THE RISK PREMIUM APPROACH TO ESTIMATING THE COST OF EQUITY CAPITAL

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One of the basic approaches to estimating the cost of common equity capital is the risk premium method, sometimes called the stock-bond yield spread method. Because investors are risk averters, the required rate of return increases as the riskiness of a financial asset increases. Therefore, if investors have the opportunity to buy default-free U.S. Treasury bonds with a yield of 8½ percent, they would require higher rates of return on corporate bonds and still higher returns on common stocks.[1] The question is, how much higher? If we knew the answer to this question, we could, at any given time, determine the cost of common equity simply by adding the risk premium to the current yield on Treasury bonds.

The basic idea behind the risk premium approach is indicated in Figure 1. The horizontal axis reflects risk--the further to the right a particular security lies, the greater its investment risk. Since U.S. Treasury bonds are free of default risk, they are shown at the origin. The vertical axis gives required rates of return, while the lines labeled SML_{1965} and SML_{1979} are "security market lines" which show, at two points in time, the assumed relationship between a security's risk and its required rate of return.

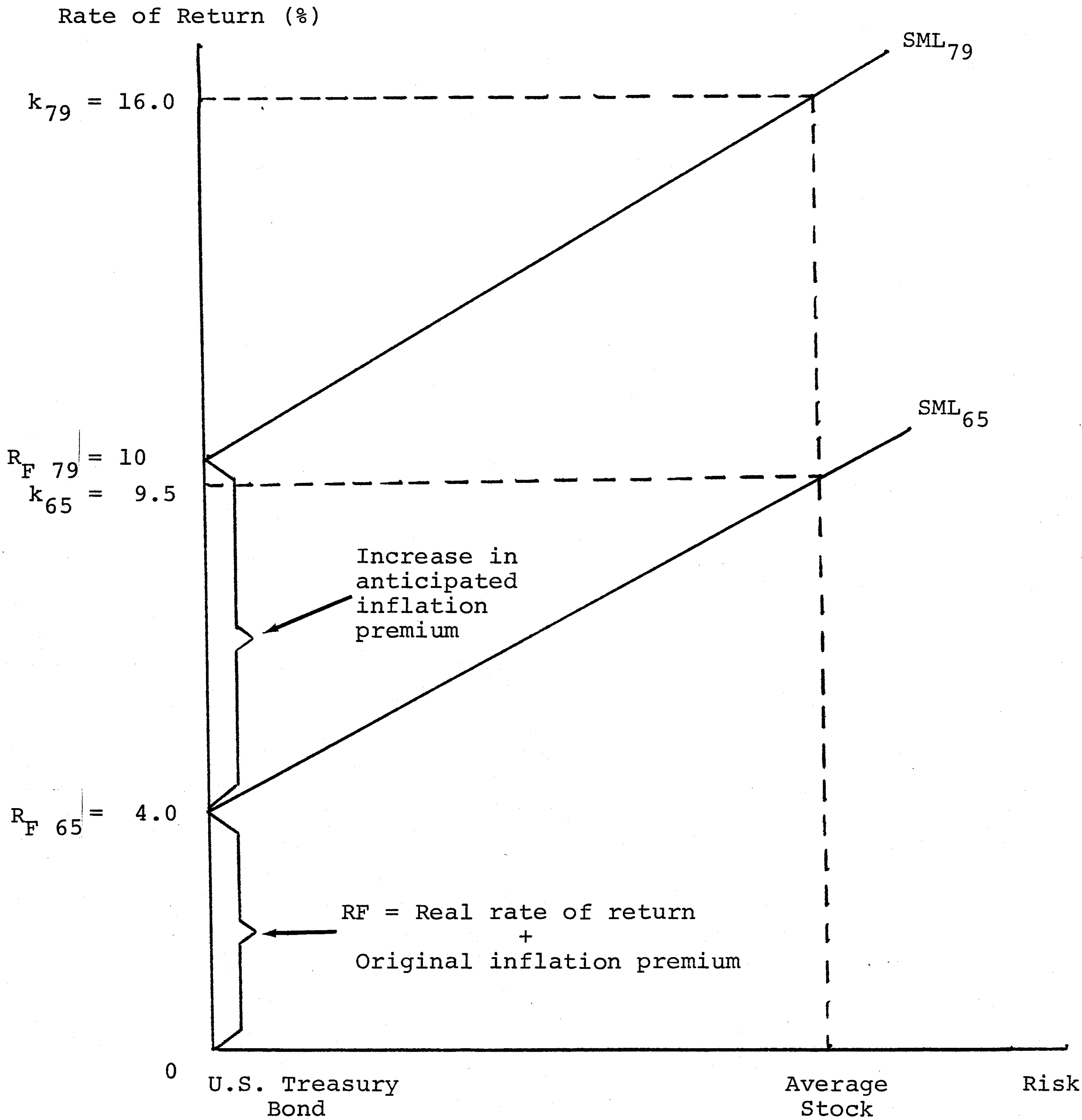
The term R_F designates the risk-free rate, or the rate of interest on U.S. Treasury bonds. It consists of a "real" or inflation-free rate (RR) plus a premium for expected inflation:

$$R_F = RR + \text{Inflation premium.}$$

[1]U.S. Treasury bonds are riskless in the sense that they are free of default risk. However, they are not completely riskless because their holders still face the dangers of purchasing power loss (inflation risk) and the loss of capital values if interest rates rise (interest rate risk). The risk premiums which we develop could, therefore, be called default risk premiums.

Figure 1

RELATIONSHIPS BETWEEN INFLATION,
RISK AND REQUIRED RATES OF RETURN



In 1965 the riskless rate, $R_{F\ 65}$ in Figure 1, was about 4 percent. In 1979 the expected long term inflation rate was considerably higher, which resulted in a 10.0 percent rate on long-term governments.

Corporate bonds are riskier than U.S. government bonds, so their yields are higher. Recently, high grade utility bonds have commanded a premium of about one percentage point more than governments, and risk premiums rise for lower-rated corporate bonds. (See Appendix A.) Therefore, if corporate bonds were shown in Figure 1, both their risk and return would exceed that of U.S. Treasury bonds. Common stocks are, of course, much riskier than bonds, so their risk premiums are also much higher. In the graph we show an increase in the risk premium on an average share of common stock from 5.5 percent in 1965 to about 6.0 percent in 1979. Thus, when the yield on government bonds was about 4 percent, as it was in 1965, the required rate of return on an average share of common stock is shown to be about 9.5 percent. In 1979, when inflation had pushed the riskless rate up to 10.0 percent, the required rate of return on an average share of stock is shown to be about 16.0 percent.

Although the concept of risk premiums is widely accepted, there is no general consensus regarding (1) how to measure these premiums, (2) their general level, (3) changes in risk premiums over time, (4) the relative size of risk premiums on utility and industrial stocks, and (5) the risk premium on a specific firm's stock. Our purpose in this paper is to provide some answers to these questions.

ALTERNATIVE METHODS OF ESTIMATING RISK PREMIUMS

Three basic procedures have been used in attempts to estimate risk premiums: (1) historical studies of the returns actually earned on stocks and bonds, (2) surveys of institutional portfolio managers, and (3) premiums obtained by subtracting the expected yield on Treasury bonds from the average expected return on a group of "representative" common stocks. We subscribe to the third procedure, but it is nevertheless useful to consider the first two approaches as a point of departure for our work.

Historical Returns

There have been a number of historical studies of the actual rates of return on stock and bond portfolios over various past holding periods. In these studies, it is assumed that a portfolio of stocks is formed, held for a period of time, and then liquidated. Similarly, a bond portfolio is formed, and its historical rate of return is estimated. The difference between returns on the stock and bond portfolios is then determined, and this historical yield spread is then used as an estimate of the risk premium of stocks over bonds.

There are some serious problems with this procedure. One is the choice of holding period: The particular holding period used is essentially arbitrary, but it can make a huge difference in the final outcome. If short holding periods are used, returns will be especially volatile, but even assuming holding periods of ten years or more, realized rates of return, and consequently "risk premiums," can vary by as much as 20 percentage points.[1] Even with holding periods in the twenty to fifty year range, the calculated rate of return on common stocks (before personal taxes) in the period 1926-1978 ranged from 3.1% to 16.9%. Returns on long-term U.S. Government bonds ranged from 0.9% to 4.5% (capital losses on bonds held down their realized returns) over the same period, and risk premiums on an average share of stock as determined by historic data ranged from -0.8% to 15.0% even using these holding periods of twenty years or more. If shorter periods were used, much wider ranges of risk premiums could be obtained. Also, choosing as an ending point a year when the stock market closed very strong (such as 1968) or very weak (such as 1974) would have a tremendous effect on the calculated risk premiums. If one simply uses the most recent available year in an attempt to avoid arbitrariness, the historical record would still reveal major swings from year to year.

An even more important weakness in the use of historic yield spreads as estimates of current risk premiums is the fact that the <u>true</u> risk premium built into the cost of common equity at any point in time reflects the difference between expected returns on stocks and bonds in the <u>future</u>. Expected, or <u>ex ante</u> returns may, on rare occasions, equal the actual <u>ex post</u> returns that were realized in some past period, but this would be the exception, not the rule. For example, the consensus view of investors may be that if they buy a portfolio of common stocks

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[1] R.G. Ibbotson and R.A. Sinquefield, <u>Stocks, Bonds, Bills, and Inflation Historical Returns (1926-1978)</u> (Charlottesville: Financial Analysts Research Foundation, 1979).

on January 1, 1980, and hold them until December 31, 1985, they will earn a before-tax rate of return (dividends plus capital gains) of 15 percent. This is the ex ante expected return. However, on December 31, 1985, if one looks back and determines the actual ex post realized rate of return from January 1, 1980, to December 31, 1985, it will almost certainly be higher or lower than the 15 percent expected return. The actual realized return might even be less than the realized return on bonds. If so, this would indicate a negative risk premium, which is clearly nonsense.

Because of these problems, risk premiums based on historic yield spreads are questionable. For purposes of estimating the cost of capital, it is more logical to base risk premiums on forward-looking than on backward-looking data.[1]

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[1]In rate cases, witnesses sometimes compare realized returns on book equity (ROE) to yields to maturity on bonds (YTM), calling the difference a risk premium. This procedure mixes historic returns (ROE) with forward-looking returns (YTM), and the result is not likely to be a meaningful figure. Only if (1) the expected future ROE is the same as the past ROE and (2) the stock is selling at its exact book value would this procedure give an accurate estimate of the cost of equity.

SURVEYS OF PORTFOLIO MANAGERS

Since institutional investors (primarily pension fund managers) make approximately 70 percent of the buy and sell decisions in the stock market, and an even larger percentage of bond transaction decisions, they largely control relative stock and bond prices and yields. Therefore, a second approach to the development of risk premiums is to survey institutional portfolio managers. To see how this approach is applied, one must understand how the portfolio managers of large institutional investors generally operate when they decide to invest or not to invest in a given stock:

1. A DCF rate of return (dividend yield plus capital gains yield) is estimated for each stock under consideration. This gives an expected rate of return for each stock. To illustrate, a bank trust department portfolio manager might obtain from the bank's security analysts a projection that American Telephone's dividends, which were $5.00 during 1979, will grow at a rate in the range of 5 to 6 percent per year for the next five years, and that the price of the stock will also grow at this same rate. If the stock is purchased at a price of $52 per share, held for five years, and then sold, it will have provided an annual market value rate of return in the range of 15.1 to 16.2 percent.

