installments. This bias results because equity investors have the opportunity to start earning a return on their reinvested dividends sooner when those dividends are received quarterly than when the dividends are received only annually.

Due to market efficiency and quarterly dividend payments, using the annual form of the DCF model to determine equity return requirements fails to match the returns that investors expect to earn with the market prices that investors pay. This is because investors expect dividends quarterly rather than annually. Failure to make this adjustment understates the cost of equity capital. Thus, this adjustment must be made if an economically correct cost of equity is to be determined.

Mr. Kahal incorrectly multiplies the current dividend in his DCF model by (1 + .5G) rather than by the generally accepted (1 + G), where G is the expected rate of growth in earnings. 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, Mr. Kahal'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 LECs.

Fifth, Mr. Kahal's cost of equity capital fails to reflect the flotation costs incurred by firms. 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 firm 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 firm would not receive the full proceeds of an equity issue.

Academic studies conclude that a flotation cost of five percent is reasonable. Therefore, I include a five percent flotation cost adjustment that is implemented as a reduction in the stock prices used in my DCF analysis. Neither AT&T nor MCI reflect the necessary adjustment for flotation costs.

In summary, Mr. Kahal mistakenly and incorrectly uses the RBHCs to determine the LECs' cost of equity. He incorrectly interprets the nature and capital market effects of increasing business risks resulting from the greater competition faced by the LECs. Mr. Kahal also uses an inappropriate DCF model that ignores market required adjustments for quarterly dividends and flotation costs. Further, he applies this model to a group of firms that are not comparable in risk to the LECs. These errors make his DCF estimates useless in determining the LECs' cost of capital.

B. Rebuttal of AT&T's Cost of Capital Estimates

AT&T does not recommend a current cost of capital for the LECs.

Rather, AT&T only performs an historical analysis of the LECs' cost of capital using an incorrect form of the DCF model to estimate the cost of equity. The analysis is performed using the RBHCs as surrogates for the LECs. AT&T incorrectly concludes that the "LECs' cost of capital has averaged no higher than 9.93 percent over the period 1991-93 -- some 132 basis points lower than those carriers' current reference rate of return" (Comments of AT&T, May 9, 1994, page 31).

The fact that AT&T has only provided historical evidence, albeit using flawed methodology, on the LECs' cost of capital from 1991 to 1993 renders its estimates irrelevant to the assessment of the LECs' current cost of capital. Moreover, cost-based rate of return calculations are irrelevant in a price cap regulatory environment. By definition, AT&T's historical evidence does not up-to-date cost of capital estimates. Further, since AT&T uses essentially the same form of the DCF model as MCI and also uses the RBHCs' capital structure in its analysis, AT&T's historical estimates are flawed by the same general conceptual errors that I identify in the above rebuttal of Mr. Kahal's testimony on behalf of MCI.

The specific errors made by AT&T in estimating the LECs' cost of capital include: 1) improper reliance on the RBHCs as comparable in risk to the LECs in applying the DCF model to estimate the cost of equity and in the capital structure analysis; 2) incorrect use of the annual form of the DCF model in the presence of quarterly

dividend payments; 3) no allowance for equity flotation costs, and 4) the presentation of only historical estimates of the cost of capital that do not reflect current market conditions or current consensus growth expectations. Since I have explained the nature and significance of each of the above errors elsewhere in my report and in Exhibit No. RSB-1, I will not elaborate further in this section of my report.

In summary, AT&T provides only historical estimates of the cost of capital for the RHBCs that are irrelevant to assessing the current LECs' cost of capital. Further, AT&T uses flawed methodology that significantly underestimates the LECs' current overall cost of capital. AT&T uses an improper DCF model and incorrect inputs to that model, ignores required adjustments to the DCF model for quarterly dividend payments and flotation costs, and applies the model to the RBHCs, which are not comparable in risk to the LECs. Further, AT&T's estimates completely ignore investors' current expectations concerning the cost of capital for the LECs.

VI. COST OF CAPITAL ESTIMATES

Even though rate of return parameters are not appropriate for price cap regulation, I determine the cost of capital for the LECs to show the impact of the flaws in the calculations of MCI and AT&T. I estimate that an appropriate cost of capital for the LECs is higher, rather than lower, than the FCC's 11.25% reference point return. This finding quantifies the flaws in the cost of

capital analyses of MCI and AT&T.

