where,

w_d = the fraction of debt in the capital structure,

k_d = the forward-looking cost of debt,

w_e = the fraction of equity in the capital structure,

k_e = the forward-looking cost of equity.

To apply the formula, one must estimate the forward-looking cost of both debt and equity using methodologies accepted by both financial economists and regulators. In addition, one must estimate the appropriate capital structure mix of debt and equity capital. With these inputs, the WACC can be calculated from equation (1).

To calculate the cost of capital associated with unbundled element leasing, the WACC formula should be applied to the closest comparable companies for which public market data is available. As explained earlier, large telephone holding companies are selected as the best proxies. Because these firms operate many businesses, most of which are riskier than the business in question in this case, their calculated WACC is likely to be higher than the WACC for the network element leasing business.

Comparable Telecommunications Companies

The comparable companies selected are derived from the list of telephone operating companies in Standard and Poor's Industry Survey. These companies are presented along with some descriptive information at Attachment 1, and include the seven regional operating Bell companies (RBOCs) , and the larger independent telephone companies.

The Cost Of Debt Capital

Because debt payments are fixed, the cost of debt can be computed directly and with a high degree of accuracy. The best estimate of the cost of debt for a telephone company is the weighted average forward-looking cost over all of the company's outstanding issues, including the debt of the holding company and any subsidiaries. Standard & Poor's Bond

Guide (Bond Guide) provides information on the face value and current yields to maturity on individual bonds.[3]

Bond data for all of the RBOCs, GTE and Southern New England Telecommunications Corp. (SNET) from the Bond Guide are presented in Attachment 2. As noted, only the weighted average yield to maturity on debt of the company whose cost of capital is being estimated is used in each company's WACC analysis. For all the major debt issues the Attachment shows the bond rating, the face value and the yield to maturity. The yield to maturity is a forward-looking cost of debt that measures the rate that the telephone company would have to pay if the bonds were issued at the current date, and reflects investors' expectations regarding the future returns on these publicly-traded bonds.

The Cost Of Equity Capital

The cost of debt can be computed directly because both the face value of debt and the contractual payments a company agrees to make are fixed. In the case of equity, however, there is no face value, and dividends are paid at the discretion of management depending upon business conditions. In addition, the dividend stream does not terminate at a known point. For these reasons, there is no simple arithmetic way to compute the cost of equity capital and more complex approaches must be employed.

There are two basic methods for estimating the cost of equity capital. The first is the discounted cash flow, or DCF, method that estimates the present value to investors of future dividends expected to be received. It has been widely adopted by the courts and regulatory agencies in rate of return hearings. An alternative is the capital asset pricing model, or CAPM. Methods based on the CAPM are sometimes referred to as "risk premium" methods because the model provides an estimate of the risk premium associated with investing in

[3] The Bond Guide does not always cover all outstanding issues if there are many. It appears that the smaller and shorter term obligations may be excluded. Because interest rates on longer term obligations are generally higher, this would have the effect of overstating the cost of debt slightly.

specific issues of common stock. Both methods are forward-looking, as they are based on expectations of future cash flows that will be derived from the investment being evaluated.

In my judgment, the DCF method is the primary analytical approach. Risk premium methods such as the CAPM serve to corroborate the results obtained using the DCF method. As the CAPM model results in higher estimates of costs of equity for the telephone holding companies, however, I have utilized an average of the costs of equity derived from the DCF and CAPM methods. In my view it is conservative to use this average because it increases the cost of capital estimate.

The DCF Method

The DCF method is based on the realization that the price of a share of stock, P, equals the present value of all future dividends expected to be received on that share, discounted at the cost of common equity. Mathematically, **the DCF model** is written,

$$P = Div_1 / (1+k) + Div_2 / (1+k)^2 + Div_3 / (1+k)^3 + \ldots, \qquad (2)$$

where Div_1 is the expected dividend in year 1, Div_2 is the expected dividend in year 2, etc., and k is the cost of capital.

The cost of common equity is arrived at by solving the DCF equation for the cost of capital, k. There are two obstacles that make it difficult to solve the equation. First, the number of terms in the equation is infinite. Second, dividends must be forecast for every future year. To surmount these obstacles, simplifying assumptions must be made about the behavior of future dividends.

The simplest assumption that can be made is that future dividends will grow forever, at a constant rate, g, i.e. the growth rate can be maintained in perpetuity. In that case the DCF equation simplifies to **the constant dividend growth model**,

$$P = Div_1 / (1+k) + Div_1 * (1+g) / (1+k)^2 + Div_1 * (1+g)^2 / (1+k)^3 + \ldots,$$

which can be solved for k. The solution is well known to be,

$$k = Div_1 / P + g$$

However, a more sophisticated version of the dividend growth model should be used for estimating the cost of capital for a sample of telephone companies. The telephone companies in our group of comparables are composed of a variety of businesses, some of which– such as cellular– are expected to grow at rates of 30 percent or more in the short run. Such high growth rates are not sustainable into perpetuity. It is therefore more appropriate to use a three-stage approach to estimating future growth.