2. Obviously, common stocks are not riskless. For example, AT&T's stock price declined from a high of about $75 in the mid-1960's to about $39 in 1974, and from $64 3/4 to $45 during the 1979-80 decline. Because different stocks are regarded as facing different amounts of risk exposure, institutional investors find it useful to group each stock into one of several "risk classes." Five risk classes are often used. Group 1 might be composed of the 20% of the stocks judged least risky, Group 2 would consist of the next least risky stocks, and so on. These risk groupings are based partly on quantitative data, but the actual placements are largely judgemental.

3. The next step is to establish a required rate of return for each stock. This could be done by adding a premium to the U.S. Treasury bond rate or to a corporate bond rate such as the Aa rate. For the S&P 400 stocks, these premiums appear typically to be established at rates close to the following:

Stock risk group	Risk premiums: Over U.S. Treasury Bonds	Risk premiums: Over Aa Corporate Bonds
1. Lowest risk	4.5-5.0%	3.5-4.0%
2. 2nd lowest risk	5.0-5.5	4.0-4.5
3. Average	5.5-6.0	4.5-5.0
4. 2nd highest risk	6.0-6.5	5.0-5.5
5. Highest risk	6.5-9.0	5.5-8.0

These premiums are based partly on what investors think is reasonable, given their perceptions of current conditions and their aversion to risk, and this, in turn, may be influenced by historic risk/return relationships.

4. The expected and required returns are next compared. If expected returns on stocks exceed required returns, investors tend to buy equities rather than debt, and vice versa. Any company or industry whose expected return exceeds its required return by a relatively large amount is favored, and conversely. When the consensus view of investors is that the expected returns on most stocks are above or below their required returns, the collective actions of investors will cause stock prices to rise or fall. Such price changes, in turn, will restore equilibrium to the market, with expected returns equal to required returns.

A study was recently conducted by Charles Benore of Paine Webber Mitchell Hutchins, Inc., a leading institution-oriented investment banking concern, in an attempt to quantify the ideas in the preceding paragraphs.[1] A summary of Benore's study is given in Table 1. Eighty-five percent of the portfolio managers surveyed assigned a risk premium

[1] Charles Benore, Paine Webber Mitchell Hutchins, Inc., "A Survey of Investor Attitudes toward the Electric Power Industry," September 25, 1979.

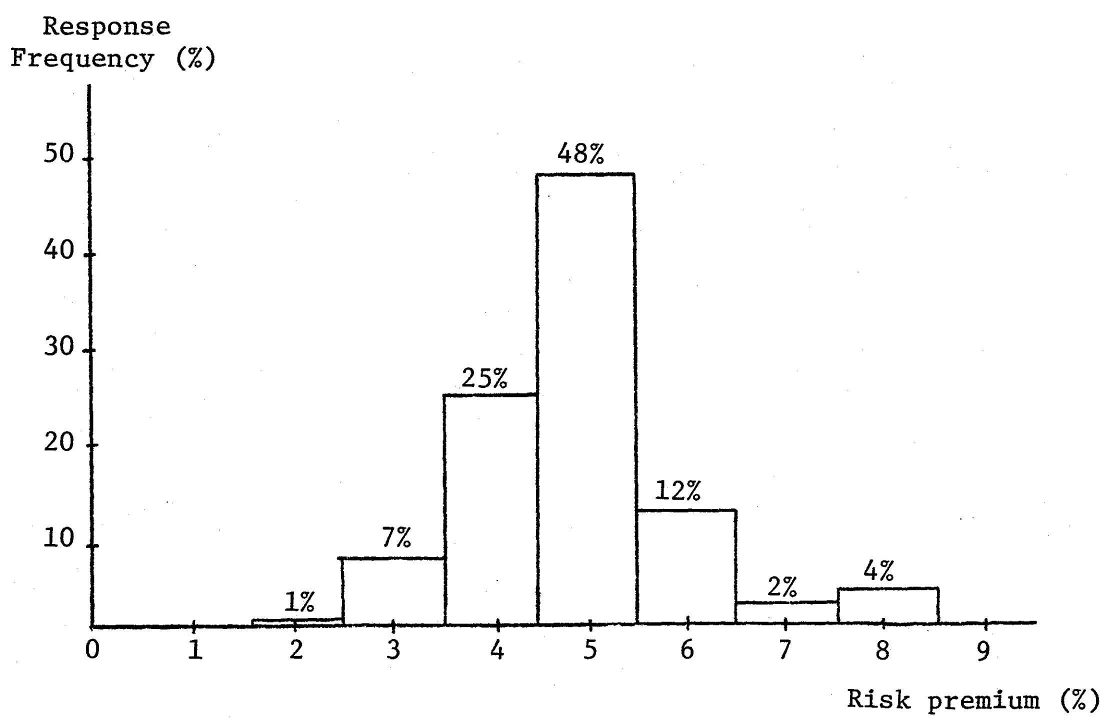
Table 1. Summary of Benore's Risk Premium Study

I. Question put to portfolio managers:

Assuming that a double A, long-term utility bond currently yields about 9 1/2%, the common stock for the same company would be attractive to you relative to the bond if its expected total return was at least:

Total Return	Indicated Risk Premium (basis points)
over 19%	over 900
18 - 19	900
17 - 18	800
16 - 17	700
15 - 16	600
14 - 15	500
13 - 14	400
12 - 13	300
11 - 12	200
under 11	under 200

II. Distribution of Responses



Weighted average (expected value) risk premium = 4.9%

Source: Paine Webber Mitchell Hutchins, Inc., "A Survey of Investor Attitudes toward the Electric Power Industry," September 25, 1979.

of from 4 to 6 percentage points, with an average of 4.90 percentage points, to utility stocks over Aa bonds. Since Aa bonds typically yield about one percentage point more than long-term government bonds, this suggests a premium over governments of about 6 percentage points for Aa electrics. Of course, the Mitchell Hutchins study is restricted to the high quality electrics, but it is nevertheless suggestive of the risk premiums for stocks in general.[1]

[1]Some analysts have suggested to us that the risk premium on a utility stock over its own bonds may be wider than that for industrial stocks because of regulators' treatment of debt versus equity. Regulators may be willing to hold a utility's equity returns down to a level that causes severe stock price losses even when economic (as opposed to political) conditions would permit a rate increase, but it is hard to imagine rates being held down to a level that causes the company's bonds to go into default.

DCF MODEL RISK PREMIUMS

The survey approach is conceptually superior to the historical returns approach in that it attempts to estimate risk premiums based on expected future returns rather than past realized returns. However, there is a possibility that survey data may be biased or otherwise unreliable. Therefore, as an alternative to asking investors for the risk premiums they use, we have reversed the process and inferred from the stock prices and bond yields that exist in the market the risk premiums that investors apply.

Different organizations (institutional investors, brokerage house analysts, and advisory services) use different data bases and methodologies for valuing stocks, and each analyst tries to do something unique to get an edge on the other 50,000 or so professional analysts who are seeking to forecast stock prices and to pick the best buys from among the thousands of available stocks. However, discussions with analysts and portfolio managers, a review of investments textbooks and such professional journals as The Institutional Investor and The Analysts' Journal, and a study of materials prepared by the Financial Analysts' Federation and the Institute of Chartered Financial Analysts suggest that we can form a reasonably accurate estimate of the consensus expected rate of return by use of the DCF model.

Depending on what assumptions are made about the long-term dividend growth of a firm, the DCF model is typically used in either of the following forms:

1. Constant Growth, or Gordon model.
2. Non-constant growth DCF model.

With the constant growth model, we estimate the expected return on equity (k) as follows:

$$k = D_1/P_0 + g. \tag{1}$$

Here D_1 represents the dividends expected during the next twelve months, P_0 is the current price of the stock, and g is the long-run expected growth rate in dividends. The major assumption of this model is that dividends will grow indefinitely at a constant rate g.

In the non-constant growth DCF model, we allow for the possibility that investors could, for various reasons, expect a firm's growth rate to vary over time. In our analysis, we assume that dividends grow in an irregular manner for N years, after which it will experience a stable, normal growth rate, g_n. Under these assumptions, we can write the DCF equation as follows:

$$P_0 = \sum_{t=1}^{N} \frac{D_t}{(1 + k)^t} + \left(\frac{D_N(1 + g_n)}{k - g_n}\right)\left(\frac{1}{1 + k}\right)^N. \tag{2}$$

The last term in the equation utilizes the constant growth model to find the present value of all future dividends beyond year N. Knowing the values of all other variables, we can solve this equation to determine k.

Using either the constant or non-constant model, if we develop an expected return for the market index (k_M) and then subtract from this return the yield on a risk-free security (R_F), we will have estimated a forward-looking risk premium for the market (RP_M):

$$RP_M = k_M - R_F. \tag{3}$$

The accuracy of this method depends on the proper measurement of the riskless rate and on the validity of the assumptions of the DCF model used to determine k_M. These topics are discussed next.

THE RISKLESS RATE

For reasons we have pointed out elsewhere,[1] the best choice of a riskless rate for purposes of calculating equity risk premiums is the "constant maturity" long-term U.S. Treasury bond rate series which abstracts from the effect of "flower bonds." The use of such short-term interest rates as T-Bills will almost certainly produce misleading and unstable results because (1) the expected rate of inflation is not constant over time and (2) through the expectations theory mechanism, long-term and short-term securities embody different average expected future interest rates. Thus, increases or decreases in the T-Bill rate reflect increases or decreases in near-term inflation rates, while increases or decreases in long-term bond rates reflect changes in expected long-term inflation rates. Since expectations about short-term inflation rates are far more volatile than expectations about long-term inflation, short-term rates are more volatile than long-term rates. Further, since stocks are long-term securities, they are more like bonds than bills with respect to inflation-induced movements. Therefore, stock returns are more highly correlated with movements in long-term bond rates than with short-term rates, which makes it more appropriate to base equity risk premiums on long-term than on short-term Treasury security rates.[2]

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[1]E.F. Brigham and D.K. Shome, "The Riskless Rate of Return in Risk Premium Studies," Public Utility Research Center Working Paper, May 1980.

[2]To some extent, utility stocks are increasingly coming to resemble a sort of low grade, floating rate income bond rather than a long-term bond. Because of inflation, utilities must go in for frequent rate cases, and the returns on equity (ROE) allowed in each rate case are dependent in part on current capital market conditions. If interest rates move up and down, then so will allowed ROE's. Coupons on outstanding bonds, on the other hand, are fixed for the life of the bond. Thus, in a sense, bonds have longer effective lives than utility stocks. This suggests that it might be more appropriate to compare utility stocks with intermediate term Treasury securities. We are currently studying this issue.

