 1999):

> As a result of past regulatory policies, those customers who are less costly to serve due to location or other characteristics subsidize the service provided to higher-cost subscribers. With the introduction of competition, the ILECs face particularly intense rivalry for access to high-volume customers, and because of previous pricing practices, the loss of these principally business users will lead to revenue shortfalls and undermine the adequacy of the rates charged other customers.
>
> Regulation creates another problem for the ILECs if they have a continuing obligation to serve all customers – even when it means facilitating the entry of competitors for their core business. Thus, ILECs are put into the position of having to invest in access facilities requested by potential competitors with no assurance that they will have an opportunity to recover a return on or a return of the original capital investment (pp. 16 – 17).

Thus, the ILECs currently face significant competitive and regulatory risks that contribute to higher capital costs.

IV. DCF MODEL ESTIMATES OF THE ILECS' COST OF EQUITY

A. FORM OF THE DCF MODEL USED IN THE ANALYSIS

Q. What form of the DCF model do you use to estimate the ILECs' cost of equity capital?

A. I use the constant growth form of the DCF model that assumes an indefinite or infinite holding period. Since most U.S. firms pay dividends quarterly, I use the quarterly form of the DCF model under the realistic assumption that such dividends are changed by firms once a year, on average in the middle of the year. Specifically, the cost of equity K is calculated as:

$$K = \left[D^q_0 (1 + G) / P_{mkt} \right] + G = \left[D^q_1 / P_{mkt} \right] + G,$$

where G is the most recent average five-year earnings per share growth rate projected by analysts, as reported by either Zacks Investment Research Inc. (Zacks) or by the IBES, and P_{mkt} is the average of the three most recent months (November 1998 to January 1999) of high and low prices for the equity. D_0^q and D_1^q reflect the most recent annual and the anticipated next year amount of quarterly dividends, respectively. D_1^q is calculated as:

$$D_1^q = d_1 (1 + K)^{.75} + d_2 (1 + K)^{.5} + d_3 (1 + K)^{.25} + d_4,$$

where d_1 and d_2 are the quarterly dividends paid prior to the assumed yearly change in

dividends and d_3 and d_4 are the two quarterly dividends paid after the given change in the amount paid by a firm. Thus, dividend D_1^q captures the quarterly payment of dividends that grow at rate G.

In order to reflect the significant effect of flotation costs on the cost of equity, I directly reduce the market price P_{mkt} used in my analysis by a conservative 5 percent. Billingsley Exhibit No. RSB-2 elaborates on the nature and applicability of the DCF model in estimating the cost of capital in regulatory proceedings. It also discusses the importance of adjusting for both the payment of quarterly dividends and for flotation costs.

B. SPECIFIC APPLICATION OF THE DCF MODEL TO ESTIMATE THE ILECS' COST OF EQUITY

Q. Specifically how do you apply the above DCF model to the ILECs, since most do not have equity trading in the marketplace?

A. Because most of the ILECs are part of their respective parent holding companies, they do not all have equity trading in the market. It is consequently necessary to infer the ILECs' average cost of equity by applying the DCF model to a group of firms identified as comparable in risk to the average local exchange telephone operating company.

Q. What method is used to identify firms of comparable risk to the average local exchange telephone operating company?

A. I use a cluster analysis model to identify firms that are comparable in risk to the average local exchange telephone operating company. Two dimensions of risk are used to compare firms. First, the financial risk of firms is measured and used as a basis of comparison. Second, business or operating risk is compared among firms. These dimensions are, in effect, averaged in a manner that generates a comprehensive risk profile. Thus, firms are not just compared on a characteristic-by-characteristic basis, they are compared in light of those chosen characteristics and the relationship among those characteristics. While there is no direct measure of regulatory risk, it is reasonable to expect that such risk would be captured in the above financial and business risk measures.

A summary measure expresses the distance between each firm and the average ILEC. A group of the 20 firms that are closest to the average ILEC in terms of this summary distance measure is chosen for analysis. A more detailed discussion of this cluster analysis and a list of the local telephone operating companies used to characterize the average ILEC are presented in Billingsley Exhibit No. RSB-4.

Q. How do the individual measures of riskiness relate to the comparability of the group of firms in the cluster in terms of overall riskiness?

A. It may be tempting to single out one company in my cluster of comparable firms and incorrectly attempt to compare its various risk measures individually to those of the average

local exchange telephone operating company. However, none of the individual companies identified in the cluster are precisely like the average ILEC in every respect. The firms are alternative investment opportunities that, in the aggregate, have overall risk similar to that of average ILEC.

In summary, none of the individual firms in my cluster are precisely like the average ILEC in terms of each individual measure of risk. The cluster should be viewed as a portfolio of firms that, as a group, is comparable in risk to the average ILEC.

C. DCF MODEL COST OF EQUITY ESTIMATES FOR THE ILECS

Q. What cost of equity capital do you estimate for the average ILEC using the DCF model?

A. Billingsley Exhibit No. RSB-3 lists the portfolio of 20 firms that are comparable in risk to the ILECs and reports the average cost of equity for the portfolio using both IBES and Zacks growth rate forecasts. The evidence indicates that the cost of equity for the ILECs is in the range of 15.02% to 15.23%.

V. CAPITAL ASSET PRICING MODEL ANALYSIS OF THE ILECS' COST OF EQUITY CAPITAL

Q. What form of the CAPM do you use to estimate the ILECs' cost of equity capital?

A. I use the common form of the model, which calculates the risk-adjusted rate of return K as:

$$K = R_f + B\,[R_m - R_f],$$

where R_f is the expected return on a risk-free security like a U.S. Treasury bond, B is the expected beta or systematic risk of the equity security, and R_m is the expected return on a broad index of equity market performance, the S&P 500.

Q. How and where do you obtain the beta coefficient data needed to estimate the ILECs' cost of equity capital using the CAPM?

A. Most of the ILECs do not have their own equity trading in the market and therefore do not have the beta coefficients required by the CAPM. Thus, as discussed above in my DCF analysis, it is necessary to identify a group of firms comparable in risk to the average ILEC that do have traded equity and therefore measurable beta coefficients. Consequently, the beta coefficients for the group of firms used in my DCF analysis that are identified in Billingsley Exhibit No. RSB-3 are relied on to estimate the cost of equity for the ILECs. Specifically, the average beta of 0.84 for the portfolio of firms is used in the CAPM equation presented above.