The Three-Stage DCF Model

A reasonable set of assumptions for the three-stage version assumes that the first stage lasts five years, because that is the longest horizon over which analysts' forecasts of growth are available. The second stage is assumed to last 15 years. During this stage the growth rate gradually tapers from the initial level of the first five years to converge to the growth rate of the U.S. economy as a whole. From the twentieth year onward the growth rate is set equal to the growth rate for the economy because different rates cannot be sustained into perpetuity.

The First Five Years

To estimate growth rates during the first five years, individual company earnings forecasts can be obtained from the Institutional Brokers' Estimate System (IBES) as of July 1996, which is provided by the firm of Lynch, Jones and Ryan. To compile the IBES data, Lynch, Jones and Ryan surveys over 2000 analysts each month regarding their estimates of five-year earnings growth rates for a wide variety of major American companies.[4] These analysts represent over 100 different securities firms. The forecasts are tabulated and widely

[4] By relying on the IBES data, which is for earnings, there is an implicit assumption that dividends and earnings grow at approximately the same rate over the five-year horizon. There are no growth forecasts beyond a five-year horizon, so an assumption must be made about how the growth rate behaves after that.

distributed to subscribers, including large institutional investors, such as pension funds, banks, and insurance companies.

Long-Run Growth

Long-term growth forecasts can be derived by averaging the long-term GNP growth forecasts obtained from the WEFA Group and from Ibbotson Associates. The WEFA Group is an econometric forecasting organization, formed in 1987 through a merger of Wharton Econometric Forecasting Associates and Chase Econometrics. Ibbotson Associates is widely known in the fields of finance and valuation as one of the leading providers of securities returns data and publications. As of June 24, 1996, WEFA predicted an average nominal GNP growth rate of 4.82% from 1997 through 2019. As of the first quarter of 1996, Ibbotson Associates forecast long-term inflation to be 3.3% annually. Ibbotson assumes that the historical long-term real GNP growth rate of 3.1% will prevail in the future. Compounding the two Ibbotson forecasts gives a nominal long-run GNP growth rate prediction of 6.4%. An average of the WEFA and Ibbotson nominal forecasts, 5.61%, is used for the DCF model.

Estimating future growth for a company always involves some uncertainty because no analyst can be expected to have perfect foresight. In some cases, the growth rate may be overestimated and in other cases it may be underestimated. On average, over a group of companies, these estimation errors tend to cancel out so that the estimated average growth rate for the group is more accurate than the estimated growth rate for any individual company.[5] Consequently, the DCF method is applied to all the telephone companies in the previously-identified sample.

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[5] I refer to estimation error and the desirability of using averages in several discussions in this paper. For the reader with some familiarity with statistics, the following excerpt from *A Guide to Econometrics*, (3rd Edition, The MIT Press, Cambridge, MA, 1992) by Peter Kennedy summarizes in simplified terms the purpose for using larger samples: (footnote continued on next page)

Given the market price of a company's stock, the current dividend, and the forecast growth rates during each of the three stages, equation (2) can be solved for k. This solution is the estimate of the cost of equity capital.

Cost of Equity Capital— DCF Method

Attachment 3 presents the DCF estimates of the cost of equity capital derived from the three stage model for the telephone company sample. The company-specific estimates range from a low of 9.6 percent to a high of 13.3 percent. The overall value-weighted average cost of equity capital for all of the companies is 11.22 percent.

The method that I have employed to arrive at a company-specific estimate of a cost of equity is as follows. First, a value-weighted average cost of equity is computed for all companies in Attachment 1 except the one for which the cost of equity is being estimated. Second, a weighted average which assigns a ¾ weight to the value-weighted average excluding the target company and a ¼ weight to the company is computed. This is done because there is a trade-off between two considerations. First, because the DCF approach, like any approach, estimates the cost of equity capital with error, it is wise to use an average. This is because in the averaging process errors tend to cancel with overestimates offsetting underestimates. Second, of all the individual companies in the sample, the target provides the best estimate of its own cost of capital.

Capital Asset Pricing Models

Capital asset pricing models are mathematical formulas designed to quantify the trade-off between risk and return. The CAPM is designed to give the risk premium, that is the

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"The sampling distribution of most estimators changes as the sample size changes. The sample mean statistic, for example, has a sampling distribution that is centered over the population mean but whose variance becomes smaller as the sample size becomes larger. In many cases it happens that a biased estimator becomes less and less biased as the sample size becomes larger and larger— as the sample size becomes larger its sampling distribution changes, such that the mean of its sampling distribution shifts closer to the true value of the parameter being estimated." (pg. 18)

premium over the rate on Treasury securities, required to induce investors to hold specific issues of common stock. The **standard CAPM** is given by equation (3),

Company risk premium = Company "beta" * Market risk premium (3)

To apply the CAPM for a given company, it is necessary to estimate both that company's beta and the market risk premium.