My analysis, as explained in Exhibit No. RSB-1, estimates the cost of equity capital from two distinct, mutually corroborating perspectives: 1) the DCF model, as applied to a group of firms of risk comparable to the LECs, and 2) the risk premium approach. The cost of equity capital for the LECs is in the range of 14.25%, to 14.56% with a midpoint of 14.41%, as discussed in Exhibit No. RSB-1. This range is above the range of 12.5% to 13.5% established by the FCC in 1990. My studies indicate that the version of the DCF model used by Mr. Kahal does not accurately measure market realities. Thus, neither Mr. Kahal's analysis nor AT&T's calculations are meaningful reflections of market expectations.

The LECs have a capital structure of 59.03% equity and 40.97% debt and a cost of debt of 7.88%, as shown in Exhibit No. RSB-6. Thus, the overall cost of capital for the LECs ranges from 11.64% to 11.82% with a midpoint of 11.73%. The LECs' current overall cost of capital exceeds the FCC's 11.25% reference point return.

My estimated overall cost of capital uses methodological approaches that take into account the changes in financial markets in recent years. The cost of debt and the capital structure present in the analysis are based on the most up-to-date data available, which reflect the recent interest rate environment. Further, the DCF model for estimating the cost of equity uses

stock market prices that are determined by investors in light of, among other things, current and expected interest rates. The IBES and Zacks consensus growth rate forecasts used in the DCF model also reflect financial analysts' interest rate expectations. The market risk premium approach explicitly incorporates the current level of interest rates by adding the recent average level of such rates to the equity risk premium.

The reasonableness of my estimated range for the overall cost of capital for the LECs of 11.64% to 11.82% is supported by the closeness of the estimates provided by these distinct methodological approaches, and by the objectivity of the market-based data used in the analysis. This concludes my report.

COST OF CAPITAL ANALYSIS FOR THE PRICE CAP LECS

A. INTRODUCTION

I use two market-based approaches to determine the cost of equity for the price cap LECs: 1) the discounted cash flow (DCF) model, and 2) the risk premium model.

B. THE DCF APPROACH

1. General DCF Model

The DCF model recognizes two types of 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_O is:

The form of the DCF model above makes no explicit assumption concerning the expected rate of growth in dividends or the stock's price over time, nor any assumption concerning the length of an investor's expected holding period. In contrast, the so-called constant growth form of the DCF 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 holding period.

The constant growth form of the DCF model can be expressed as:

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

2. **Modifications to the DCF Model**

Two additional modifications to this model are necessary. First, it should be recognized that dividends are paid by most companies on a quarterly, not an annual, basis. An adjustment to the model must consequently be made. The second adjustment to the general DCF model above considers the flotation costs borne by the firm in raising equity funds. This adjustment is discussed previously in my report. Failure to make these necessary allowances for market realities seriously understates the cost of equity capital.

The DCF model in my analysis assumes that firms pay dividends quarterly but that those dividends are only changed by a firm annually. Thus, quarterly reinvestment opportunities are accurately recognized and the more commonly observed pattern of annual dividend growth is accounted for as well. While I use this approach in my analysis of the LECs' cost of equity, this approach is not used in AT&T's and MCI's analyses. Further, my analysis reflects the fact that firms adjust the level of their dividends in the middle of the year on average.

The adjusted DCF model calculates a revised dividend, D :

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 change in the amount of the dividend paid by a firm. This annualized dividend, D , 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:

3. **Growth Rate Determination**

Investors are forward-looking. Investment decisions are based on 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 an historical rate.

Financial research indicates that the consensus growth rate forecasts of financial analysts are the most unbiased and objective

measures of investors' growth expectations for a stock. I consequently use the growth rate estimates published by the Institutional Brokers Estimate System (IBES) and Zacks Investment Research (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 a broader perspective on long-term growth rate expectations.

4. **Comparable Firm Identification**

a) Rationale

It is imperative that regulation be structured so that the LECs have an opportunity to earn a return commensurate with competing alternative investments of comparable risk. Since the LECs' equities do not have observable market prices, it is necessary to identify a group of firms of comparable risk that do have market-traded equity. The application of an appropriately constructed DCF model to such a group of firms of comparable risk with observable equity prices allows the inference of an objective, market-determined cost of equity capital for the LECs. The average cost of equity for this group of firms is used as a reliable measure of the cost of equity capital for the LECs.

b) Cluster Analysis Methodology

I use a cluster analysis model to identify firms that are of comparable risk to the LECs. Seven dimensions of risk are used to compare firms. The dimensions measure the business and

financial risks of the 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. In contrast, they are compared in light of those chosen characteristics and the relationship among those characteristics.