The beta coefficients used in my CAPM analysis are the most recent prospective measures

supplied by BARRA, a widely recognized provider of data and decision support systems for institutional investors. Billingsley Exhibit No. RSB-5 elaborates on the nature and significance of using prospective rather than historical beta estimates.

Q. How do you estimate the risk-free rate of return needed in the CAPM equation?

A. In order to be consistent with the expectational emphasis of the CAPM, I use the 5.86% average expected yield implied by the prices of the U.S. Treasury bond futures contracts quoted during January of 1999. The prices of these contracts reflect the market's consensus forecast of long-term, low-risk interest rates. Billingsley Exhibit No. RSB-6 describes the futures contracts used in the analysis in more detail and shows the calculations necessary to derive the implied expected future risk-free rate of return.

Q. How do you estimate the expected return on a broad index of equity market performance for use in the CAPM?

A. I use expectational data to estimate the return of the S&P 500 as my proxy for overall equity market performance. Billingsley Exhibit No. RSB-7 elaborates on how the DCF model is applied to estimate the expected return on the S&P 500 using both Zacks and IBES growth rate forecasts. The expected return during the most recent month (January 1999) for which data is available is used in the CAPM analysis.

Q. What cost of equity capital do you estimate for the ILECs under the CAPM

approach?

A. Summarizing the results of the above analysis, I use a risk-free rate of return of 5.86%, an average beta of 0.84 for firms comparable in risk to the ILECs, and IBES and Zacks growth rate estimates that imply an expected return on the S&P 500 of 16.99% and 16.74%, respectively. These objective, market-determined data indicate that the ILECs' cost of equity capital is 15.21% using the IBES growth rate and 15.00% using the Zacks growth rate forecast.

VI. MARKET RISK PREMIUM ANALYSIS OF THE COST OF EQUITY CAPITAL

A. NATURE OF THE APPROACH

Q. What is the market risk premium approach?

A. The market risk premium approach quantifies the risk/return trade-off discussed in detail in Billingsley Exhibit No. RSB-1 on the economic standards used in cost of equity analysis. The equity market risk premium is defined as the difference between the return on a broad basket of equity securities (the "market") and the return on a low-risk or "riskless" benchmark security or portfolio. The return on long-term U.S. Treasury bonds and the return on utility bonds are common benchmarks. I use the risk premium approach to confirm the reasonableness of my DCF and CAPM cost of equity estimates for the ILECs.

B. SPECIFIC TYPE OF RISK PREMIUM ANALYSIS USED

Q. What specific form of the risk premium approach do you use?

A. I examine the relationship between expected returns on the S&P 500, as estimated by the DCF model using IBES growth rate forecasts, and the current market yields on public utility bonds from October of 1987 to January of 1999. Additional detail on the issues and the techniques associated with calculating the expected return on the market is presented in Billingsley Exhibit No. RSB-7.

Billingsley Exhibit No. RSB-8 shows that the average expected risk premium from 1987 to early 1999 is 6.72%. The average yield on A-rated public utility bonds, which are used because this is approximately the average bond rating on the debt of the firms that are comparable in risk to the ILECs, over the most recent three months (November of 1998 to January of 1999) is 6.97%. Thus, the average risk premium of 6.72% is added to the recent average public utility bond return of 6.97% to yield an expected cost of equity return on the S&P 500 of 13.69%.

C. ADJUSTMENT FOR POTENTIAL CHANGES IN THE RISK PREMIUM OVER TIME

1. EVIDENCE OF CHANGES IN THE RISK PREMIUM

Q. Can any changes in the risk premium be adjusted for so as to increase the confidence in its representativeness?

A. Yes. As elaborated on in Billingsley Exhibit No. RSB-7, studies of the historical behavior of the equity risk premium indicate that it varies considerably over time. Importantly, there is evidence that the equity risk premium is related inversely to the returns on low-risk benchmark debt securities. Thus, when interest rates decline, the equity risk premium widens and when interest rates rise, the equity risk premium narrows.

Research on this phenomenon by professors R. S. Harris and F.C. Marston, published in **Financial Management** in 1992, examines the relationship between the equity risk premium and a benchmark low-risk security (index) over time. They find that the equity risk premium moves an average of -.651 of contemporaneous changes in the return the chosen low-risk security. In other words, if interest rates decline by 100 basis points, the equity risk premium will increase by an average of about 65 basis points.

2. SPECIFIC ADJUSTMENT FOR CHANGES IN THE EQUITY RISK PREMIUM OVER TIME

Q. What specific adjustment do you make to your risk premium analysis in light of the above evidence on the inverse relationship between the risk premium and the level of interest rates?

A. In order to apply the results of Harris and Marston's study to current capital market conditions it is necessary to measure the difference between the average yield on long-term U.S. Treasury bonds over the time period of their study and the current yield on such bonds. During the period of Harris and Marston's study, the average risk premium was 6.47% and the average yield on long-term U.S. Treasury bonds was 9.84%. As noted above, the equity market risk premium is expected to change an average of -.651 of changes in the level of long-term Treasury bond yields. Given that the current average yield on 30-year Treasury bonds is 5.19% (January 1999), the appropriate current risk premium is 9.50%. This is calculated by multiplying the 4.65% decline in rates since the time period of Harris and Marston's study by -.651 and adding back the average risk premium of 6.47% to the indicated change of 3.03%. This alternative approach consequently provides an expected return on the S&P 500 of 14.69%, which is the current average level of 30-year Treasury yields of 5.19% added to the adjusted risk premium of 9.50%.

Q. What is your conclusion with regard to the ILECs' s cost of equity capital?

A. Based on my cost of equity analysis, I believe the ILECs' cost of equity is in the range of 15.00% to 15.23%. The above risk premium analysis indicates that the expected return on the overall equity market is in the range of 13.69% to 14.69%. Thus, the risk premium analysis results corroborate the reasonableness of my estimated range for the ILECs' cost of equity.

VII. COST OF DEBT

Q. How do you determine the ILECS' current cost of debt capital?

A. The cost of debt capital is estimated using current market data that reflect investors' expectations concerning the future course of interest rates.