Estimating Beta

The beta coefficient measures the systematic risk of investing in a company's equity. The CAPM is built upon the insight that investors will be rewarded for bearing only those risks, called systematic risks, that cannot be eliminated by diversification.

Beta is calculated by a procedure called regression analysis. Using regression analysis, the sensitivity of a stock to movements in the market can be estimated. This sensitivity is what determines beta. Dow Jones Beta Analytics software available on-line through the Dow Jones News Retrieval Service is used to obtain betas computed on five years of monthly return data through July 31, 1996 for all of the comparable telephone companies. Returns on the S&P 500 are used as the market proxy. Because beta is measured with error, the average beta over all the comparables is a more accurate indicator of the true beta than any individual estimate of beta.

Betas can also be calculated over other time periods and using different observation intervals. For example, for newer smaller companies one year of daily data are often used to measure beta. This is because the true underlying beta is likely to be changing for such companies and because five years of data are often not available. The drawback is that the shorter sample period and more frequent observation interval increase measurement error. The telephone

company sample is sufficiently large, established and stable that it is more appropriate to use five years of monthly data. [6]

Before averaging individual betas it is necessary to take account of the fact that the various comparable companies have differing amounts of debt in their capital structures. The amount of a company's debt leverage affects the riskiness of its stock returns and thereby its beta. To take account of this, a two-step procedure is used to estimate the average beta. First, the raw betas (i.e. betas computed using the Dow Jones software without accounting for capital structure differences) are estimated for each of the sample companies. Second, the raw betas are "unlevered" using standard financial economic formulas and based on the market value debt/equity ratios of each respective company as of December 31, 1995.

The **formula for "unlevering" a raw, or "levered" beta** is,

$$B_u = B_L / [1 + (1 - Tc) \times D/E] \qquad (4)$$

where,

B_u = the "unlevered" beta,

B_L = the "levered" beta,

E = the value of the sample company's equity;

T_c = the corporate tax rate (typically an average rate for the sample);

D = the value of the sample company's debt.

This puts all the betas on comparable terms so that they can be averaged. Once the average has been estimated, the beta for any individual company is estimated by "re-levering" using a simple variant of formula (4) which solves for B_L, the "levered" beta.

[6] I also examined betas calculated using one year of daily data and found that the numbers did not differ significantly from those calculated using five years of monthly data. This indicates that there has been no significant shift in the risk of RBOCs and other large independent telephone companies.

The Telephone Company Beta Estimates

Raw (levered) estimates of beta for the telephone companies in the sample are presented in Attachment 4. They vary from a high of 1.10 to a low of 0.66 on a levered basis. As discussed above, however, before calculating an average, the betas must be unlevered to adjust for the different amount of debt leverage employed by the individual companies before calculating an average. Attachment 4 also shows the unlevered betas and their market value weighted average. The weighted average unlevered beta for the entire sample is 0.70. The average unlevered beta is re-levered using the formula discussed above to take account of the capital structure of the telephone company for which the cost of capital is being estimated. The result is a range from 0.77 to 0.97.

By definition, the beta of all common stock generally (in other words the beta of the market) is 1.0. Therefore, the beta of these telephone stocks is less than that of common stocks generally. This means that investments in these telephone company stocks are less risky than investments in typical industrial companies. Consequently, the cost of capital for the telephone companies should also be less than it is for the average **Estimating the Market Risk Premium**

The risk premium on the market is the amount of added expected return that investors require to hold a broad portfolio of common stocks instead of risk-free Treasury securities. Because there are over 100 issues of Treasury securities, some convention is required to derive a risk premium. Commonly, the risk premium is measured over both short-term Treasury bills with a maturity of one to three months and long-term Treasury bonds with a maturity of 10 to 30 years. For these cost of capital analyses, one-month Treasury bills and 20-year Treasury bonds are used because Ibbotson Associates has compiled data on these securities back to 1926.

The market risk premium can be estimated two ways. First, the DCF approach can be applied to the market as a whole. Second, the premium can be estimated by examining historical data on the difference between the return on a broad portfolio of common stocks and associated Treasury securities.

DCF Estimate Of The Market Risk Premium

Two steps are required to estimate the market risk premium using the DCF model. The first step is to compute the DCF expected return (another word for the cost of capital) for the market as a whole. Deducting the risk-free rate from the expected return gives the market risk premium.

The starting point for estimating the expected return on the market is the S&P 500 index. The sample is then limited to those S&P 500 companies that pay a dividend of at least 3 percent on the grounds that the DCF approach is less accurate for companies that pay small dividends.[7] The sample includes large companies for which the data is considered to be reliable for purposes of DCF estimates. For the selected companies, the three-stage DCF model is applied in the same fashion as it was applied to the sample of telephone companies. Finally, the individual DCF estimates for the sample companies are averaged. This average, which comes out to be 11.32 percent, is used as an estimate of the expected return on the market as a whole.