A summary measure expresses the distance between each firm and the LECs, as proxied by the BOCs. The group of the 20 firms that are closest to the aggregated BOCs in terms of this summary distance measure is chosen for analysis. The DCF model is applied to this group of comparable firms in order to infer the LECs' cost of equity capital. This analysis results in a cost of equity estimate of 14.25% to 14.33%, using IBES and Zacks growth rate estimates, respectively.

The details concerning the comparable firm identification criteria and methodology are provided in Billingsley Exhibit No. RSB-2. Billingsley Exhibit No. RSB-3 lists the group of comparable firms and presents the DCF results.

The relationship between the riskiness of an overall portfolio of securities and the riskiness of the individual securities that compose that portfolio is analogous to the relationship between the various individual risk measures of the firms in my cluster and the individual risk measures of the aggregate BOC. None of the individual securities in a portfolio may be of the same

riskiness as the overall portfolio due to offsetting interrelationships among the securities, which are often termed diversification effects. By implication, it is possible to form two portfolios that have the same overall riskiness but in which the individual securities that make up the two portfolios may appear to have little in common. Even though the "whole" is not equal to the sum of its "parts", investors are able to price assets and portfolios of assets of comparable risk similarly.

In summary, none of the individual firms in my cluster may be precisely like the aggregate BOC in terms of each individual measure of risk. However, the cluster is correctly viewed as a portfolio of firms that, as a group, is comparable in risk to the aggregate BOC and thus to the risk of the LECs.

C. MARKET RISK PREMIUM APPROACH

In addition to my DCF analysis, I use the market risk premium approach to corroborate the reasonableness of the cost of equity capital determined for the LECs under the DCF comparable firm sample approach. The market risk premium approach is a systematic way of quantifying the risk/return trade-off. The 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 far less risky benchmark security. The return on long-term U.S. Treasury bonds and the return on utility bonds are common benchmarks.

The economic justification for examining the difference between the return on the market and a benchmark security's return is to measure the premium that is necessary to coax investors to move from investing in a "risk-free" or lower risk security to a higher risk equity investment. This premium is often referred to as the equity risk premium.

The return on utility bonds is used frequently as the benchmark security because it is a relevant reference point in evaluating a utility's cost of equity. My analysis identifies a market risk premium on public utility bonds and then adds that premium to the current return on such bonds in order to determine a reasonable average cost of equity capital for public utilities of comparable bond ratings.

1. **Bond Yield Plus Risk Premium Approach**

   My first risk premium approach examines the relationship between expected returns on the Standard & Poor's 500 Index (S&P 500), as estimated by the DCF model, and expected returns on an index of Aa-rated public utility bonds over a recent period. The resulting average expected equity risk premium of 6.29% (as shown in Billingsley Exhibit No. RSB-5) is added to the average yield of 8.03% that has prevailed on Aa-rated public utility bonds over the most recent three months (March 1994 - May 1994) for which data are available. This produces a cost of equity estimate of 14.32%. A more detailed discussion of this methodology is presented in Billingsley Exhibit No. RSB-4.

2. **Harris Study Risk Premium Approach**

My second risk premium approach is based on research by Dr. R. S. Harris, published in **Financial Management** in 1986. He finds evidence that the equity risk premium is inversely related to returns on the traditionally used benchmark securities, namely, U.S. Treasury or corporate debt securities. Thus, when interest rates decline, the equity risk premium widens and when interest rates rise, the equity risk premium narrows.

In Harris' work the benchmark security is 20-year U. S. Treasury bonds and the utility proxy is the Standard & Poor's Utility Index of 40 stocks. Adjusting for the difference between the level of the rates on the benchmark security during the time period of his study and the current level of such rates generates an equity premium estimate that is explicitly adjusted for a prominent source of any instability over time. This estimated risk premium is added to the current level of the benchmark security's rate in order to provide another test of the reasonableness of the cost of capital for the LECs under the DCF model.