Q. How can the ILECs' prospective cost of debt be empirically estimated?

A. The ILECs' prospective cost of debt can be estimated by adding the current yield to maturity on 30-year U.S. Treasury bonds to the average spread (difference) between the yields on such bonds and A-rated public utility bonds. As noted above, A-rated bonds are used as the benchmark because this is the average rating of the group of companies that are comparable in risk to the ILECs.

For the period from November of 1998 to January of 1999, 30-year U.S. Treasury bonds yielded an average of 5.18%. As shown in Billingsley Exhibit RSB-9, the spread between A-rated public utility bonds and 30-year Treasury bonds averaged 1.18% from October of 1987 through January of 1999. Adding the average spread of 1.18% to the above recent average Treasury bond yield to maturity of 5.18% produces a yield of 6.36%, which does not reflect the material effect of flotation costs.

Q. What is your estimate of the ILECs' prospective cost of debt?

A. Based on my analysis, I believe that the ILECs' prospective cost of debt is 6.35%. This is a conservative estimate of the ILECs' prospective cost of debt in light of the fact that the current (January 1999) average yield on A-rated public utility bonds is 6.97%.

VIII. OVERALL COST OF CAPITAL FOR THE ILECS

Q. What capital structure, component costs of capital, and overall cost of capital do you use in estimating the ILECs overall cost of capital?

A. I use my estimated costs of equity and debt for the ILECs along with the average market value-based capital structure for the group of 20 firms shown to be comparable in risk to the ILECs. The analysis uses a cost of debt of 6.35% and a cost of equity of from 15.00% to 15.23%. As shown in Billingsley Exhibit No. RSB-10, the current average market value-based capital structure for the portfolio of companies comparable in risk to the ILECs is 12.17% debt and 87.83% equity. This average market capital structure is consistent with Dr. William E. Avera's observations in this proceeding that (see Comments of Dr. William E. Avera, CFA, CC Docket No. 98-166, Filed on Behalf of the United States Telephone Association, et. al., January 19, 1999):

> As a result of greater perceived risks, ILECs must obtain an increasing portion of their capital in the form of equity funds (p. 3).

> Consistent with increasing business risk resulting from the transition to competition, *Value Line* anticipates that … ILECs will increase the proportion of common equity in their capital structure significantly over the next three to five years, to about … 83 percent of total capital based on … market values (p.29).

The data and estimates in my analysis indicate that the ILECs' overall cost of capital is in the range of 13.95% to 14.15%.

Q. Why is it more appropriate to use market value- rather than book value-based capital structures in cost of capital analysis?

A. Market value-based capital structures reflect the most up-to-date expectations of investors in the capital markets. In contrast, book value-based capital structures reflect accounting conventions and historical costs. It is important to stress that capital costs inherently involve market-based expectations no matter what type of cost estimation model is used. Therefore, the capital structure that is matched with expected capital costs must also be measured in market value terms that capture investors' expectations. In order to be consistent with well-established financial theory and practice, market-determined capital costs must be matched with market-determined capital structures. Indeed, the use of market value-based capital structures in cost of capital and capital budgeting analysis is the standard approach taken in modern corporate finance textbooks (e.g., see S.A. Ross, R. W. Westerfield, and B. D. Jordan, *Essentials of Corporate Finance*, Irwin: 1996, pp. 316-317 or R.A. Brealey and S.C. Myers, *Principles of Corporate Finance*, McGraw-Hill: 1996, 5th

ed., pp. 214, 517).

Many people mistakenly believe that there are three different costs of capital: historical, current, and expected. Actually there is only one relevant measure, which is the *expected* cost of capital that is based on market values. This is consistently updated every day in the financial markets and exists at any given point in time. Thus, market value-based capital structures are more appropriate than accounting-based capital structures in cost of capital analysis.

IX. REBUTTAL OF THE GENERAL SERVICES ADMINISTRATION'S COST OF CAPITAL ANALYSIS OF THE ILECS

A. ERRORS IN DCF COST OF EQUITY ANALYSIS

1. INCORRECT RELIANCE ON THE RBOCS AS COMPARABLE IN RISK TO THE ILECS

Q. What justification does the GSA give for applying the DCF approach to the RBOCs as firms comparable in risk to the ILECs?

A. The GSA offers no empirical evidence to justify its use of the RBOCs as supposedly comparable to any of the ILECs. Indeed, it contradicts its own stated selection criteria and demonstrates the arbitrariness of its decision to rely on the RBOCs in the following excerpts (Direct Case of the General Services Administration, CC Docket No. 98-166, January 19, 1999):

> The objective of this selection process should be to find a sample of companies with business risks similar to the interstate access services of the 1300 rate-of-return carriers, almost all of which are small, mostly rural companies … The mix of RBOC services, of course, goes well beyond interstate access (pp. 5 - 6).

> It is impossible to measure the tradeoff between the elements that increase and decrease the relative degree of risk between the RBOCs and the rate-of-return carriers. (p. 7)

Thus, the GSA assumes that the RBOCs are comparable in risk the ILECs. It does not demonstrate comparability. The GSA conducts no systematic, empirical analysis using objective screening criteria to identify firms comparable in risk to the ILECs.

In contrast to the GSA, I identify comparable firms by measuring risk and statistically determining risk comparability. My analysis shows that the RBOCs, as a group, are not comparable in risk to the ILECs.

2. INAPPROPRIATE APPLICATION OF THE EXPECTED GROWTH RATE

Q. What mistake does the GSA make in applying the expected growth rate to the DCF approach to estimating the cost of equity?

A. The GSA incorrectly multiplies the first dividend in the DCF model by (1 + .5G) rather than by the generally accepted (1 + G), where G is the expected rate of growth in earnings. This approach systematically underestimates the resulting cost of equity capital because it implicitly assumes that dividends have no time value. The common annual form of the DCF model is $K = [(D \times (1 + G))/P] + G$, where D is the most recent annual dividend and P is the market price of the equity security. Thus, the GSA's use of only one-half of G in the first part of the equation clearly underestimates the dividend yield component of the expected return and thereby biases downward the estimated cost of equity for the ILECs.

3. FAILURE TO ADJUST FOR FLOTATION COSTS

Q. Do you agree with the GSA's opinion that it is appropriate to ignore the impact of flotation costs in estimating the costs of equity capital for the ILECs?