The market risk premium is computed by subtracting the risk-free rate from the expected return. In the case of the 20-year Treasury bond this is straightforward. The calculations are shown in Attachment 5. The Attachment shows that as of July 1996, the 20-year bond yield was 7.1 percent. Subtracting 7.1 from 11.32 percent gives a market risk premium over long-term Treasury bonds of 4.22 percent.

[7] All of the companies in the telephone sample pay dividends greater than three percent except Cincinnati Bell.

In the case of one-month Treasury bills the situation is more complicated. Because the goal of the analysis is to estimate the long-run cost of capital, using a one-month interest rate can be misleading. A more appropriate choice is the average return on one-month Treasury bills that is expected to obtain over the long-term. This can be calculated using the following two-step procedure. First, compute the long-run historical difference between the return on one-month Treasury bills and the return on 20-year Treasury bonds. Second, subtract that historical difference from the current yield on 20-year bonds. The difference gives a forward-looking market estimate of the average expected yield on one-month Treasury bills over the next 20 years. Attachment 6 shows that the average expected one-month Treasury bill rate over the long run is 5.4 percent as of July 31, 1996. Subtracting this rate from the expected return on the market gives a market risk premium over Treasury bills of 5.92 percent as shown in Attachment 5.

Using The Historical Risk Premium To Estimate The Market Risk Premium

The historical risk premium is defined as the historical difference between the return on the stock market and the risk-free rate. Attachment 7-3 presents both arithmetic and geometric averages of the historical risk premium calculated over various periods of time.[8] In Attachment 7-3, the S&P 500 Index is used to measure the market. Attachment 7-3 shows that depending on the period selected and the method for averaging, the historical premium of stocks over Treasury bills ranges from 8.8 to 5.2 percent, while the average premium of stocks over long-term Treasury bonds (total return) ranges from 7.1 to 2.6 percent. When income returns are used to calculate the bond premium, the range is 7.4 to 3.7 percent. The higher premiums occur in earlier years and when the arithmetic average is used.

In light of the results in Attachments 5, 6, and 7-3, my conclusion is that the best estimates of the market risk premium are 7.5 percent over one-month Treasury bills and 5.5 percent over 20-year Treasury bonds. These estimates are conservative (i.e., on the high side) in the sense

[8] Historical annual returns on the S&P 500, one-month treasury bills, long-term treasury bonds, and long-term treasury bond income returns are shown at Attachments 7-1 and 7-2.

that they are above the premiums observed in the more recent periods and greater than those implied by the DCF analysis.

The Estimate Of The Cost Of Equity Capital

To review, **the CAPM** says that,

Cost of equity capital = Risk-free rate + Beta * Market risk premium.

Applying this equation using the long-run expected one-month Treasury bill rate as the measure of the risk free rate and each company's estimated beta provides the estimates of the cost of equity for each company presented in Attachment 8.[9] Applying the CAPM equation using the 20-year Treasury bond as the measure of the risk free rate gives the results also shown at Attachment 8.

These estimates are remarkably close to those obtained using Treasury bills as the measure of the risk-free rate. In light of these results, the average of the two is used as the CAPM estimate of the cost of equity capital.

Conclusion Regarding The Cost Of Equity

A reasonable overall estimate for the cost of equity is approximately the midpoint of the range between the estimates calculated using the three-stage DCF and CAPM methods. The midpoints for each company in the sample are shown in Attachment 8. As discussed above, while I view the DCF method as the primary analytical method, it is conservative to use an average because the CAPM estimates tend to be slightly higher. When the midpoint is selected, the resulting range for the cost of equity for the sample companies is 11.33% to 12.10%.

[9] Notice that in the preceding equation the expected long run Treasury bill rate over the next 20 years is used, not the current one-month Treasury bill rate. It is worth noting that such choice has almost no impact on the final result.

Capital Structure

Most American business are financed by a combination of equity (common stock) and debt (including bonds and bank loans). The capital structure refers to the fraction of debt and equity used to finance a business. In terms of the WACC formula presented at the outset, the capital structure is determined by the financing weights, w_e and w_d.

The capital structure is generally related to the risk of a business. As discussed earlier, companies that face greater operating risk tend to take on less debt. For example, most computer software and biotechnology companies typically have virtually no debt in their capital structure.

When estimating the cost of capital for a company, a goal is to estimate the long-run target capital structure that a rational, informed management team would employ. If there are comparable companies, the accepted solution is to use their observed capital structure as the starting point. In this case, however, the comparables are all riskier than the company in question because of the necessity to use data that are only available at the holding company level.

The Capital Structure For The Telephone Companies

The current capital structures for the sample of companies is shown in Attachment 9. Notice that the comparison is made on both a book value and market value weight basis. At this juncture, there remains a debate among academics regarding the choice between book and market weights. Historically, the operating phone companies have presented their cost of capital in terms of book value weights.