THE CONSTANT GROWTH MODEL

To apply the Gordon Equation to a group of stocks taken to represent "the market," we estimate the average or "market" required rate of return, k_M, as follows:

$$k_M = (\text{Dividend yield})_M + (\text{Growth rate in dividends})_M.$$

Here

$$(\text{Dividend yield})_M = \frac{\begin{array}{c}\text{Total dividends expected to be}\\ \text{paid on all stocks in next period}\end{array}}{\begin{array}{c}\text{Total current market value}\\ \text{of all stocks}\end{array}},$$

and

$$\begin{pmatrix}\text{Growth rate}\\ \text{in dividends}\end{pmatrix}_M = \begin{pmatrix}\text{Constant long-term rate}\\ \text{at which dividends are}\\ \text{expected to grow}\end{pmatrix}.$$

There are two major problems with this procedure. First, the constant growth model applies only to individual companies whose expected future growth rates are relatively constant; that is, the estimated growth rate for any year t is equal to the rate expected in Year t + 1. This means that it is most applicable to the larger, more mature companies, while it is not applicable (without a major reformulation) at all to smaller, rapidly developing companies. Therefore, if the market portfolio does not consist of constant growth companies, then the aggregated data will not meet the model's required conditions. Second, even if the expected growth rate is constant over time, estimating it is a very difficult task.

While these problems certainly exist, they are not insurmountable, and security analysts deal with them on a daily basis. Further, it may be reasonable to assume that errors associated with estimates of individual companies will, to a large extent, cancel one another out when we average across a large sample of companies to develop the risk premium on the market portfolio.[1] Also, the problem of nonconstant growth can be reduced if not eliminated by restricting our analysis to the larger, more mature companies. Accordingly, we chose two market indices for our analysis: (1) the S&P 400 Industrials and (2) the Dow Jones 30 Industrials.[2] Most of the companies in these indices have been in business for many years, are well established in their lines of business, and have sales and profits which tend to move with the level of general economic activity. While none of the companies can be expected to grow at an identical rate from year to year, it is still true that for most of them the expected long-run future growth rate is constant in the sense that the best estimate of the growth rate for, say, 1985 is the same as the best estimate for 1984 or 1986.

Of course, limiting our analysis to larger companies means that we cannot draw from the study any inferences about risk premiums and the cost of capital for smaller companies. On the other hand, limiting the analysis does permit us to make better estimates of these values for larger firms.

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[1]The situation here is similar to that encountered in portfolio analysis. Betas of individual securities tend to be unstable and to reflect a great deal of measurement error. However, when companies are grouped into portfolios, the portfolio betas tend to be highly stable. The same type of situation may also exist here.

[2]We eliminated AT&T from both our samples since AT&T is a regulated utility and should not be treated as an unregulated industrial. Our indices are therefore the "S&P 399" and the "Dow Jones 29." We will examine AT&T and the other utilities separately.

Estimating Growth Rates

The most difficult problem in implementing the DCF model is to obtain a good estimate of the expected future growth rate. If a company has experienced a relatively steady, stable growth in earnings and dividends, and if this past rate of growth is expected to continue into the future, then past growth rates might be extrapolated and used to project future growth. However, because of inflation and other factors, the steady growth situation has not held for most companies in recent years, so analysts have developed other methods for making growth forecasts. One well-recognized and widely used procedure involves multiplying the fraction of a company's earnings which investors expect it to retain (b) by the expected rate of return on book equity (ROE):

$$g = b(\text{ROE}).$$

This procedure matches investors' estimates of future growth if, and only if, the following conditions hold:

1. The percentage of earnings retained is expected to remain constant over time. Investors never literally expect a constant retention rate, but the assumption is satisfied if the best current estimate of the retention rate during any future year is the same as the expected rate for any other future year.

2. Investors expect the company to sell no new common stock, or to sell it, on average, at about book value.

3. The future rate of return on book common equity is expected to fluctuate randomly around some constant level over time, making the best guess as to the ROE for any future year, say 1984, the same as that for any other year, say 1985.

If these three conditions are expected to hold true into the indefinite future, then a precise estimate of the future growth rate can be obtained with the equation $g = b(ROE)$. If these conditions are not met exactly, then the equation will not produce an exactly accurate growth estimate. Since the three conditions have not held exactly in the past and will not hold exactly in the future, the formula has limitations. However, the formula does give a reasonably accurate estimate of long-term growth for large companies, and it is, in any event, far more accurate than simply assuming that past growth rates will be maintained.

To estimate g_M, the expected market growth rate, we need estimates of b_M and ROE_M. Most companies have target payout ratios that are reasonably stable over time, so their target retention rates (b) are also reasonably stable. Earnings vary from year to year, so the actual (as opposed to the target) payout and retention rates will vary, but these variations will be around the target values. Therefore, to estimate the target retention rate (which is the value we need for the growth rate formula) we may take an average of retention rates in the recent past. The period used to develop the average should be long enough to cover both peaks and troughs of business cycles, but not so long as to include data that is "ancient history" and which no longer reflects the firm's operating conditions.

There is no one correct method for developing expected future growth rates from past data. Different investors surely process and interpret the existing data differently and, thus, reach different conclusions as to the best estimate of a firm's future growth.[1] Therefore, depending on our assumptions as to how most investors derive growth estimates, we can obtain different projected growth rates, hence different estimates of expected market returns and risk premiums. We experimented with several different procedures for estimating growth rates. For the aggregated set of companies, differences in the risk premiums derived by the different methods were generally rather small, with the average risk premiums from 1964 to 1979 ranging from 5 to 7 percent.

The results reported in this paper utilize estimates of the expected growth rate based on weighted average data, giving the most weight to the most recent data. To derive the estimate of g using the formula g = b(ROE), we estimated the value as of Year t for the expected retention rate (b) during Year t + 1 and future years as follows:[2]

$$(b_M)_{t+1} = 0.4(b_M)_t + 0.3(b_M)_{t-1} + 0.2(b_M)_{t-2} + 0.1(b_M)_{t-3} .$$

Here

$$(b_M) = 1.0 - \frac{\text{All common dividends paid by all S\&P 399 firms}}{\text{Total earnings available to common stockholders}}$$

$$= 1.0 - \frac{(DIV_M)}{(Earnings_M)} .$$

The expected rate of return on common equity (ROE) was calculated similarly:

$$(ROE_M)_{t+1} = 0.4(ROE_M)_t + 0.3(ROE_M)_{t-1} + 0.2(ROE_M)_{t-2} + 0.1(ROE_M)_{t-3}.$$

[1] Indeed, as L.D. Brown and M.S. Rozeff ("The Superiority of Analyst Forecasts as Measures of Expectations: Evidence from Earnings," Journal of Finance, March 1978) have shown, analysts use subjective information that would be difficult if not impossible to extract from historic data.

[2] We describe here the estimating procedure for the S&P 399. The identical methodology is also used for the Dow Jones 29.

Here, ROE_M is the market value weighted average return on book equity,[1]

$$ROE_M = \left[\sum_{i=1}^{399} (MVF_i)(ROE_i) \right],$$

and MVF_i is the market value fraction of each company i, (Market value of Firm i)/(Total market value), while ROE_i is the return on average common equity for the i^{th} company.

Given these estimates of the market retention rate and the market ROE, we obtain an estimate of the expected future market growth rate as follows:

$$(g_M)_{t+1} = (b_M)_{t+1} \times (ROE_M)_{t+1} .$$

This is the g value used in the DCF equation.

Estimating Dividend Yields

Once we have estimated the expected growth rate, the next element needed to implement the constant growth Gordon model is the expected dividend yield on the market, which for the S&P 399 is calculated as follows:

$$\begin{pmatrix}\text{Expected Market} \\ \text{Dividend Yield}\end{pmatrix}_{t+1} = \frac{(\text{Total dividend on S\&P 399})_t (1 + g_M)_{t+1}}{(\text{Total market value of S\&P 399})_t}$$

$$= \frac{(D_M)_t (1 + g_M)_{t+1}}{MV_t} .$$

[1] One could develop aggregate data on the basis of either book value or market value weights. Market value weights are more consistent both with financial theory and also with the fact that industrial companies with higher market/book ratios are growing faster and, hence, making larger incremental investments than firms with low M/B ratios.

We should also note that the choice of a four year period, and the 0.4, 0.3, 0.2, and 0.1 weights, is arbitrary, but that we did sensitivity tests using longer and shorter periods, and with weights set by exponential smoothing techniques. The results were not materially influenced by the use of exponential smoothing, and the choice of periods did not matter within the range of 3 to 6 years.

We based the market value on December 31st closing prices. We considered using various types of average stock prices, but we ultimately concentrated on spot prices because they are conceptually better. Since the stock market is relatively efficient, especially for large companies such as those in the S&P Industrial Index, the year-end closing price should reflect all currently available information on that date, and any average prices based on earlier data would probably be misleading in the sense that earlier prices would not reflect information and market conditions as of December 31. Of course, using a spot price does mean that this price can reflect some random movement away from the equilibrium price, but (1) in an efficient market such random fluctuations are not likely to be large, and (2) the net effect of random fluctuations should be small in a sample as large as the S&P Industrials.[1]

The Market Risk Premium

Having determined the expected growth rate and dividend yield on the market, we can sum these two components to obtain the expected rate of return on the market:

$$(k_M)_{t+1} = \frac{(D_M)_t \; (1 + g_M)_{t+1}}{(MV)_t} + (g_M)_{t+1} \; .$$

Subtracting the yield to maturity on U.S. Treasury bonds (R_F) from k_M produces an estimate of the risk premium investors require on the market:

$$RP_M = k_M - R_F.$$

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[1]We experimented a bit with stock prices, within the limits imposed by use of the Compustat Data Tapes. In addition to the closing price, we also used (1) the average of the January 1 and December 31 prices, and (2) the average of the high and the low for the year. On average, the choice of stock price definition did not materially affect the calculated risk premiums.

Here R_F is the December yield for the 20-year Constant Maturity Series.

In effect, we have estimated market returns looking forward from January 1 of a particular year. The bond yields used are returns that will be earned (with certainty) if the bonds are purchased and held to their 20-year maturity. The difference between the expected stock return and the bond yield is an estimate of the risk premium on the S&P or Dow Jones Industrial Stock Indexes.

Tables 2 and 3 show estimated risk premiums, plus certain other data, for the two industrial indexes, while Figures 2 and 3 give plots of the key values. The major points of interest, which can be seen most clearly from the graphs, are these:

1. Risk premiums seem to vary from year to year. Some of this year-to-year variation probably reflects random errors in our estimating procedures, although some undoubtedly reflects changes in investors' outlooks and degree of risk aversion.
2. Two clear trends in risk premiums are evident in the graph-- risk premiums drifted downward rather steadily from the mid-1960's until 1974, but they have climbed sharply in recent years.
3. Because some of the year-to-year variations are undoubtedly caused by random errors, the 3-year moving averages may be more reflective of the true market risk premiums than are the actual annual numbers. However, judgment on this point should be reserved until we have examined results produced by the nonconstant growth model.
4. The expected rate of return, and consequently the risk premium, for the S&P 399 and the Dow Jones 29 track one another very closely over time; in fact, the correlation between these two series is 0.97.