A. No, I do not agree with this opinion. Flotation costs include the costs associated with selling or "floating" new securities in the capital markets. They include investment bankers' compensation, legal fees, registration fees, and the price pressure that new issues place on the other currently outstanding securities. Flotation costs are much like the "points" charged on a new mortgage. I elaborate on the economic rationale for considering flotation costs in Billingsley Exhibit No. RSB-2, which addresses key points noted in the Commission's recent Notice of Proposed Rulemaking (CC Docket 98-222, released October 5, 1998, paragraph 24).

4. FAILURE TO ADJUST FOR QUARTERLY DIVIDEND PAYMENTS

Q. Is the GSA's use of the annual form of the DCF model consistent with the investor's perspective on valuing equity securities?

A. No. The GSA uses the annual form of the DCF model even though all of the members of its RBOC sample of supposedly comparable firms pay dividends on a quarterly basis. The annual form of the DCF model does not accurately portray the investor's perspective, and consequently, significantly underestimates the costs of equity capital of the ILECs. As for the handling of flotation costs noted above, I elaborate on the economic rationale for adjusting for the presence of quarterly dividend payments in Billingsley Exhibit No. RSB-2. This exhibit also responds to key points noted in the Commission's recent Notice of Proposed Rulemaking (CC Docket 98-222, released October 5, 1998, paragraph 23).

B. INCORRECT RELIANCE ON BOOK VALUE CAPITAL STRUCTURES

Q. Do you agree with the GSA's reliance on book value capital structures?

A. No, I do not. The GSA relies on an book value-based capital structure for the RBOCs of 44% debt and 56% equity in estimating the overall cost of capital (Direct Case, Table 7, p. 22). The use of market values is theoretically appropriate and consistent with establishing

a expected cost of capital for use in a proceeding such as this one. Firms issue debt and equity at market value and the securities are subsequently bought and sold at market value. No investor would pay the book values of the ILECs' debt and equity while they are traded in open capital markets.

Market values should be used because they are dynamically determined in the marketplace by investors, while book values are the result of historical accounting practices. One-time accounting events that do not change market values can significantly alter book values. Examples of one-time events include restructuring charges, the adoption of SFAS 106 for Other Post-Employment Benefits, and the discontinuance of regulatory accounting under SFAS 71. Additionally, the point in time at which a company issued stock in the past can influence backward-looking book values, while expected market values are not affected. Stock and bond prices do not remain at their issuance prices in dynamic capital markets.

Over time, market values vary from book values as investors change the stock price in reaction to new information. If a new event or announcement significantly enhances or detracts from shareholder value, that change is immediately translated into a market value change, while there is likely to be no immediate change in book value. The GSA's reliance on book values is unrepresentative of the investor's perspective and introduces yet another downward bias into its cost of capital estimates. By using historical, accounting-based capital structures the GSA produces a backward rather than an expected overall cost of capital for the ILECs. Thus, its estimated overall cost of capital of only 9.50% for the ILECs is clearly biased downward.

X. REBUTTAL OF MCI WORLDCOM'S COST OF CAPITAL OBSERVATIONS ON THE ILECS

Q. What is your assessment of the relevance and reliability of MCI WorldCom's comments on the ILECs' capital costs?

A. MCI WorldCom merely assumes that the ILECs' current overall cost of capital is below the Commission's current authorized rate of 11.25%. MCI WorldCom's only support for this incorrect position is that:

> In several proceedings since 1994, MCI WorldCom has filed studies of the LEC cost of capital. These studies showed that the cost of capital was approximately 9.5 percent starting at the latest in 1994, and has now fallen to 9.1 percent. (Comments of MCI WorldCom, CC Docket No. 98-166, January 19, 1999, pp. 3-4.)

Thus, MCI WorldCom does not present any current evidence concerning ILEC capital costs. Their position is only an unproven assumption that is not supported by any up-to-date cost of capital analysis. It is consequently an unreliable basis for making a recommendation to the Commission concerning the appropriateness of the current authorized overall cost of capital of 11.25%.

As noted above, the approaches used in MCI WorldCom's previously filed studies make many of the same errors made by the GSA noted above (e.g., see Statement of Matthew I.

Kahal on Behalf of MCI Communications, CC Docket No. 94-1, filed May 1994). Specifically, the errors in MCI WorldCom's cited prior studies include: 1) improper reliance on the RBOCs as supposedly comparable in risk to ILECs in applying the DCF model to estimate equity capital costs; 2) incorrect use of the annual form of the DCF model in the presence of quarterly dividend payments; 3) incorrect application of the estimated growth rate in the DCF model by only using (1 + .5G) rather than (1 + G), and 4) failure to allow for equity flotation costs.

MCI WorldCom's most recent cost of capital evidence is based on data no more recent than September of 1998 and in the case of the RBOC data, is based on even older data (see Rate of Return for Local Exchange Telephone Companies, Prepared for MCI WorldCom, Inc. by Matthew I. Kahal, October 1998, included in MCI WorldCom, Inc. Comments, CC Docket No. 96-262, CC Docket No. 94-1, filed October 26, 1998). This more recent but still dated study also makes most of the same methodological errors noted above. Thus, MCI WorldCom's incorrect position that the ILECs' current overall cost of capital is below 11.25% is not supported by current cost of capital analysis and relies on dated, historical studies that are methodologically flawed.

XI. SUMMARY OF COST OF CAPITAL ANALYSIS AND RECOMMENDATIONS

Q. What cost of capital do you estimate for the ILECs?

A. My analysis determines the cost of equity capital from two distinct perspectives: 1) the DCF model, as applied to a group of firms comparable in risk to the ILECs, and 2) the CAPM approach. The risk premium approach is used to corroborate the reasonableness of the estimates produced by the DCF and CAPM approaches. I believe that the cost of equity capital for the ILECs is in the range of 15.00% to 15.23%.

My analysis also concludes that the ILECs currently have a market value-based capital structure of 87.83% equity and 12.17% debt and a cost of debt of 6.35%. Thus, the overall cost of capital for the ILECs ranges from 13.95% to 14.15%. It is consequently my opinion that the ILECs current overall cost of capital is in excess of the 11.25% rate of return authorized by the Commission for the ILECs in 1990. Thus, if the Commission should decide to represcribe the authorized rate of return for the ILECs that are subject to rate of return regulation for their earnings on interstate access services at this time, the overall cost of capital should be increased above the current level of 11.25%.