The market value of total invested capital value-weighted average book value debt weight for the sample companies is 57 percent as of December 31, 1995. In terms of market value weights– based on market prices of equity at July 31, 1996– the debt weights are lower. The total invested capital value-weighted average weights based on market value for the full

sample is 25 percent. However, market value weights probably understate long-run target weights for two reasons. First, the sharp rise in equity values in 1995 pushed up the market value of equity significantly and unexpectedly. Second, although debt values also rose sharply when interest rates fell in 1995, this is not reflected in the weights. Market value weights refer only to the market value of equity; debt is always valued at book. For these reasons, in this case it is inappropriate to rely solely on current market value weights when calculating the WACC. Therefore, the WACC formula is applied using both debt and market weights to establish a range.

The Appropriate Range For The Weighted Average Cost Of Capital

Given the dispersion in capital structure weights, it is appropriate to use the average company weights in the WACC calculations. The average is the best current estimate of the target capital structure for participants in this industry. As discussed above, since there is not general agreement regarding the preferability of book versus market weights, both book and market averages are employed in this analysis to establish a WACC range for each company within which its actual WACC is expected to fall.[10]

Attachment 10 shows the WACC from the estimates of the cost of debt, the cost of equity and the capital structure.

Potential Upward Bias In The Estimated Cost Of Capital Using Telephone Holding Company Comparables

Modern diversified corporations like telephone holding companies operate dozens of different businesses, some of which are riskier than others. Consequently, the operating risk of the corporation is a weighted average of the risks of all the constituent businesses. There are some risks associated with the business of "leasing" of unbundled network elements. There is the risk of regulation itself. The return a network is allowed to earn depends on the outcome of arbitrations such as these and remains somewhat uncertain. That risk is reduced

[10] One approach that would clearly be inappropriate would be to adjust a commission-approved return based on book value weights without also assuring that the return received proper tax treatment.

by the FCC's compensatory forward-looking pricing rules that tell investors that telephone holding companies will have the opportunity to recover all efficiently-incurred costs on a forward-looking basis. In addition, there remains some risk that end users, particularly business users, will bypass the incumbent LEC's network as other alternatives become available. These risks, however, are substantially less than the risks faced by telephone holding companies' other businesses.

To aid in assessing the degrees of risk, think of integrated telephone holding companies as being composed of separate business units. One business unit owns the network and leases network elements to all local service providers, including both competitors and the telephone companies' other business units that are involved in the provision of local service. Whereas those operating units involved in providing local service are in businesses that (if prices are set appropriately in these proceedings) will be faced with new competitors, the unit involved in leasing the network which all the competitors need to use maintains virtual monopoly power and faces much less risk. The sample of companies for which cost of debt and equity are estimated is composed of diversified telephone companies. As stressed earlier, these companies operate a variety of businesses, virtually all of which face a great deal more operating risk than leasing a local exchange network. The company to which the WACC should be applied, however, is one which is involved exclusively in leasing network facilities. Under these circumstances, using a higher debt weight than the current market value weights for the sample companies is one way to take account of the relative risks.

Conclusion

The Telecommunications Act provides that LEC's are entitled to a reasonable return— based on forward-looking costs— for providing network elements to unaffiliated users. This white paper sets forth modern analytical techniques which estimate the forward-looking cost of capital of diversified telephone holding companies. These techniques are based on current thinking in financial economics regarding the estimation of rates of return required by investors: forward-looking information embodied in current stock market prices for equity; in

current interest rates and in growth projections prepared by professional analysts and forecasters; and, specific factual information related to these companies and the communications industry as a whole. The resulting cost of capital estimates for the diversified telephone holding companies by definition overestimate the cost of capital for the business of providing network elements.

Attachment 1

Telephone Holding Companies

Company	Market Value of Equity at 7/31/96 ($ mil)	1995 Revenues ($ mil)	1995 Book Value of Plant ($ mil)	Access Lines in Service (mil)
RBOC's				
Ameritech	30,502	13,428	14,288	19.3
Bell Atlantic	25,883	13,430	15,921	20.0
BellSouth	40,750	17,886	21,092	21.5
NYNEX	19,675	13,407	17,055	17.1
Pacific Telesis	15,411	9,042	11,385	16.0
SBC Communications	29,771	12,670	12,988	14.5
U.S. West	14,508	9,484	13,529	15.1
Large Independent Telephone Companies				
ALLTEL	5,189	3,110	2,973	1.6
Cincinnati Bell	3,274	1,336	994	0.9
GTE	39,798	19,957	22,437	24.5
SNET	2,521	1,839	1,565	2.0

Sources: Value Line Inc.; Dow Jones News Retrieval.

Summary of Cost of Debt for RBOC's, GTE and SNET

AIT	**AMERITECH**	7.46%
BEL	**BELL ATLANTIC**	7.41%
BLS	**BELLSOUTH**	7.50%
NYN	**NYNEX**	7.66%
PAC	**PACIFIC TELESIS**	7.58%
SBC	**SBC COMMUNICATIONS**	7.50%
USW	**US WEST**	7.64%
GTE	**GTE**	7.57%
SNG	**SNET**	7.49%

Details are presented in Attachments 2-2 through 2-14.