Table 2. Estimated Risk Premiums, Constant Growth, 1964-1979, for the S&P 399 Industrial Index

Beginning of Year	Expected Dividend Yield $(Y)_M$	Expected Growth Rate $(g)_M$	Expected DCF Return on Equity $(k = Y + g)_M$	20-Year Government Bond Yield (R_F)	Risk Premium $(RP = k - R_F)_M$	3-Year Centered Moving Average (RP)
1964	3.30%	6.19%	9.49%	4.19%	5.30%	-
1965	3.19	6.67	9.86	4.18	5.68	5.70%
1966	2.96	7.65	10.61	4.50	6.11	6.35
1967	3.61	8.41	12.02	4.76	7.26	6.37
1968	2.85	8.48	11.33	5.59	5.74	6.17
1969	2.83	8.56	11.39	5.88	5.51	5.30
1970	3.14	8.42	11.57	6.91	4.66	4.91
1971	3.13	7.70	10.83	6.28	4.55	4.57
1972	2.72	7.79	10.51	6.00	4.51	4.61
1973	2.38	8.34	10.72	5.96	4.76	4.93
1974	3.17	9.63	12.81	7.29	5.52	6.05
1975	5.00	10.78	15.78	7.91	7.87	6.49
1976	3.80	10.52	14.32	8.23	6.09	7.03
1977	3.71	10.71	14.42	7.30	7.12	6.95
1978	5.02	10.50	15.52	7.87	7.65	7.30
1979	5.32	10.72	16.03	8.91	7.12	-
Average	3.51%	8.82%	12.33%	6.36%	5.97%	

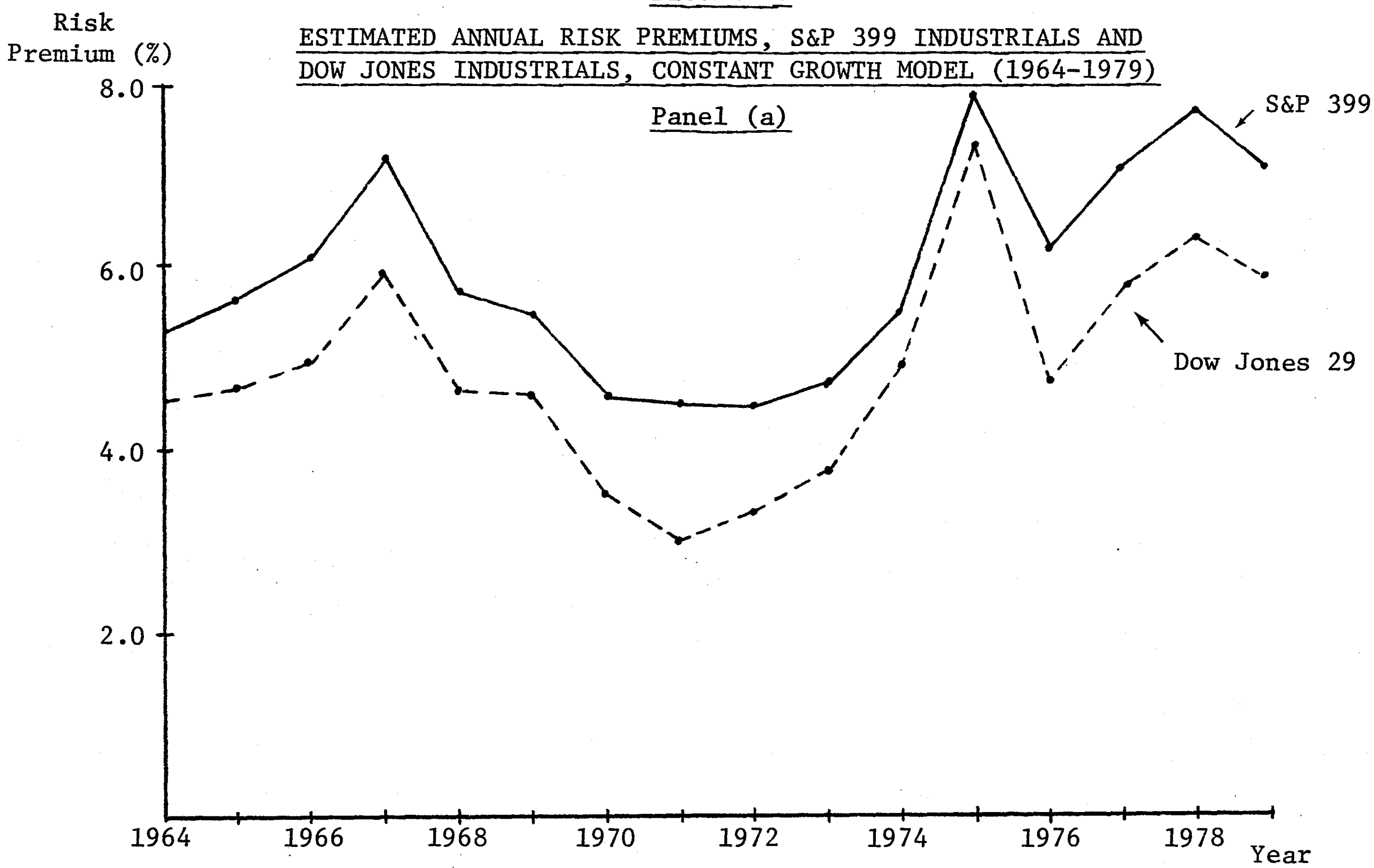
Table 3. Estimated Risk Premiums, Constant Growth, 1964-1979, for the Dow-Jones 29 Industrials

Beginning of Year	Expected Dividend Yield $(Y)_M$	Expected Growth Rate $(g)_M$	Expected DCF Return on Equity $(k = Y + g)_M$	20-Year Government Bond Yield (R_F)	Risk Premium $(RP = k - R_F)_M$	3-Year Centered Moving Average $(\overline{RP})$
1964	3.53%	5.24%	8.77%	4.19%	4.58%	-
1965	3.48	5.39	8.87	4.18	4.69	4.76%
1966	3.15	6.35	9.50	4.50	5.00	5.23
1967	3.83	6.92	10.75	4.76	5.99	5.20
1968	3.01	7.20	10.20	5.59	4.61	5.08
1969	3.18	7.33	10.51	5.88	4.63	4.26
1970	3.46	7.00	10.46	6.91	3.55	3.73
1971	3.29	5.99	9.28	6.28	3.00	3.30
1972	3.02	6.33	9.35	6.00	3.35	3.37
1973	2.75	6.96	9.72	5.96	3.76	4.01
1974	3.82	8.38	12.20	7.29	4.91	5.35
1975	5.94	9.35	15.29	7.91	7.38	5.67
1976	4.20	8.76	12.96	8.23	4.73	5.96
1977	4.34	8.73	13.07	7.30	5.77	5.60
1978	6.05	8.13	14.18	7.87	6.31	5.98
1979	6.14	8.63	14.77	8.91	5.86	-
Average	3.95%	7.29%	11.24%	6.36%	4.88%	

FIGURE 2.

ESTIMATED ANNUAL RISK PREMIUMS, S&P 399 INDUSTRIALS AND DOW JONES INDUSTRIALS, CONSTANT GROWTH MODEL (1964-1979)

Panel (a)



3-YEAR CENTERED MOVING AVERAGE RISK PREMIUMS, S&P 399 INDUSTRIALS AND DOW JONES INDUSTRIALS, CONSTANT GROWTH MODEL (1964-1979)

Panel (b)