Q. Does this conclude your comments?

A. Yes, it does.

CC Docket No. 98-166

Billingsley Exhibit No. RSB-1

Regulatory and Economic Standards Used In Cost of Capital Analysis

REGULATORY AND ECONOMIC STANDARDS USED IN COST OF CAPITAL ANALYSIS

I. Regulatory Standards

Two important Supreme Court decisions, commonly referred to as **Bluefield** and **Hope**, provide the essential standards that are applied in the regulation of a public utility's allowed rate of return. The first standard is that a public utility should be allowed earnings opportunities sufficient to enable it to attract capital on reasonable terms. The second standard is that a public utility should be allowed the opportunity of earning at a level comparable to other firms of corresponding risk.

The **Bluefield** case establishes the regulatory standard that a public utility's allowed rate of return should be sufficient to permit it to attract the capital that it needs to meet its responsibilities. In order to maintain the ability to attract capital, a public utility must assure that its financial integrity is not compromised.

The **Hope** case establishes the standard that a public utility's allowed rate of return will not be appropriate unless it is comparable to the returns on investments of comparable risk. In terms of the current proceeding, this standard requires that the target firm's discount rate used in universal service fund cost studies be commensurate with the expected rate of return associated with the risk faced by investors in firms of comparable risk.

II. Economic Standards

A. Overview

Several fundamental economic standards are used to determine the cost of equity capital. These standards are implied by the concepts of opportunity cost, the risk/return trade-off, and market efficiency. If the process used to establish the cost of equity is inconsistent with those standards, then the resulting estimate will be biased. Such a cost of equity would not treat ratepayers fairly and could damage the ability of the regulated firm to raise funds. This could compromise the firm's capacity to continue providing appropriate telecommunications services.

B. Opportunity Cost

Investors have the opportunity to put their money to work in a variety of different investments. The decision to put money in one investment implies that another

investment opportunity must be given up. Thus, the opportunity cost of making an investment is the opportunity (expected return) foregone on the next best alternative.

The opportunity afforded by an investment must be measured in light of the time value of money. This acknowledges that the value of a dollar to be received in a year is not worth a dollar today. This is because investors have the opportunity to invest less than a dollar today at some positive expected return in order to generate a dollar a year from today. Money has a time value that reflects the benefits of an investor's other competing investment alternatives.

The cost of equity capital is an opportunity cost from the equity investor's viewpoint. When an investor considers investing money in a stock, care is taken to evaluate the expected return on the next best alternative investment that must be foregone if that stock is bought. An investor has a target required rate of return that is influenced by that opportunity cost. If an investor does not expect a stock to meet the target or minimally acceptable return, then that investor will not purchase the stock. In order to meet investors' return expectations, the firm must reinvest the funds supplied by those investors at an expected rate of return no less than that expected by investors.

The standard that emerges for cost of equity capital analysis is that any estimate should consider the opportunity costs faced by equity investors. The cost of equity capital cannot be determined in isolation. It must reflect equity investors' other investment alternatives. In the case of a regulated public utility, the company's authorized rate of return must meet investors' return requirements, as reflected in the cost of equity capital, or investors will not supply the firm with their capital. This would effectively deny the utility access to the capital market on reasonable terms. Thus, the standards established by **Hope** and **Bluefield** would be violated.

C. Risk/Return Trade-Off

The risk/return trade-off is a description of how investors behave given what they like and what they dislike about investments. Investors generally prefer higher to lower returns and prefer less to more risk. Investors will not take on additional risk unless they expect to earn higher returns. This is because investors must trade-off what they like (higher expected returns) against what they dislike (higher risks) in making investment decisions. In everyday terms, investors cannot get more of what they like unless they are willing to take on more of what they dislike.

In competitive capital markets, the risk/return trade-off will generally prevail. If an investment's expected return is not commensurate with its risk, investors will look

elsewhere for investment opportunities. Investors seeking to measure opportunity costs must develop some criterion for judging what makes investments comparable so that they can identify the "next best alternative foregone," as discussed above. The primary criterion is risk. Investors will evaluate investments of comparable risk and seek the investment yielding the highest expected return for a given level of risk. Thus, opportunity costs can only be measured accurately when the riskiness of competing investments is taken into consideration.

The standard for cost of capital analysis implied by the risk/return trade-off is that a firm must meet the return requirements that equity holders impose after having evaluated other investments of comparable risk. If a firm does not meet investors' risk-adjusted expected returns, investors will move their money to alternative investments of similar risk that offer expected higher returns. This standard asserts that a regulated firm should have the opportunity to earn a return that is commensurate with its risk and, by implication, comparable to the expected returns of other firms of comparable risk.

D. Implications of Opportunity Costs and the Risk/Return Trade-Off

The joint presence of opportunity costs and the risk/return trade-off implies the standard that investments of comparable risk are expected to generate comparable returns. If they do not, investors will purchase the stocks of firms yielding higher expected returns and will sell the stocks of firms yielding lower expected returns until the returns reflected by the prices are the same. This standard is the result of many investors measuring their opportunity costs by comparing investments with full knowledge that relevant alternatives are defined largely on the basis of comparable riskiness.

This standard implies that groups of firms comparable in risk to a target firm should have average costs of equity capital that are comparable to that target firm's cost of equity capital. This is the basis for the common practice of applying the discounted cash flow (DCF) model to a group of comparable firms.

E. Market Efficiency

In its most general form, an efficient market is one in which all information that is relevant to security price (expected return) formation is reflected quickly in prices (expected returns). Market efficiency is not an all or nothing proposition, but rather is a matter of degree. Financial research finds evidence of a high degree of efficiency in

contemporary U.S. financial markets. Thus, security prices are on average unbiased, objective estimates of what the investment community expects to happen to a security. Indeed, prices reflect the market's assessment of what a security is expected to yield given its riskiness relative to comparable investments. The implication of a high degree of market efficiency for cost of equity capital analysis is that the equity prices for firms of comparable risk are reliable sources of objective information about capital costs.

CC Docket No. 98-166

Billingsley Exhibit No. RSB-2

Nature and Applicability of the DCF Model in Regulatory Proceedings

NATURE AND APPLICABILITY OF THE DISCOUNTED CASH FLOW MODEL IN COST OF EQUITY CAPITAL ANALYSIS FOR REGULATORY PROCEEDINGS

I. Nature of the Discounted Cash Flow (DCF) Model

The DCF model is a formal statement of common sense and basic financial theory. The model asks an investor's most basic question: How much is this stock worth? Common sense dictates that the answer depends on what investors expect to get out of the stock and when they expect to get it. The "what" is the expected cash flow stream generated by the stock and the "when" is the projected timing of those expected cash flows.