AMERITECH Bond Yields

	S&P DEBT RATING	Debt Outstanding at Par (mil $)	Yield to Maturity
Ameritech Capital Funding			
Gtd Deb 7 1/2s 2005	AA+	192	7.16%
Illinois Bell Telephone			
1st G 4 7/8s '97	AAA	50	6.15%
1st H 4 3/8s 2003	AAA	50	7.06%
1st K 7 5/8s 2006	AAA	200	7.62%
Deb 7 1/8s 2023	AAA	100	7.70%
Deb 7 1/4s 2024	AAA	200	7.75%
Deb 6 5/8s 2025	AAA	100	7.69%
Deb 8 1/2s 2026	AAA	275	8.18%
Nts 5.80s 2004	AAA	100	7.08%
Indiana Bell Telephone			
Deb 4 3/8s 2003	AAA	20	7.11%
Deb 4 3/4s 2005	AAA	25	7.20%
Deb 5 1/2s 2007	AAA	40	7.35%
Michigan Bell Telephone			
Deb 6 3/8s 2005	AAA	125	7.15%
Deb 7 3/4s 2011	AAA	150	7.75%
Deb 7s 2012	AAA	75	7.48%
Deb 7.85s 2022	AAA	200	7.61%
Deb 7 1/2s 2023	AAA	200	7.76%
Nts 5 7/8s '99	AAA	150	6.64%
Nts 6 3/8s 2002	AAA	100	6.96%
Ohio Bell Telephone			
Deb 5s 2006	AAA	60	7.31%
Deb 5 3/8s 2007	AAA	75	7.26%
Deb 6 3/4s 2008	AAA	55	7.34%
Deb 7 1/2s 2011	AAA	100	7.53%
Deb 7 7/8s 2013	AAA	200	7.77%
Deb 7.85s 2022	AAA	100	7.80%
Nts 5 3/4s 2000	AAA	100	6.78%
Nts 6 1/8s 2003	AAA	150	7.09%
Wisconsin Bell Inc			
Deb 7 1/4s 2007	AAA	90	7.37%
Deb 6 3/4s 2024	AAA	150	7.64%
Wisconsin Telephone (Now Wisconsin Bell Inc)			
Deb 4 3/8s 2002	AAA	20	7.00%
Deb 6 1/4s 2004	AAA	50	7.19%
		Weighted Average:	7.46%

Source: Standard & Poor's Bond Guide, August 1996

Bell Atlantic Bond Yields

	S&P DEBT RATING	Debt Outstanding at Par (mil $)	Yield to Maturity
Bell Atlantic Fin'l Services (issued under support agreement w/Bell Atlantic Corp)			
Nts 6 5/8s '97	A+	130	6.32%
Bell Atlantic--N.J. (was New Jersey Bell Tel.)			
Deb 5 7/8s 2004	AA+	250	7.05%
New Jersey Bell Tel. (Now Bell Atlantic--N.J.)			
Deb 4 7/8s 2000	AA+	20.0	6.94%
Deb 7 1/4s 2002	AA+	100	7.04%
Deb 4 5/8s 2005	AA+	40.0	7.33%
Deb 5 7/8s 2006	AA+	55.0	7.27%
Deb 6 5/8s 2008	AA+	50.0	7.27%
Deb 7 1/4s 2011	AA+	125	7.59%
Deb 7 3/8s 2012	AA+	75.0	7.76%
Deb 8s 2022	AA+	200	7.57%
Deb 7 1/4s 2023	AA+	100	7.71%
Deb 6.80s 2024	AA+	100	7.70%
Deb 7.85s 2029 (HRO on 11-15-99 @ 100)	AA+	150	7.29%
Bell Tel. of Penna (Now Bell Atlantic--Pennsylvania)			
Deb 4 3/4s 2001	AA	50.0	6.94%
Deb 6 5/8s 2002	AA	100	7.03%
Deb 4 3/8s 2003	AA	50.0	7.05%
Deb 6 1/8s 2003	AA	150	7.06%
Deb 7 3/8s 2007	AA	150	7.29%
Deb 6 3/4s 2008	AA	100	7.41%
Deb 7 1/8s 2012	AA	75.0	7.77%
Deb 7 1/2s 2013	AA	125	7.71%
Deb 7.70s 2023	AA	100	7.93%
Deb 8.35s 2030 (HRO on 11-15-99 @ 100)	AA	175	7.29%
Deb 8 3/4s 2031	AA	125	7.67%
Deb 7 3/8s 2033	AA	225	7.88%
Chesapeake Pot. Tel Md (Now Bell Atlantic-Maryland)			
Deb 5 7/8 '99	AA	100	6.73%
Deb 4 3/8s 2002	AA	50	7.05%
Deb 6s 2003	AA	200	7.06%
Deb 5 7/8s 2004	AA	60	7.23%
Deb 6 5/8s 2008	AA	75	7.48%
Deb 7 1/4s 2012	AA	50	7.90%
Deb 7.15s 2023	AA	250	7.67%
Deb 8s 2029 (HRO on 10-15-96 @ 100)	AA	50	7.54%