During the period of Dr. Harris' study (1981 to 1984), the average risk premium was 4.81% and the average yield on 20-year U.S. Treasury bonds was 12.25%. Given that the current average level on 20-year U.S. Treasury bonds is 7.15% (May 1994), the appropriate current risk premium is 7.41%. This is determined by multiplying the 5.10% decline in rates since the time period of Harris' study by

-.51 and then adding back the average risk premium of 4.81% to the indicated change of 2.60%. This alternative approach consequently provides a cost of equity for the LECs of 14.56%, which is the current average level of 20-year U.S. Treasury yields of 7.15% added to the adjusted risk premium of 7.41%.

Based on both of my risk premium approaches, the risk premium cost of equity for the LECs is in the range of 14.32% to 14.56%.

D. COST OF DEBT, CAPITAL STRUCTURE AND OVERALL COST OF CAPITAL ESTIMATES

The methodology for estimating the cost of debt is more direct than that used to estimate the cost of equity. This is because the cost of debt is based on the contractual rate that a firm is obligated to pay to its debtholders. In practice, the cost of debt is calculated as the weighted average of the costs of long-term and short-term debt. The weights used to determine the overall cost of capital are based on the relative amounts of short-term and long-term debt in the capital structure. For the BOCs, short-term debt is defined to include notes payable, short-term capital leases, and the current maturing portion of long-term debt. Long-term debt consists of funded debt, other long-term debt, and long-term capital leases.

While there are numerous theories of the capital structure decision, it is generally accepted that managers balance the perceived costs and benefits of leverage. The potential benefits of leverage are measured by the extent to which a firm can magnify its return on equity by

adding income-generating assets relative to a given equity base. Further, for the average U.S. corporation, debt is cheaper than equity because interest payments are tax-deductible while dividend payments are not.

It is important to note that additional debt is only acceptable to both existing debtholders and equityholders up to a point. Additional leverage implies higher financial risk due to the greater burden posed by the contractual debt payments of interest and principal. Thus, both debtholders and equityholders will ultimately raise their return requirements in order to be compensated for the additional risk associated with high levels of indebtedness.

Capital structure decisions are influenced by managers' desire to balance business and financial risks. Thus, a firm operating in a higher risk business will tend to employ less debt than a firm operating in a lower risk business. Business risk is largely determined by the competitiveness of the markets in which a firm operates. As demonstrated in Section III of my report, the LECs have been facing increasing business risk in recent years. This has put the LECs under pressure to use more equity in their capital structures so that they can offset higher business risk with lower financial risk.

I use an average capital structure of the BOCs for 1993, as reported in the FCC's ARMIS 43-02 USOA Report data and as presented in Billingsley Exhibit No. RSB-6, to measure the capital structure of the LECs. This is consistent with positions advocated by USTA in CC Docket No. 92-133.

Thus, this capital structure relies on data directly applicable to the LECs, readily available, and on file with the FCC.

I do not use the aggregated capital structures of the RBHCs for the same basic reasons that I did not consider the RBHCs valid reference points in my estimation of the LECs' cost of equity capital. For instance, the capital structures of the RBHCs reflect the impact of the financing of their unregulated businesses. These unregulated components have different risks than the regulated businesses of the LECs. Further, the capital structures and debt costs of the BOCs can be directly observed for the BOCs and no cluster analysis is required for measurement purposes.

The BOCs offer more reliable, accurate evidence of the cost of debt and capital structure of the LECs than the RBHCs. The allegation that the BOCs' data are unreliable because the RBHCs have the ability to manipulate them is unsubstaniated by the evidence. Critics of using BOC data merely observe that such manipulation is possible but provide no evidence that such manipulation has ever actually occurred or ever been contemplated by any of the RBHCs. Further, such critics ignore the fact that investors and bond rating agencies effectively constrain actions that distort capital structure by virtue of their valuation opinions and investment decisions.

Billingsley Exhibit No. RSB-6 summarizes the accurate capital structure of 59.03% equity and 40.97% debt, a cost of debt of 7.88%, and a cost of equity capital of between 14.25% and 14.56% with a midpoint of

14.41%. Thus, the current overall cost of capital ranges from 11.64% to 11.82% with a midpoint of 11.73%.