Determining how much a stock is worth depends on one more critical consideration: the riskiness or probability that investors associate with their forecast of what they will receive from the stock. In this context, risk is the possibility that investors' expectations will be frustrated. Thus, risk is reflected by the probability that investors' actual returns will differ from their expected returns. The DCF model assumes that the average investor dislikes risk and consequently will accept higher risk only if there is a higher expected return.

The DCF model recognizes two types of expected cash flows: the periodic payment of cash dividends and the (possible) future sale of the stock. If an investor facing an opportunity cost of K percent expects to get dividends D_t annually for the next N years and then sells the stock at the end of year N for a price of P_N, then the appropriate current price P_0 is:

$$P_0 = \frac{D_1}{(1+K)^1} + \frac{D_2}{(1+K)^2} + \ldots + \frac{D_N + P_N}{(1+K)^N}$$

In summary, the appropriate price of a stock is the present value of all of the cash benefits that an investor expects to get from owning it.

II. Applicable Form of the DCF Model

A. Issues

The above form of the DCF model is typically modified in at least two ways. First, a regulatory commission is presumably not concerned with determining how much a stock should sell for. Its goal is to determine what rate of return a

regulated firm's equity investors should reasonably expect to receive for bearing the firm's risk. Thus, a regulator is concerned with what the price is rather than with what it should be. The actual price P_{mkt} should consequently be used to infer investors' required rate of return.

Second, the form of the DCF presented above makes no explicit assumption concerning the expected rate of growth in dividends and the stock's price over time, nor any assumption concerning the length of an investor's expected holding period. The so-called constant growth form of the DCF model assumes that dividends and price grow at a constant rate G over time, that the growth rate is less than the required rate of return, and that investors have an infinite or indefinite holding period.

It is important to remember that the fundamental source of a stock's value to investors in the DCF model is its expected dividend stream. Why would investors be willing to trade a stock among themselves if the stock was nothing more than a piece of paper that would never pay any money? If the current price of a stock is the present value of all expected future cash flows, then the price at any point in time should be the present value of the expected cash flows beyond that point in time.

While an infinite holding period may not seem to apply to any one investor, this assumption is an accurate way of portraying the behavior of investors collectively. This is because investors must determine all prices, present and future, by projecting a seemingly endless series of future dividends. They must make such dividend projections since any expected future price is dependent on the dividends that are expected to be paid on that stock after it is purchased.

The constant growth form of the DCF model makes these two adjustments and can be expressed as:

$$K = \frac{D_0 (1 + G)}{P_{mkt}} + G = \frac{D_1}{P_{mkt}} + G,$$

where D_0 is the most recent dividend paid, G is the expected growth rate, D_1 is the next anticipated dividend, and the rest of the variables are defined as above.

Two additional modifications to the DCF model are necessary. First, it should be recognized that dividends are paid by most companies on a quarterly, not an

annual basis. The second adjustment to the general DCF model presented above considers the flotation costs borne by the firm in raising equity funds.

B. Adjustment for Quarterly Dividends

1. Rationale

The annual form of the DCF model assumes that investors receive dividends only once a year and that they have the opportunity to reinvest those cash flows in investments of the same risk. The required rate of return implied by the annual form of the DCF model will be biased downward if investors actually receive their dividend payments in quarterly rather than in annual installments. This bias results because equity investors have the opportunity to start earning a return on their reinvested dividends sooner when these dividends are received quarterly than when the dividends are received only annually.

Investors determine prices that are consistent with the returns that they expect to earn. Thus, investors pay prices that reflect that they expect dividends quarterly rather than annually. Failure to make this adjustment to the DCF model will understate the cost of equity capital. This adjustment should be made in order to determine an economically correct cost of equity for a regulated firm.

2. Specific Adjustment

There are two basic ways in which quarterly dividends can be handled. The first approach makes the simplifying assumption that dividends are paid quarterly and grow quarterly as well. While this approach has the virtue of simplicity, it is not realistic because most firms adjust their dividend payments only once a year, not quarterly.

The second approach assumes that firms pay dividends quarterly but that those dividends are only changed by a firm annually. Thus, quarterly reinvestment opportunities are recognized and the more realistic pattern of annual dividend growth is accounted for as well. This is the approach that I use in my analysis of a regulated firm's cost of equity. Further, I assume that firms on average adjust the level of their dividends in the middle of the year.

The adjusted DCF model calculates a revised dividend, D_1^q :

$$D_1^q = d_1 (1+K)^{.75} + d_2 (1+K)^{.5} + d_3 (1+K)^{.25} + d_4,$$

where d_1 and d_2 are the two quarterly dividends paid prior to the assumed yearly change in dividends and d_3 and d_4 are the two quarterly dividends paid after the given change in the amount paid by a firm. This dividend, D_1^q, revised to recognize the quarterly payment of dividends that grow at rate G once a year (on average for all firms in the middle of the next 12 months), is substituted in the place of D_1 in the basic form of the DCF model as follows:

$$K = \frac{D_1^q}{P_{mkt}} + G.$$

In my analysis, the market price is the average of the monthly high and low stock prices for the most recent three months for which data are available.

C. Adjustment for Flotation Costs

1. Rationale and Specific Adjustment

The cost of equity capital must reflect what a firm needs to earn on its funds in order to meet the return requirements of its investors. Flotation costs reduce the amount of funds that a firm has to invest and thereby increase the return that a firm must earn on those remaining funds if it is to continue attracting investors. If a utility was allowed to recover all of its flotation costs at the time of issuance, there would be no need for this adjustment. Otherwise, it is important to subtract the flotation costs from the price used in the DCF model in order to capture the fact that a utility does not receive the full proceeds of an equity issue.

Two empirical studies indicate that a 5% flotation cost is realistic. Research by C. W. Smith, Jr. (*Journal of Financial Economics*, 1977, pp. 273-307) finds that explicit flotation costs amount to between 4% and 5% of the amount of an equity issue. Focusing on the utility industry, research by R. H. Pettway (*Public Utilities Fortnightly*, May 10, 1984, pp. 35-39) finds that the sale of equity securities generally also involves implicit flotation costs in the form of a 2% to 3% decline in the price of the stock that results from market pressure.