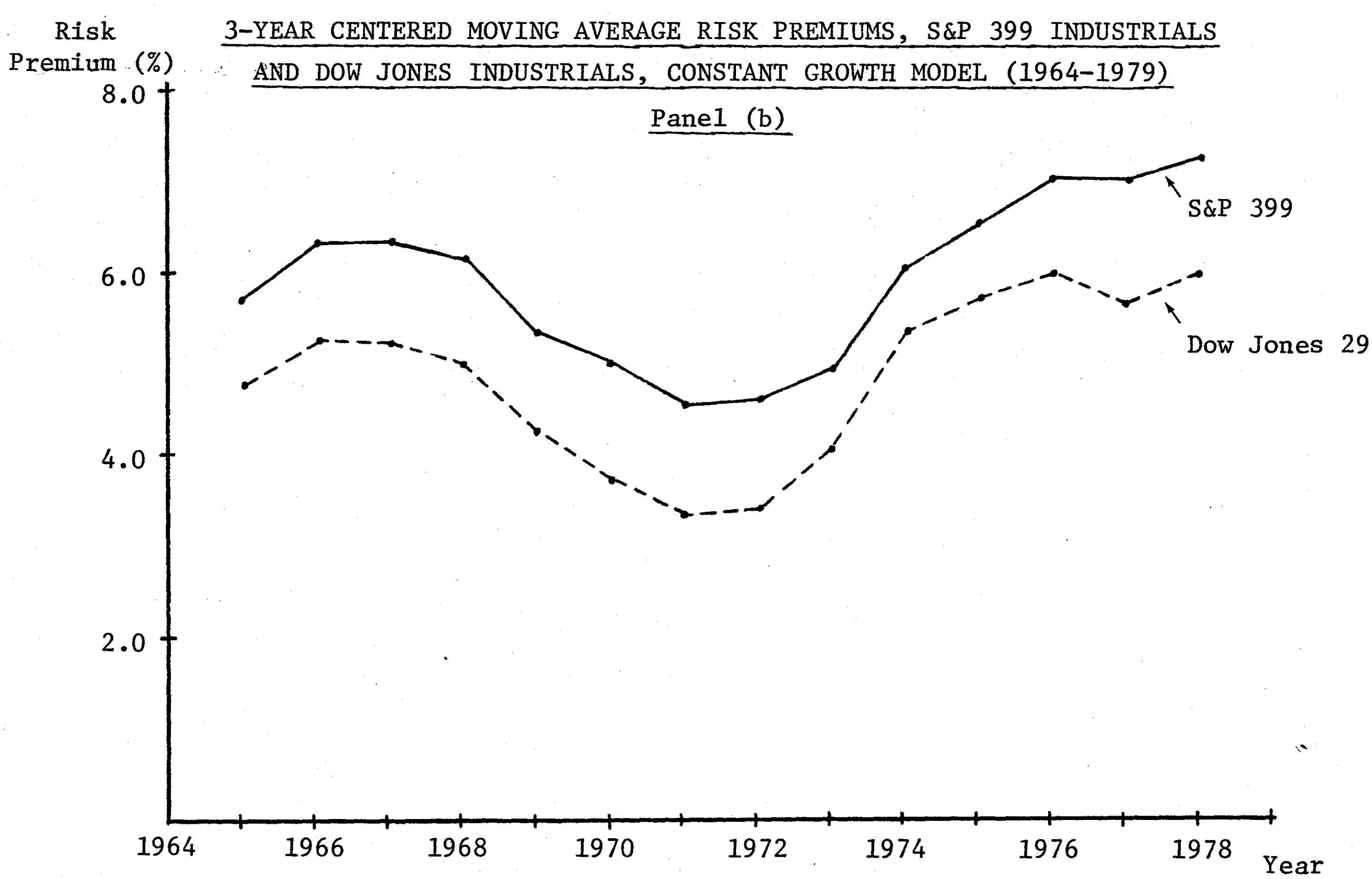
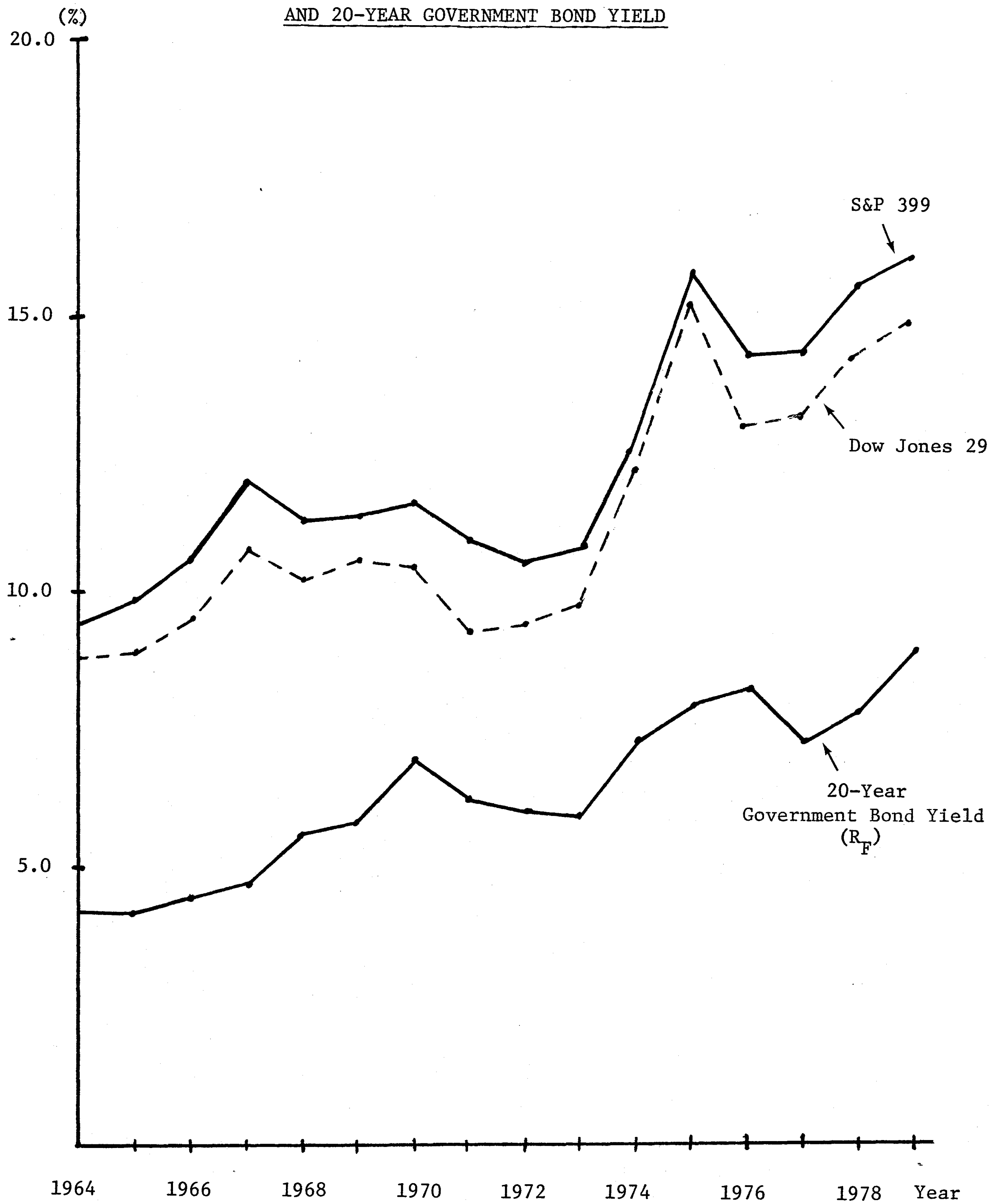


FIGURE 3: EXPECTED CONSTANT GROWTH DCF RETURN ON EQUITY AND 20-YEAR GOVERNMENT BOND YIELD



However, both the expected rate of return and the risk premium are consistently higher for the S&P 399; on average, this differential is about one percentage point. The lower apparent risk for the Dow Jones stocks is probably attributable to the fact that they are larger, stronger companies than the broader S&P index.

5. There is a very strong correlation between equity returns and bond yields; this is evident from Figure 3. The correlation coefficient between the bond yields and returns on the S&P 399 index is 0.88, and that between bond yields and returns on the Dow Jones is 0.86. We would expect equity returns to rise when debt returns increase, and it is obvious that they do.

THE NONCONSTANT GROWTH MODEL

The nonconstant growth model requires solving for k in Equation 2:

$$P_0 = \sum_{t=1}^{N} \frac{D_t}{(1 + k)^t} + \left(\frac{D_N(1 + g_n)}{k - g_n}\right)\left(\frac{1}{1 + k}\right)^N . \tag{2}$$

Here, P_0 is the firm's current price; D_t is the expected dividend in year t; N is the number of years before the constant growth state is reached; and g_n is the constant (or "normal") growth rate expected to prevail after N periods. Knowing the values of these variables, we can solve Equation 2 for k, the firm's expected and required rate of return.

The required input data for this model cannot be generated by a mechanical process--specific analysts' forecasts are necessary. We need estimates for a large number of companies, and the most convenient source of such forecasts--indeed, the only source of historical forecasts we have discovered--are those published by Value Line in its Investment Survey. However, unlike operations with the Compustat Tapes, it is a difficult (and expensive) task to collect data from the old issues of Value Line. Therefore, we did not develop risk premiums with the nonconstant model for the S&P 399--rather, we restricted our analysis of industrial companies to the Dow Jones 29. However, we did collect data on and analyze the Dow Jones Electrics (the 11 electric utility stocks included in the Dow Jones Utility Index).

The derived risk premiums are valid estimates of the true market risk premiums only if (1) stocks are in equilibrium, with expected returns being equal to required returns, and (2) Value Line's analysts' expectations represent the consensus view of the market. The first condition is quite reasonable, but the second definitely poses a problem which will be discussed in more detail later in the paper.[1]

Methodology

Value Line provides data which can be used to evaluate Equation 2 over a four year time horizon, so the nonconstant model is specified as follows:

$$P_0 = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \frac{D_4}{(1+k)^4} + \left(\frac{D_4(1+g_n)}{k-g_n}\right)\left(\frac{1}{1+k}\right)^4. \tag{3}$$

Value Line provides specific forecasts for D_1 and D_4; we obtained estimates of D_2 and D_3 by interpolation. Value Line also provides the data required

[1]Value Line's analysts seem to follow standard estimating techniques, and the Investment Survey is subscribed to by more individual and institutional investors than any other service. Second, the Value Line earnings and dividend estimates are reasonably consistent with forecasts of other analysts that we have examined. Third, all analysts, including Value Line's, use essentially the same data base for making forecasts, and they all generally confer with company officials to learn of new developments and to check on the reasonableness of their forecasts. For these reasons, at any point in time different security analysts typically make relatively consistent earnings and dividend forecasts for a given company, and especially for such large, stable, and widely followed companies as those we have examined. We also note that Value Line's forecasts have been studied in depth by academic researchers, and the Value Line quarterly earnings growth projections in the past have been superior to time series forecasts. However, Value Line's five year forecasts may or may not be accurate in comparison to other analysts' forecasts, and they may or may not represent the consensus view of investors. See L.D. Brown and M.S. Rozeff, "The Superiority of Analyst Forecasts as Measures of Expectations: Evidence from Earnings," Journal of Finance, March 1978, pp. 1-16.

to derive an estimate of g_n, the constant growth rate after Year 4. We estimate g_n as

$$g_n = b_n(ROE_n).$$

The value for b_n is the retention rate estimated by Value Line in Year 4,

$$b_n = 1 - D_4/EPS_4.$$

ROE is estimated as follows:[1]

$$ROE_n = ROE_4 = EPS_4/\text{Average Book Value}_4.$$

The estimates of b_4 and ROE_4 are combined to form an estimate of the growth rate in Year 4, which is assumed to be the expected long-run normal growth rate, g_n.[2]

---

[1]Value Line reports an ROE for the utilities but not for the industrial companies. For both groups, it does report the estimated tangible book value per share for $t = 1$ and $t = 4$. We interpolate to find book value at $t = 3$, then calculate the average book value as the average of $t = 3$ and $t = 4$.

[2]In a study similar to ours, B. G. Malkiel ("The Capital Formation Problem in the United States," Journal of Finance, May 1979, pp. 291-306) assumed a constant growth rate for the first five years, after which the growth rate was assumed to decay exponentially over the next fifteen years to a terminal growth rate equal to the estimated real growth rate in GNP (3 - 4%). This seems to us to be an unrealistically low forecast in an economy where inflation has averaged about 8% over the last decade. The earnings and dividends of a firm are expected to grow at the nominal rather than the real rate. However, Malkiel states that his results are insensitive to the terminal growth rate, the period of decay, and the rate of decay.

Sample Calculation of k_i for an Illustrative Firm

We show below the calculations for Southern Company, using Value Line data from the April 4, 1980, issue.

1. Value Line gives estimates of earnings and dividends for 1979, 1980, and averages of 1982-1984, which may be interpreted as estimates for 1983. Interpolating for 1981 and 1982, we obtain these estimates of earnings per share (EPS) and dividends per share (DPS):

	1979	1980	1981	1982	1983	Growth rate 1979-1983
EPS	1.51	1.70	1.90	2.10	2.30	11.09%
DPS	1.54	1.56	1.57	1.59	1.60	0.96%

   Notice that earnings are projected to grow at an average rate of 11.09 percent versus a growth rate of less than one percent for dividends. Very clearly, the conditions necessary for the constant growth model do not hold, demonstrating the need for the nonconstant model.

2. Value Line also forecasts EPS for 1983 of \$2.30 and an average book value in 1983 of \$17.24, so the estimated 1983 ROE is 13.3 percent.[1] This ROE, combined with the 1983 retention rate of 0.3 or 30 percent, produces an estimated long-run growth rate of 4 percent:

$$g = b(ROE) = 0.3(13.3) = 3.99\% \approx 4\%.$$

   This 4 percent is a forecast of the growth rate in earnings and dividends beyond 1983, and it is assumed to be a constant.

---

[1] For the utilities, Value Line gives an estimated ROE in 1983; for Southern, this value is 13 percent. The difference, 30 basis points, results from two factors: (1) the use of tangible book value versus total common equity for the reported ROE and (2) the fact that the reported ROE is based on year-end rather than average common equity.