Bell Atlantic Bond Yields

	S&P DEBT RATING	Debt Outstanding at Par (mil $)	Yield to Maturity
Deb 8.30s 2031 (HRO on 8-1-96 @ 100)	AA	100	7.54%
Chesapeake & Pot. Tel Va (Now Bell Atlantic-Virginia)			
Deb 7 1/8s 2002	AA+	100	7.10%
Deb 5 1/4s 2005	AA+	50	7.30%
Deb 6 1/8s 2005	AA+	100	7.28%
Deb 5 5/8s 2007	AA+	65	7.32%
Deb 6 3/4s 2008	AA+	70	7.33%
Deb 7 1/4s 2012	AA+	50	7.89%
Deb 7 5/8s 2012	AA+	100	7.56%
Deb 7 7/8s 2022	AA+	100	7.68%
Deb 7 1/4s 2024	AA+	75	7.71%
Deb 7s 2025	AA+	125	7.67%
Deb 8 3/8s 2029 (HRO on 10-1-99 @ 100)	AA+	100	7.34%
Chesapeake & Pot. Tel Wash DC (Now Bell Atlantic-Washington D.C.)			
Deb 4 3/8s '98	AA	20	6.51%
Deb 5 5/8s 2006	AA	25	7.43%
Deb 7s 2009	AA	50	7.55%
Deb 7 3/4s 2013	AA	60	7.91%
Deb 7 3/4s 2023	AA	90	7.92%
Chesapeake & Pot. Tel W Va (Now Bell Atlantic - West Virginia)			
Deb 5s 2000	AA+	25	6.88%
Deb 6.05s 2003	AA+	50	7.16%
Deb 7s 2004	AA+	50	7.19%
Deb 7 1/4s 2009	AA+	40	7.59%
Deb 7 1/4s 2013	AA+	50	7.99%
Diamond State Telephone (Now Bell Atlantic-Delaware)			
Deb 6 1/8s 2003	AA+	20	7.17%
Deb 4 5/8s 2005	AA+	7	7.31%
Deb 7s 2008	AA+	10	7.76%
Deb 7 3/4s 2013	AA+	15	7.77%
Deb 8 3/8s 2019	AA+	15	7.34%
Deb 7s 2023	AA+	20	7.73%
Deb 8 5/8s 2031	AA+	15	7.63%
		Weighted Average:	7.41%

Source: Standard & Poor's Bond Guide, August 1996

BELLSOUTH Bond Yields

	S&P DEBT RATING	Debt Outstanding at Par (mil $)	Yield to Maturity
BellSouth Capital Funding			
Nts 9 1/4s '98	AAA	115	7.31%
BellSouth Telecommunications			
Deb 5 7/8s 2009	AAA	350	7.28%
Deb 7s 2025	AAA	300	7.52%
Deb 8 1/4s 2032	AAA	250	8.01%
Deb 7 7/8s 2032	AAA	300	7.87%
Deb 7 1/2s 2033	AAA	300	7.97%
Deb 6 3/4s 2033	AAA	400	7.68%
Deb 7 5/8s 2035	AAA	300	7.83%
Deb 5.85s 2045	AAA	300	6.37%
Deb 7s 2095	AAA	500	8.75%
Nts 6 1/2s 2000	AAA	275	6.74%
Nts 6 1/4s 2003	AAA	450	7.00%
Nts 6 3/8s 2004	AAA	200	7.02%
Nts 7s 2005	AAA	150	7.10%
Nts 6 1/2s 2005	AAA	300	7.21%
South Central Bell Tel (Now BellSouth Telecommunications)			
Deb 7 3/8s 2012	AAA	100	7.82%
Southern Bell Tel. & Tel (Now BellSouth Telecommunications)			
Deb 5s '97	AAA	75	6.38%
Deb 4 3/8s '98	AAA	70	6.31%
Deb 4 3/4s 2000	AAA	100	7.00%
Deb 4 3/8s 2001	AAA	75	7.05%
Deb 4 3/8s 2003	AAA	70	7.29%
Deb 6s 2004	AAA	100	7.27%
Deb 7 3/8s 2010	AAA	150	7.76%
Deb 7 5/8s 2013	AAA	350	7.90%
		Weighted Average:	7.50%