While the above studies deal with both utilities and industrial firms, they are also relevant to the estimation of telecommunications companies' flotation costs. As the telecommunications industry becomes more competitive, such firms are increasingly being viewed more like industrials than as "pure" public utilities.

Equity investors taking a long-term view in their valuations recognize this. Thus, the firm's cost of equity should reflect this expected transition. Therefore, given actual costs of approximately 4-5% and market pressure of 2-3%, I include a conservative 5% flotation cost adjustment that is implemented as a 5% reduction to the stock prices used in my DCF analysis.

2. Relevance of Flotation Costs Despite the Absence of Actual Equity Sales

The fact that a regulated firm does not actually sell equity by virtue of an affiliation with a parent company does not invalidate the need to adjust for flotation costs. Taken to its logical extreme, it could be argued that such a regulated subsidiary firm has no cost of equity capital at all since it does not sell shares of stock on the open market. Yet such regulated firms bear such equity costs and should be compensated accordingly.

The omission of a flotation cost adjustment is incorrect and is equivalent to comparing mortgage rates without adjusting for "points." A regulated firm will not get fair treatment if it is only permitted to earn a return that does not cover all of its reasonable costs, which include flotation costs.

3. Estimation of Growth for Use in the DCF Model

Investors are forward-looking. Investment decisions are made on the basis of how investors expect a stock to perform in the future. While how a stock has performed in the past may well influence an investor's expectations concerning future performance, there is no guarantee that the future will be a simple extension of the past. Thus, it is important that the estimated growth rate used in the DCF model be a prospective or expected, not a historical, rate.

Financial research indicates that the consensus growth rate forecasts of financial analysts are the most unbiased, objective, and accurate measure of investors' growth expectations for a stock. Thus, I use the growth rate estimates published by the Institutional Brokers Estimate System (IBES) and Zacks Investment Research, Inc. (Zacks). Both IBES and Zacks are used widely within the investment profession and are revised frequently enough to remain relevant to investors evaluating the growth prospects of stocks. Further, the use of both sources provides broad-based measures of long-term growth rate expectations.

CC Docket No. 98-166

Billingsley Exhibit No. RSB-3

DCF and CAPM Data for ILEC Comparable Firm Portfolio

DCF AND CAPM DATA FOR ILEC COMPARABLE FIRM PORTFOLIO

DCF RESULTS

Portfolio of Comparable Firms	IBES	ZACKS	BARRA Beta Coefficients
Albertsons	14.97%	16.55%	0.64
Anheuser Busch	11.88%	10.38%	0.75
Atlantic Richfield	13.66%	14.47%	0.61
Avery Dennison	16.25%	16.11%	0.88
Campbell Soup	14.10%	14.09%	0.75
Cincinnati Bell	18.11%	18.26%	0.91
Clorox	14.40%	14.75%	0.91
Corning	19.69%	19.80%	0.99
Disney (Walt)	17.45%	15.77%	1.14
Donnelley R. R. & Sons	14.41%	13.83%	0.82
Dow Chemical	12.94%	10.20%	0.77
Du Pont (E. I.)	12.74%	13.15%	0.88
Heinz (H. J.)	13.70%	13.33%	0.65
Hershey Foods	12.40%	12.34%	0.67
Kellogg	12.80%	12.53%	0.72
Lilly (Eli)	17.80%	17.72%	0.97
May Department Stores	13.22%	13.00%	0.81
Procter & Gamble	14.48%	14.20%	0.88
Wal-Mart Stores	14.81%	14.25%	0.97
Warner-Lambert	24.73%	25.69%	1.00
AVERAGE	**15.23%**	**15.02%**	**0.84**

CC Docket No. 98-166

Billingsley Exhibit No. RSB-4

Comparable Firm Identification Criteria and Methodology

COMPARABLE FIRM IDENTIFICATION CRITERIA AND METHODOLOGY

I. Introduction

Since most of the local telephone operating companies do not have equity trading independently of their respective parent holding companies, there is little equity market evidence with which to directly measure the companies' equity costs. Thus, it is necessary to identify a portfolio of firms that is comparable in equity investment risk to a target, which is the average local telephone operating company. The discounted cash flow (DCF) model is applied to the portfolio's members and an average cost of equity capital is determined for the incumbent local exchange company (ILEC)-comparables group. Given that this portfolio of firms is of comparable risk to its target firm, the average local telephone operating company as a proxy for the ILECs as a group, this average costs of equity is an objective, reasonable estimate of the ILECs' cost of equity. The next section identifies the sources of investment risk and the specific proxies used to identify comparable firms.

II. Risk Criteria

The following sources of investment risk are measured and used to identify a group of firms that is comparable in risk to the ILEC target under analysis:

A. Financial Risk

1. Relative Amount of Debt

   Financial risk is dependent, in part, on the amount of total debt employed by a firm relative to its equity base. Other things being equal, higher debt per dollar of equity implies higher risk. This source of risk is measured by a firm's equity-to-total capital ratio. The most recent annual value (1997) of this ratio is used.

2. Ability to Service Debt

   Apart from the above descriptive measure of a firm's relative indebtedness, it is important to evaluate the ability of a firm to service its total debt. This is assessed by examining the amount of interest (I) that a firm owes relative to the resources (net cash flow (NCF), or net income plus non-cash expenses plus interest expense) it has available to meet that commitment. This is measured by the cash flow-based interest coverage ratio, NCF/I. Other things being equal, an increase in this ratio reflects greater ability to service debt and

consequently implies lower riskiness. The most recent annual value (1997) of this variable is used.

3. Bond Rating

Bond ratings reflect a rating agency's evaluation of the relative probability of default on a firm's given debt security. Ratings are readily accessible to investors and are commonly used to appraise the risk of a firm. Bond ratings are assigned numerical (i.e., dummy variable) values for the purposes of the present analysis.

B. Business Risk

1. Variability of Cash Flows

The variability of a firm's cash flows characterize the riskiness of a firm's chosen line of business. Cash flows represent a firm's command over goods and services. The risk implications of a given level of cash flows are easiest to interpret when related to an economically meaningful base such as total assets. This source of risk is measured by the standard deviation of the ratio of a firm's operating cash flows-to-total average assets. Higher values of the measure are associated with greater risk. The variable is calculated using the most recent five years of annual data (1993-1997).