We can insert the projected dividends and growth rate into Equation 2, along with the current market price of \$12, and then solve for k to estimate the DCF cost of equity:

$$\$12.50 = \frac{1.56}{(1 + k)^1} + \frac{1.57}{(1 + k)^2} + \frac{1.59}{(1 + k)^3} + \frac{1.60}{(1 + k)^4} + \left(\frac{1.60(1.04)}{(k - 0.04)}\right)\left(\frac{1}{(1 + k)}\right)^4.$$

The solution value of this equation is k = 15.5 percent, and it is an estimate of Southern's cost of common equity capital. This same procedure was followed for each company in each sample (the 29 Dow Jones Industrials and the 11 Dow Jones Utilities) in each year from 1966 to 1979.

Analysis of Results

Proceding as described above, we estimated the risk premiums for the Dow Jones Industrials and the Dow Jones Electrics for the years 1966-1980. Table 4 and Figures 4 and 5 present our findings, which are summarized below:

1. It is apparent from Figure 4 that the cost of equity tracks interest rates quite closely; indeed, Treasury bond yields are correlated with industrial k values at the level r = 0.91, while for the electrics r = 0.92.
2. Figure 4 also shows that the cost of equity capital for the electric utilities has risen faster than that of the industrials--in the 1960's, when utilities were regarded as being safe, "widow-and-orphan" stocks, their cost of capital was much below that of the industrials. More recently, after the utilities have suffered huge market price declines as a result of regulatory lag, escalating fuel costs, environmental

Table 4. Value Line Risk Premiums, 1966-1980

Beginning of Year	Dow Jones 29 Industrials		Dow Jones 11 Electrics		3-Year Centered Moving Average	
	Value Weighted k	Risk Premium	Value Weighted k	Risk Premium	Industrials	Electrics
1966	9.56%	5.06%	8.11%	3.61%	-	-
1967	11.57	6.81	9.00	4.24	5.61%	3.98%
1968	10.56	4.97	9.68	4.09	5.62	3.93
1969	10.96	5.08	9.34	3.46	5.12	3.89
1970	12.22	5.31	11.04	4.13	5.11	4.04
1971	11.23	4.95	10.80	4.52	5.12	4.39
1972	11.09	5.09	10.53	4.53	5.18	4.82
1973	11.47	5.51	11.37	5.41	5.23	5.50
1974	12.38	5.09	13.85	6.56	5.84	6.90
1975	14.83	6.92	16.63	8.72	5.70	7.01
1976	13.32	5.09	13.97	5.74	6.11	6.71
1977	13.63	6.33	12.96	5.66	6.10	5.65
1978	14.75	6.88	13.42	5.55	6.60	5.74
1979	15.50	6.59	14.92	6.01	6.61	5.92
1980	16.53	6.35	16.39	6.21	-	-
Average	12.64%	5.74%	12.13%	5.23%		

FIGURE 4. EXPECTED RATES OF RETURN ON DOW JONES INDUSTRIALS AND ELECTRICS, NONCONSTANT (VALUE LINE) MODEL, VERSUS TREASURY BOND YIELDS, 1966-1980

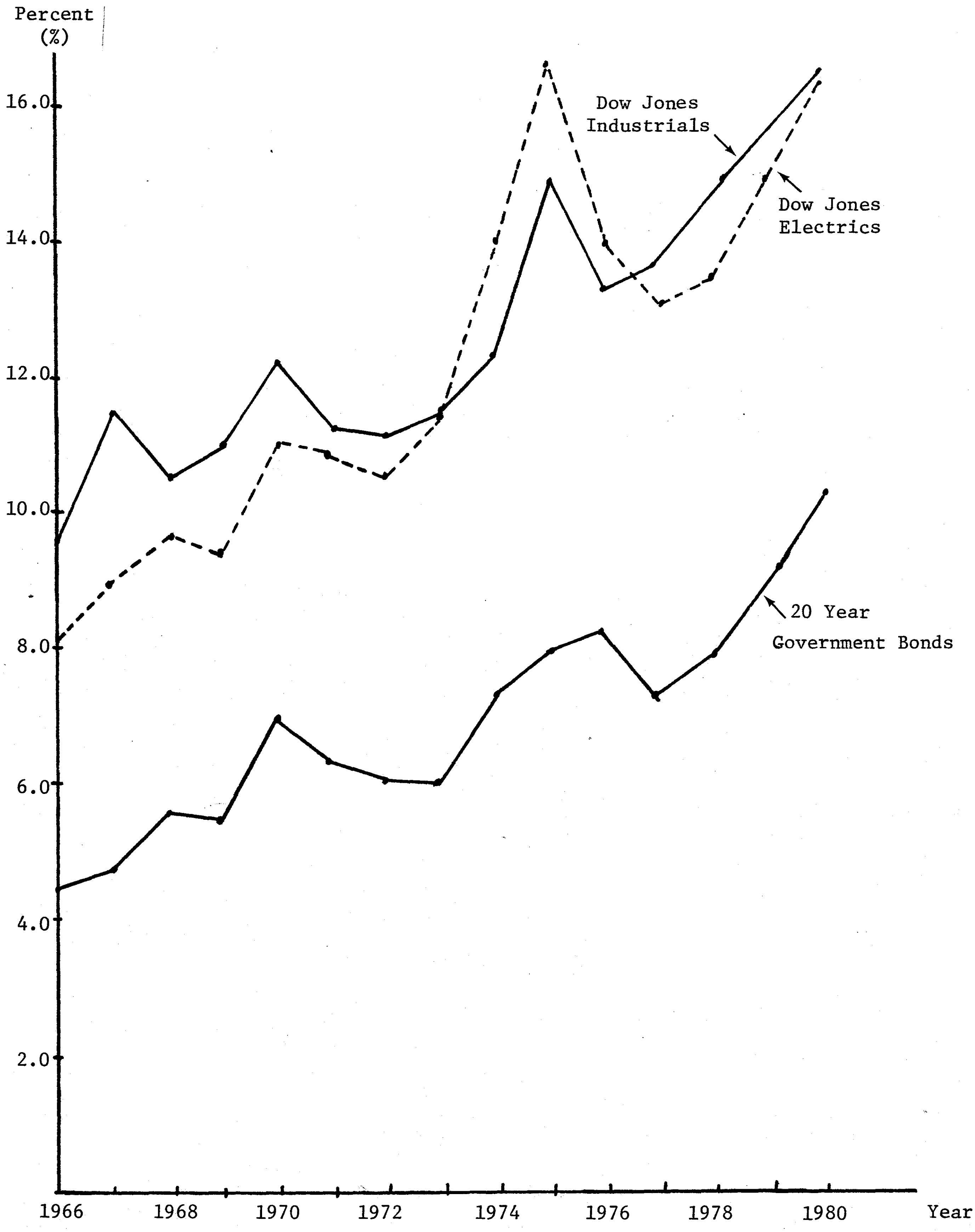


Figure 5. Estimated Risk Premiums for Dow Jones Industrials and Electrics, Nonconstant (Value Line) Model, 1966-1980

problems and the like, their cost of capital has approached, and in some years (1974, 1975, and 1976) even surpassed, that of the industrials.

3. Another view of the relative positions of the utilities versus the industrials is revealed from the risk premiums graphed in Figure 5. Here we see (1) that the industrials' risk premiums exhibited no pronounced trend from 1966 through 1974, but that the trend has been up since 1974, and (2) that the utilities have generally trended up since the mid-1960's, although, after reaching a peak in 1975, the utilities' upward trend has essentially ceased.

Some Caveats

As noted above, the validity of our nonconstant approach is critically dependent upon the assumption that the Value Line analysts' forecasts are substantially the same as those of the average investor in the market, or the market consensus. For large groups of companies, this assumption seems reasonable at first glance, but it can certainly be questioned, and a potential bias does exist whenever the forecasts of any single organization are used as a proxy for the views of investors in general. If at some point in time Value Line as an organization tended to be optimistic or pessimistic relative to other organizations about the future state of the general economy, or about a subset such as the electric utilities, then Value Line's expected rates of return, and consequently risk premiums based on Value Line data, would not reflect the views of investors in general. It would obviously be useful to check our nonconstant growth risk premiums, which were based on Value Line data, against results based on other analysts' data. Unfortunately, no other published forecasts on a historical basis could be located. However, we hope to obtain forecasts made by analysts of other organizations (bank trust departments, mutual funds, life insurance companies, and brokerage houses) at some future date. If we could obtain a good set of such forecasts, they could be averaged to form an estimate of the market consensus and then used just as we used the Value Line data. One could certainly place more confidence in information based on such an average than on the forecasts of a single organization such as Value Line.