Source: Standard & Poor's Bond Guide, August 1996

NYNEX Bond Yields

	S&P DEBT RATING	Debt Outstanding at Par (mil $)	Yield to Maturity
NYNEX Capital Funding			
(Gtd) M-T Nts 'B' 7.59s '99	A-	7	6.83%
(Gtd) M-T Nts 'B' 7.60s '99	A-	31	6.84%
(Gtd) M-T Nts 'B' 7.61s '99	A-	28	6.81%
(Gtd) M-T Nts 'B' 7.62s '99	A-	21	6.82%
(Gtd) M-T Nts 'B' 7.63s '99	A-	10	6.83%
(Gtd) M-T Nts 'B' 7.66s '99	A-	10	6.81%
(Gtd) M-T Nts 'B' 7.64s '99	A-	9	6.83%
(Gtd) M-T Nts 'B' 8.11s '99	A-	21	6.88%
(Gtd) M-T Nts 'B' 8.10s '99	A-	42	6.92%
(Gtd) M-T Nts 'B' 8.10s '99	A-	15	6.92%
(Gtd) M-T Nts 'B' 8.14s '99	A-	10	6.91%
(Gtd) M-T Nts 'B' 8.35s '99	A-	25	6.91%
(Gtd) M-T Nts 'B' 8.06s 2001	A-	10	7.15%
(Gtd) M-T Nts 'B' 8.22s 2001	A-	65	7.17%
(Gtd) M-T Nts 'B' 8.40s 2001	A-	10	7.17%
(Gtd) M-T Nts 'B' 8.32s 2004	A-	10	7.47%
(Gtd) M-T Nts 'B' 8 3/4s 2004	A-	150	9.63%
(Gtd) M-T Nts 'B' 8.61s 2004	A-	10	7.58%
New York Telephone Co			
Ref L 4 5/8s '97	A	60	6.88%
Ref M 4 5/8s 2002	A	60	7.20%
Ref N 4 1/4s 2000	A	70	7.05%
Ref O 4 5/8s 2004	A	130	7.57%
Ref P 4 7/8s 2006	A	100	7.71%
Ref Q 6s 2007	A	75	7.62%
Ref R 7 1/2s 2009	A	150	7.77%
Ref T 7 3/4s 2006	A	200	7.71%
Ref V 7 3/8s 2011	A	200	7.97%
Deb 6 1/2s 2005	A	200	7.35%
Deb 8 5/8s 2010	A	150	7.82%
Deb 7s 2013	A	100	7.61%
Deb 7s 2013	A	100	7.75%
Deb 7 7/8s 2017	A	200	7.96%
Deb 7 5/8s 2023	A	100	7.82%
Deb 6.70s 2023	A	250	7.90%
Deb 7 1/4s 2024	A	450	7.79%
Deb 7s 2025	A	250	7.98%
Deb 9 3/8s 2031	A	200	9.09%
Deb 7s 2033	A	200	7.98%
Nts 5 1/4s '98	A	100	6.68%

NYNEX Bond Yields

	S&P DEBT RATING	Debt Outstanding at Par (mil $)	Yield to Maturity
Nts 5 7/8s 2003	A	200	7.20%
Nts 5 5/8s 2003	A	150	7.24%
Nts 6 1/4s 2004	A	150	7.71%
New England Tel. & Tel			
Deb 4 5/8s '99	AA-	45	6.81%
Deb 4 1/2s 2002	AA-	50	7.10%
Deb 4 5/8s 2005	AA-	60	7.27%
Deb 6 1/8s 2006	AA-	100	7.61%
Deb 7 3/8s 2007	AA-	200	7.61%
Deb 6 3/8s 2008	AA-	125	7.74%
Deb 7 7/8s 2022	AA-	100	7.92%
Deb 6 7/8s 2023	AA-	250	7.93%
Deb 7 7/8s 2029	AA-	350	7.99%
Deb 9s 2031	AA-	100	8.66%
Nts 6 1/4s '97	AA-	175	6.63%
Nts 5.05s '98	AA-	100	6.62%
Nts 6.15s '99	AA-	100	6.83%
Nts 5 3/4s 2000	AA-	100	6.94%
Nts 8 5/8s 2001	AA-	100	7.26%
Nts 6 1/4s 2003	AA-	225	7.14%
		Weighted Average:	7.66%

Source: Standard & Poor's Bond Guide, August 1996

PACIFIC TELESIS Bond Yields

	S&P DEBT RATING	Debt Outstanding at Par (mil $)	Yield to Maturity
Pacific Bell			
Deb 5 7/8s 2006	AA-	250	7.18%
Deb 6 7/8s 2023	AA-	100	7.86%
Deb 7 3/8s 2025	AA-	350	7.93%
Deb 7 1/8s 2026	AA-	625	7.72%
Deb 8 1/2s 2031	AA-	225	8.19%
Deb 7 3/4s 2032	AA-	300	7.98%
Deb 7 1/2s 2033	AA-	400	7.96%
Deb 6 5/8s 2034	AA-	550	7.89%
Deb 7 3/8s 2043	AA-	300	7.88%
Nts. 8.70s 2001	AA-	200	7.04%
Nts 7 1/4s 2002	AA-	300	6.88%
Nts 7s 2004	AA-	325	7.15%
Nts 6 1/4s 2005	AA-	325	7.45%
Pacific Telephone & Tel			
Deb 4 5/8s '99	AA-	100	6.75%
Deb 4 5/8s 2000	AA-	125	6.93%
Deb 6s 2002	AA-	130	7.13%
Deb 6 1/2s 2003	AA-	165	7.15%
Deb 7 1/4s 2008	AA-	175	7.58%
		Weighted Average:	7.58%

Source: Standard & Poor's Bond Guide, August 1996