COMPARABLE FIRM IDENTIFICATION CRITERIA AND METHODOLOGY

I. INTRODUCTION

Since the LECs do not have equity trading in the market, no direct market price of equity can be used to infer the LECs' cost of equity. Thus, it is necessary to identify a portfolio of firms that are comparable in equity investment risk to the LECs. The DCF model will be applied to each of the portfolio's members and an average cost of equity capital will be determined. Given that the portfolio of firms is of comparable risk to the LECs, this average cost of equity is an objective, reasonable estimate of the LEC's 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 clarify firms into a group of risk comparable to the LECs:

A. Variability of Return

The variability of returns reflects the total risk perceived by the investor. This is measured by the standard deviation of the return on common equity (ROE) over the most recent available five years (1988-1992). Higher variability implies higher risk to the equity investor.

B. 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 total assets-to-equity ratio, the so-called "equity multiplier" in fundamental equity analysis. The most recent available annual value (1992) is used in the analysis.

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 (operating earnings, or earnings before interest and taxes (EBIT)) it has available to meet that commitment. This is measured by the interest coverage ratio, EBIT/I. Other things being equal, an increase in this ratio reflects greater ability to service debt and consequently implies lower riskiness. The most recent available annual value (1992) of this variable is employed.

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 used commonly to appraise the risk of a firm. Bond ratings are assigned numerical values for the purposes of the present analysis. The most recent Standard & Poor's bond rating is used in the identification process.

4. Liquidity Risk

An important aspect of a firm's riskiness is its comprehensive ability to service all of its debt, both long- and short-term. The ability of a firm to meet its total debt commitments is captured by the various financial risk variables discussed above. A firm's capacity to cover its short-term indebtedness is measured by the well-known quick or "acid test" ratio: (Current Assets − Inventories) / Current Liabilities. This variable measures the extent of a firm's short-term, presumably readily convertible into cash, assets available to meet its short-term liabilities. Other things being equal, the higher is the quick ratio, the lower is the perceived risk of investing in a company. The most recent available annual value (1992) of this variable is used in the identification process.

C. Business Risk

1. Variability of Cash Flows

The variability of a firm's cash flows characterize the riskiness of a firm's 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 cash flows-to-total assets. Higher values of the measure are associated with greater risk. The variable is calculated using the most recent five years of available annual data (1988-1992).

2. Growth Opportunities

Other things being equal, companies experiencing higher growth are associated with early stages in the life cycle of a firm. The early stages are characterized by rapidly increasing revenues, profit margins, and earnings. Yet such rapid growth is not sustainable over the long-run and movement into a more mature stage of the life cycle usually brings the erosion of a firm's competitive position. Thus, high sales growth is usually an indication that a firm is in a start-up business or moving toward a potential shake-out, either of which proxy for higher operating or business risk. The growth in sales variable is measured using the most recent available five years of annual data (1988-1992).

III. METHODOLOGY USED IN THE COMPARABLE FIRMS IDENTIFICATION PROCESS

Comparable firms are 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 the 20 firms that are identified as comparable to the LECs are retained for use in inferring the cost of equity capital for the LECs.

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 seven descriptive variables V_{ij} discussed above, is calculated as:

$$D_i = \sqrt{\sum_{j=1}^{7} (V_j - V_{Tj})^2}\,.$$

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 of the target firm. The group of firms considered to be similar to the target firm, the LECs (the aggregation of the Bell Operating Companies [BOCs] is the actual target since it has published financial data), 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 consensus growth rate forecast based on at least two analysts' estimates are retained for analysis. Foreign, financial and limited partnership firms are eliminated due to their different accounting conventions. The parent companies of price cap LECs are also eliminated. Outliers are identified on a variable-by-variable basis. Those firms with variable values greater than or less than two standard deviations from the mean value of the population for each variable are deleted. All outliers must be eliminated before standardizing the variables or the means and standard deviations will be biased. The final population consists of 216 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 V_j and the standard deviation σ_j of each variable across all of the firms as:

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

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, the 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 group of the 20 firms that are the least distant from the LECs in risk characteristics. Billingsley Exhibit No. RSB-3 lists the final group of comparable firms. A correlation coefficient matrix for the variables used to identify firms is provided on the following page. It shows that the degree of correlation among the variables is acceptably low and thus that there is no reason to be concerned that any of the variables capture essentially the same source(s) of investment risk.