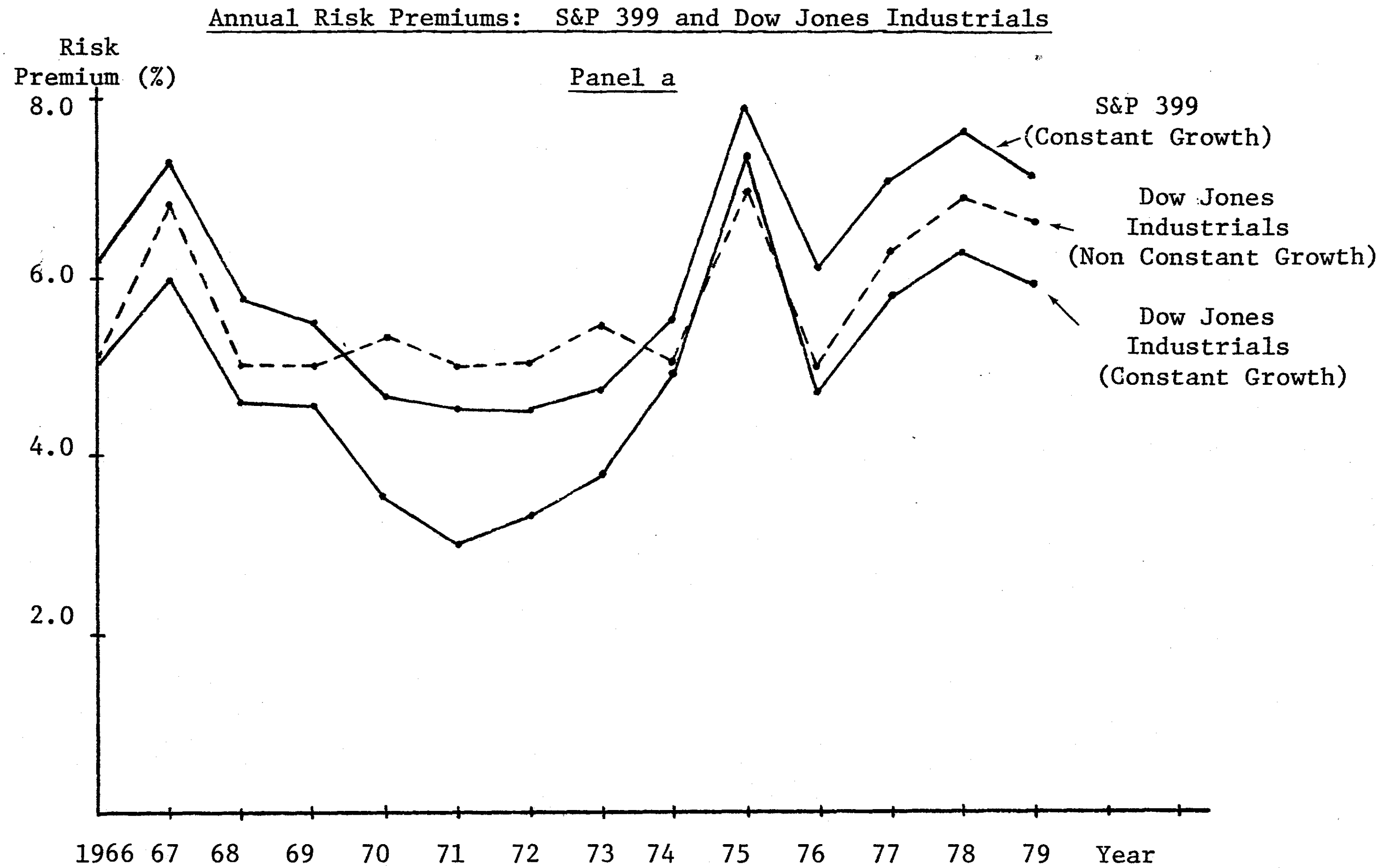
CONSTANT GROWTH VERSUS NONCONSTANT GROWTH RISK PREMIUMS

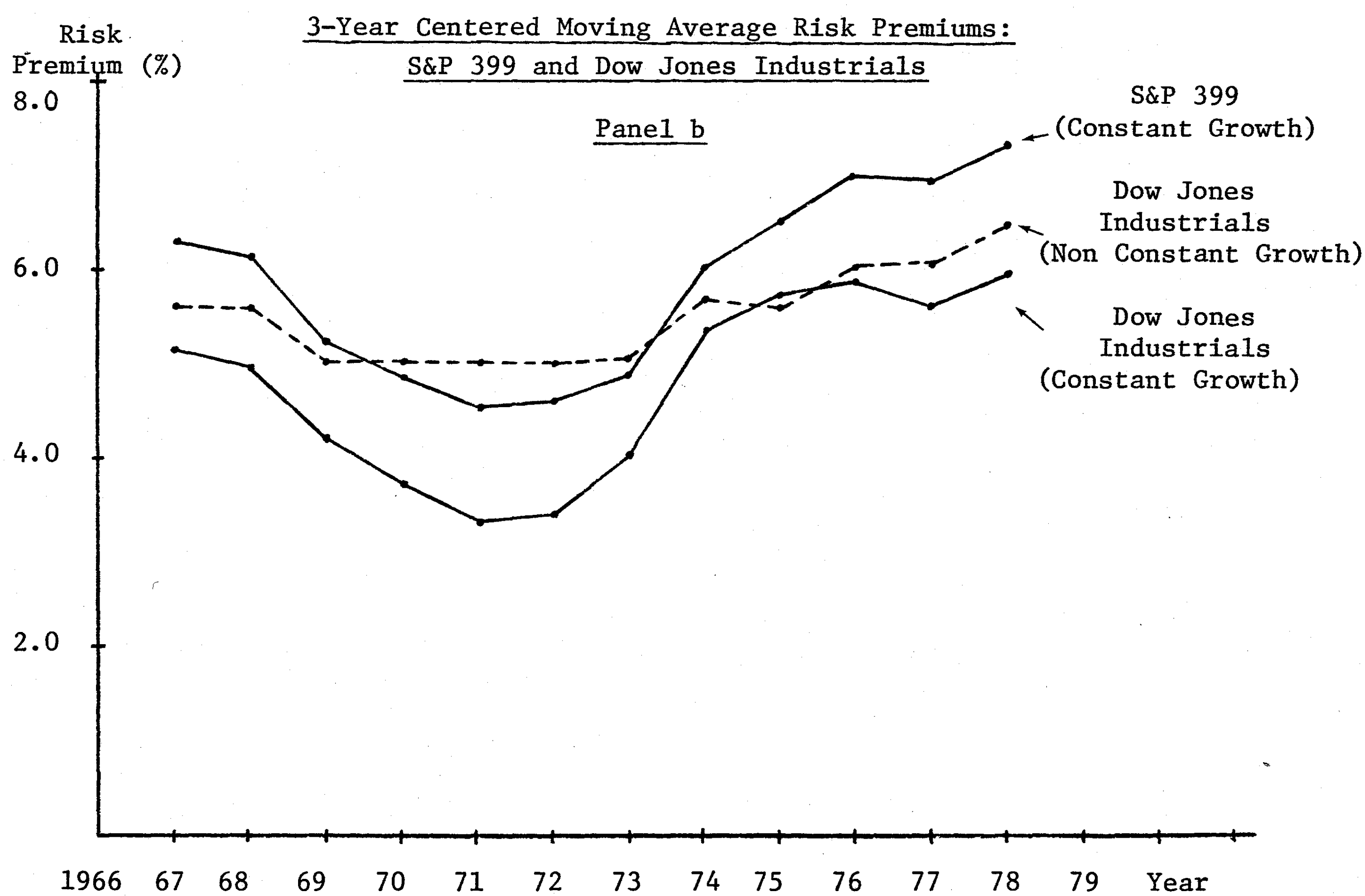
Figure 6 shows the Dow Jones risk premiums as estimated by the constant and nonconstant growth models, along with risk premiums for the S&P 399 as estimated by the constant growth model. The lower panel plots moving averages, which smooth out variations somewhat and thereby facilitate certain types of comparisons. These points are suggested by the graphs:

1. It is clear that industrial firms' risk premiums, no matter whether they are measured by the constant or the nonconstant growth models, whether they are for the Dow Jones 29 or the S&P 399, or whether they are based only on historical data or on the Value Line analysts' forecasts, tend to track one another rather closely.
2. Using the constant growth model, it is also very clear (from Panel b) that risk premiums are higher for the S&P 399 than for the Dow Jones 29. Because of data limitations, we are unable to compare these two samples using the nonconstant (Value Line) procedure.
3. For the Dow Jones 29, it is apparent that risk premiums estimated by the nonconstant model, with Value Line analysts' forecasts, are far more stable than those based on the constant growth model using only historic accounting data. Apparently, the analysts "look over the valleys and through the peaks" when making their estimates for future growth rates, and this stabilizes both the expected returns on equity and the estimated risk premiums.

The S&P 399 would provide a better basis for estimating the risk premium for an "average NYSE company." At the same time, one might argue that the nonconstant model, with the Value Line data, is conceptually superior to

Figure 6.


Annual Risk Premiums: S&P 399 and Dow Jones Industrials
Risk Premium (%)
Panel a
8.0
6.0
4.0
2.0
S&P 399 (Constant Growth)
Dow Jones Industrials (Non Constant Growth)
Dow Jones Industrials (Constant Growth)
1966
67
68
69
70
71
72
73
74
75
76
77
78
79
Year


3-Year Centered Moving Average Risk Premiums: S&P 399 and Dow Jones Industrials
Risk Premium (%)
Panel b
8.0
6.0
4.0
2.0
S&P 399 (Constant Growth)
Dow Jones Industrials (Non Constant Growth)
Dow Jones Industrials (Constant Growth)
1966
67
68
69
70
71
72
73
74
75
76
77
78
79
Year

the constant growth model using Compustat data. Thus, the "best" market risk premium might be the one for the S&P 399 based on the nonconstant model. Unfortunately, data limitations have kept us from examining this particular premium.[1] Therefore, as the best available alternative, we are inclined to use the risk premium estimated for the Dow Jones 29, increased by approximately 0.5 percentage points to account for the apparently higher risk premiums on the S&P 399. Thus, in January, 1980, the market risk premium would appear to be in the range of 6 to 7 percentage points, with the midpoint of 6.5 representing the most likely estimate.

[1]We have conducted experiments along these lines, using the Value Line data tapes, but the tapes do not provide the information necessary to calculate risk premiums over time.

RISK PREMIUMS FOR INDIVIDUAL COMPANIES

Our major interest in risk premiums is to use them to help estimate the cost of equity for individual companies. Given an accurate estimate of the market risk premium, and a judgment about whether investors consider a particular company to be of high, average, or low risk, we could adjust the market risk premium for the company, then add the current bond rate to obtain an estimate of the company's cost of equity. The company's risk position could be ascertained in various ways, as could the size of the adjustment for high and low risk firms. For the industrials, one might use the CAPM, but this would not, in our judgment, be appropriate for the utilities.[1]

We have considered the adjustment process at some length, but to date we have not been able to develop a methodology which provides what we consider to be highly reliable estimates of company-specific risk premiums. First, we concluded that it is completely inappropriate to estimate company risk premiums directly with the constant growth model. Aggregated data do appear to provide reasonable estimates of the market risk premium, but the data on individual companies are too unstable to use except after averaging to eliminate random errors in the company data. An examination of the raw data showed that while the majority of the companies had risk premiums that were not obviously unreasonable, in some years a few of the smaller members of the S&P 399 had calculated risk premiums that

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[1]See Eugene F. Brigham and Roy L. Crum, "On the Use of the CAPM in Public Utility Rate Cases," Financial Management, Summer 1977, pp. 7-17, and "Reply to Comments on 'Use of CAPM in Public Utility Rate Cases,'" Financial Management, Autumn 1978, pp. 72-76.

were negative, while others had premiums of 20 percent or more.[1] Because of these problems, we abandoned the idea of estimating individual company risk premiums using the constant growth model.[2]

---

[1]The negative premiums arise if a firm has (1) low dividends, hence a low dividend yield, and (2) an abnormally low rate of return on equity, which produces a low or even negative growth rate. If this condition holds for several years, especially during the last two years to which our formula gives special weight, then the combination of dividend yield plus growth rate can be less than the yield on Treasury bonds, producing a negative risk premium. This situation is always regarded as being temporary--investors expect the ROE to return to normal levels, pulling up earnings, dividends, and the growth rate.

Large risk premiums can arise in two ways. First, a company may have a very high ROE, say 30 percent, and may retain most of its earnings, which would give it a k value of close to 30 percent. Subtracting R_F would produce a risk premium of over 20 percent. If the high ROE is a temporary cyclical phenomenon, then our smoothing process would reduce the risk premium, but if the high ROE persists for four years, we would report high premium. While companies can and do earn very high ROE's in the short-run, it is unrealistic to project a continuation of an ROE of over 20 percent, combined with a low payout ratio, over the long-run. The second factor that can cause high risk premiums is that, on rare occasions, some of the S&P 399 companies have had large write-offs, which have reduced reported equity to low levels. Later, "normal" profits are divided by the very low reported equity values, and this results in very high reported ROE's and risk premiums.