2. Operating Return on Assets

The operating return on assets, as measured by the ratio of a firm's operating cash flow-to-total average assets, reflects the business risk associated with generating income in a given line of business. Operating cash flow is used because it does not include the risk effects captured in measures that include financing and investing choices. This variable is calculated using the most recent annual data (1997).

C. Relationship Among Regulatory, Business, and Financial Risk

As discussed in the above statement, the ILECs face significant regulatory risk. While this risk is important, it is cannot be measured directly. However, it is reasonable to expect that the above business and financial risk measures capture the effects of regulatory risk. In other words, business and financial risk measurements should be influenced by the regulatory environment faced by a firm. Because the average business and financial risk characteristics of the ILEC-target firm sample reflects the regulatory environment, the resulting sample of companies comparable in risk to the ILECs captures the target sample's business, financial, and regulatory risk. Indeed, the influence of regulatory risk on business and financial risk

measures allows the comparable risk sample to be drawn from the broadest possible sample of firms irrespective of their particular regulatory environment. For example, it is not necessary to limit the potential sample of companies that are comparable in risk to the ILECs to regulated telecommunications firms because the influence of the regulatory environment is already captured in the business and financial risk measurements. Investors compare companies on the basis of expected return and risk across industry classifications and regulatory environments in making day-to-day investment decisions. Thus, the process used in the current analysis to identify a group of firms that are comparable in risk to the ILECs relies on the common-sense logic used by investors in comparing firms.

III. Methodology Used in the Comparable Firms Identification Process

A portfolio of comparable firms is identified using a modified cluster analysis model. Classical cluster analysis techniques develop natural groupings of objects based on the relationships among a given set of descriptive variables. The goal is to determine how the object should be assigned to groups so that there will be as much similarity within groups and as much difference among groups as possible. No predetermined reference object is offered to organize the grouping effort. The modified cluster analysis used in this analysis differs from the classical techniques by identifying a target object (firm) characterized by several descriptive (financial) measures. The goal of this application is to find a group of firms that is as similar as possible to the target firm in terms of the identified measures of investment risk. Unlike classical cluster analysis, the goal of maximizing the differences among groups is irrelevant since all dissimilar groups are discarded. Specifically, in this context, only those firms that are identified as comparable to the given target firm are retained for use in inferring its cost of equity capital.

As in classical cluster models, similarity is determined by measuring the Euclidian distance between the descriptive variables in a manner that considers the multivariate nature of the problem. The distance D_i of each firm i in the sample from the target firm T, assuming the five descriptive variables V_{ij} discussed above, is calculated as:

$$D_i = \sqrt{\Sigma_{j=1}^{5} (V_{ij} - V_{Tj})^2}.$$

The distance measure uses the squared differences of a given firm's descriptive variable from that of the target firm T in order to measure distance irrespective of whether it is above (positive) or below (negative) the respective value for the target firm. The portfolio of firms considered to be similar to the target, the average local telephone operating company or ILEC, is identified by balancing the goals of minimizing the distance D_i of a firm from the target with the desire to have a sample of sufficient size to assure confidence in its representativeness.

IV. Issues in Applying Cluster Analysis

Only firms available on the COMPUSTAT data source also having an IBES and Zacks consensus growth rate forecast based on at least two analysts' estimates are retained for analysis. Foreign, financial, and limited partnership firms are eliminated. The sample of local telephone operating companies consists of 30 firms, which are listed at the end of this exhibit. Firms such as Frontier Corporation whose primary revenue source is from long-distance services (70% of revenue in 1997) are excluded from the ILEC target sample. Further, firms such as Cincinnati Bell that have recently been involved in a major corporate spin-off (Convergys Corporation in December of 1998) are also excluded from the analysis due to data restatement issues. The sample of firms used to identify the ILEC-comparable portfolio removes outliers on a variable-by-variable basis. Those firms with variable values greater than two standard deviations above or below the mean value of the population for each variable are deleted. All outliers are eliminated before standardizing the variables to prevent biasing the means and standard deviations. The final population consists of 394 firms.

Since the proxies of investment risk discussed above are denominated in different units of measurement, they consequently need to be standardized. A Z-statistic is calculated using the mean of V_j and the standard deviation σ_j of each variable across all of the firms as:

$$Z_{ij} = \frac{V_{ij} - \overline{V_j}}{\sigma_j}$$

The squared difference between the Z-value for each firm's given variable and the value of the Z-statistic for the target firm for the same given variable across all descriptive variables is then calculated. After generating Z-values for every variable for each firm, squared differences for each firm are summed. The distance measure D_i is determined by taking the square root of the sum of the squared differences.

The final step in the analysis is the identification of the portfolio of the 20 firms that are the least distance from the average ILEC. Billingsley Exhibit No. RSB-3 lists the final group of comparable firms for the ILECs. A correlation coefficient matrix for the variables used to identify firms is provided on the following page.

CLUSTER ANALYSIS CORRELATION MATRIX

	Common Equity to Total Capital	Operating Cash Flow to Assets Standard Deviation	Operating Cash Flow to Assets	Cash Flow Interest Coverage
Bond Rating	0.1617	0.0713	0.0844	0.1789
Common Equity to Total Capital		0.0187	0.1162	0.3671
Operating Cash Flow to Assets Standard Deviation			0.0053	0.0004
Operating Cash Flow to Assets				0.1390

LOCAL TELEPHONE OPERATING COMPANIES USED TO CHARACTERIZE THE AVERAGE ILEC

Alltel Pennsylvania
Bell Atlantic/DC
Bell Atlantic/DE
Bell Atlantic/MD
Bell Atlantic/NJ
Bell Atlantic/PA
Bell Atlantic/VA
Bell Atlantic/WV
BellSouth Telecommunications
Carolina Telephone & Telegraph
Century Telephone Enterprise
GTE California
GTE Florida
GTE Hawaiian Telephone
GTE North
GTE Northwest
GTE South
GTE Southwest
Illinois Bell Telephone
Indiana Bell Telephone
Michigan Bell Telephone
New England Telephone & Telegraph
New York Telephone
Ohio Bell Telephone
Pacific Bell
Southern New England Telephone
Southwestern Bell Telephone
United Telephone -Florida
Wisconsin Bell