[2]We should note, however, that the premiums based on averaged data for individual companies were generally quite similar to those based on aggregated data. The highs and the lows tended to offset one another. However, in some instances the explosive nature of ratios (dividing a number by a number close to zero produces a very large quotient) resulted in risk premiums (plus or minus) of over 100 percent. These were always found for smaller companies; hence they did not get much weight in the market-weighted average risk premium, and, in addition, the extreme pluses and minuses tended to cancel one another. Nevertheless, we still feel much more comfortable with the aggregated data premiums as reported in the present study.

With the nonconstant growth approach, using Value Line data, the problem of data instability is generally not serious, so it is feasible to make direct, company specific estimates of the risk premiums.[1] For instance, in the preceding example for the Southern Company, we found that the nonconstant growth DCF cost of equity in late May, 1980, was 15.5%. The risk premium for Southern Company is thus estimated to be

$$RP = k_i - R_F = 15.5 - 10.2 = 5.3\%.$$

Here R_F is the yield on a twenty year government bond in late May, 1980. This same general approach could be used for any of the 1,700 companies followed by Value Line.

However, as noted above, the validity of this approach is critically dependent upon whether or not the Value Line analysts are representative of the views of investors in general. On an individual company basis, and for the current period, it may be possible to obtain forecasts such as those made by Value Line, but by other influential securities organizations. If a number of such forecasts could be obtained, they could be averaged to form a proxy for the views of investors in general. The larger the number of separate forecasts, the higher our confidence in the resulting average risk premium would be.[2]

---

[1] However, Value Line may be more or less optimistic about the Company than the average investor; this could cause the Company's risk premium and estimated cost of equity to be measured incorrectly.

[2] It should also be noted that Value Line judges some stocks to be better "buys" than others. This suggests that Value Line's analysts feel that all stocks are not in equilibrium--that some are above the Security Market Line (SML) while others are below the SML. This being the case, it may be that Value Line is more optimistic than the average investor about the growth prospects for the companies it ranks highest and less optimistic about those which it ranks lowest. This point does not influence the validity of Value Line data for determining the average risk premium, but it reinforces questions about using Value Line to estimate risk premiums for individual companies.

OTHER STUDIES OF RISK PREMIUMS

As noted earlier, Ibbotson and Sinquefield have studied the historic relationship between returns on stocks and bonds, and Benore has studied forward-looking risk premiums on a survey basis. Also, Malkiel examined risk premiums using a methodology very similar to ours.[1] Malkiel estimated the expected rate of return on the 30 Dow Jones industrial stocks in each year from 1960 to 1977. He based his growth rate forecast on Value Line earnings growth forecasts, and he used 10-year maturity government bonds as a proxy for the riskless rate. Further, he assumed that each company's growth rate would, after the initial 5-year period, move toward the long-run real national growth rate (3 to 4% when his study was prepared). Malkiel reported that he tested the sensitivity of his results against a number of different types of changes, but, in his words, "The results are remarkably robust and the estimated risk premiums are all very similar to those displayed on the chart."[2]

Figure 7 shows a plot of Malkiel's risk premiums together with ours for the Dow Industrials, using Value Line data. Our years have been shifted back one to make our data comparable to Malkiel's. Our risk premiums are generally higher than Malkiel's in the earlier years, but the two studies converge after 1973. The differences could have arisen for these reasons: (1) Malkiel restricted his terminal growth rate to the 3 to 4% range; (2) he included AT&T while we excluded it;

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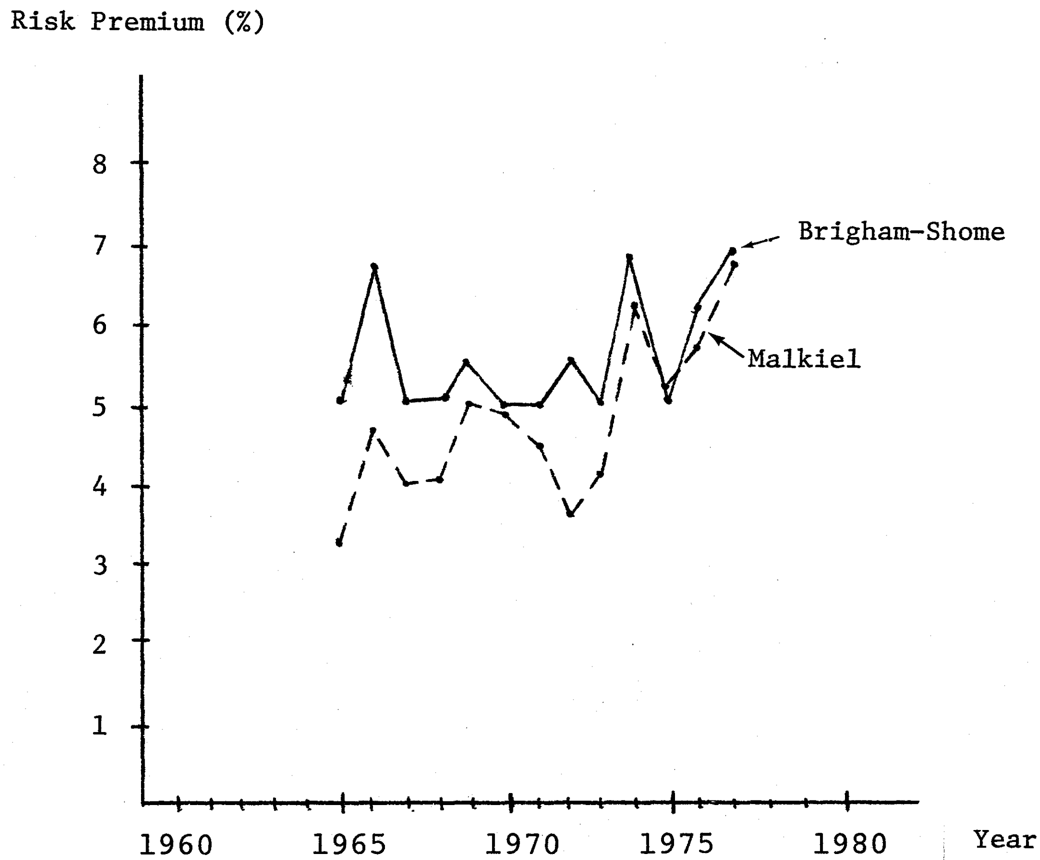
[1] B. G. Malkiel, *op. cit.*

[2] Ibid., p. 300.

Figure 7

Comparison with Malkiel's Risk Premiums



Source: Malkiel, Op. Cit., Figure 2; Brigham-Shome, Table 4.

(3) the Dow Jones Industrials included Chrysler and Esmark when Malkiel did his study, but these two companies had been replaced by IBM and Merck when we did ours; (4) he used 10-year Treasury bonds while we used 20-year maturities; and (5) the format of the Value Line reports has tended to change somewhat over time, and we may have interpreted earlier year data differently than Malkiel did.

Malkiel's risk premium analysis was not the central focus of his study--his focus was on reasons why the United States has lagged behind certain other nations in expanding and improving its stock of physical capital. He only calculated and discussed risk premiums and the accompanying rise in the cost of equity capital as one small part of his discussion of the United States' lag in aggregate capital expansion. His data (and ours) certainly support his major contention. At the same time, Malkiel's data also support our estimates, especially in the more recent years.

SUMMARY

The purpose of this paper was to estimate a market risk premium for use as a basing point in the determination of the cost of equity for a firm. In the past, most analysts who required a risk premium for their work have used historic holding period returns such as those provided by Ibbotson-Sinquefield, or else used risk premiums based on survey data such as those of Benore. Malkiel is the major exception--he used forward-looking risk premiums designed to capture expectations about future returns, and his methodology and results are similar to ours.

We used both the DCF constant growth model (the Gordon model) and a nonconstant version of the DCF model to determine expected rates of return on samples of industrial and utility stocks, over the period 1964-1980. From these expected annual returns we subtracted the yield to maturity on 20-year U.S. Treasury bonds to obtain estimates of the market risk premium. Risk premiums for the industrials declined slightly from the early 1960's through 1974, after which time the trend has been generally upward. The electric utilities had much lower risk premiums than the industrials in the 1960's, but the utilities' riskiness both in absolute terms and relative to the industrials has trended up since the mid-1960's. As a result, the utilities' cost of equity has been rising faster than that of the industrials, and today there does not appear to be much difference between the cost of equity to industrials and to utilities.

Appendix A. YIELD DIFFERENTIALS ON VARIOUS TYPES OF BONDS 1960-1979 (Average of Monthly Values)

	GOVERNMENT BONDS		UTILITY BONDS				YIELD SPREADS						
YEAR	SHORT TERM	LONG TERM	AAA	AA	A	BBB	AAA -L.T. GOVT'S	AA -AAA	A -AAA	BBB -AAA	A -AA	BBB -AA	BBB -A
1960	3.85	3.99	4.51	4.54	4.66	4.82	.52	.03	.15	.31	.12	.28	.16
1961	3.51	3.90	4.47	4.52	4.61	4.70	.57	.05	.14	.23	.09	.18	.09
1962	3.32	3.95	4.29	4.37	4.42	4.53	.34	.08	.13	.24	.05	.16	.11
1963	3.56	4.02	4.29	4.32	4.37	4.45	.27	.03	.08	.16	.05	.13	.08
1964	3.84	4.17	4.41	4.44	4.50	4.60	.24	.03	.09	.19	.06	.16	.10
1965	4.07	4.23	4.52	4.55	4.63	4.77	.29	.03	.11	.25	.08	.22	.14
1966	4.95	4.68	5.19	5.23	5.37	5.64	.51	.04	.18	.45	.14	.41	.27
1967	4.69	4.90	5.61	5.67	5.80	6.07	.71	.06	.19	.46	.13	.40	.27
1968	5.41	5.33	6.24	6.36	6.56	6.88	.91	.12	.32	.64	.20	.52	.32
1969	6.42	6.22	7.22	7.39	7.57	7.90	1.00	.17	.35	.68	.18	.51	.33
1970	7.19	6.75	8.11	8.35	8.70	9.12	1.36	.24	.59	1.01	.35	.77	.42
1971	5.32	5.94	7.54	7.71	8.24	8.62	1.60	.17	.70	1.08	.53	.91	.38
1972	5.83	5.67	7.41	7.53	7.80	8.05	1.74	.12	.39	.64	.27	.52	.25
1973	6.88	6.12	7.72	7.83	8.03	8.17	1.60	.11	.31	.45	.20	.34	.14
1974	7.75	6.59	8.45	8.63	8.75	9.08	1.86	.18	.30	.63	.12	.45	.33
1975	7.37	8.21	8.84	9.17	9.50	10.21	.63	.33	.66	1.37	.33	1.04	.71
1976	6.50	7.87	8.50	8.82	9.05	9.64	.63	.32	.55	1.14	.23	.82	.59
1977	6.21	7.69	8.14	8.44	8.60	8.86	.45	.30	.46	.72	.16	.42	.26
1978	8.24	8.46	8.83	9.06	9.20	9.48	.37	.23	.37	.65	.14	.42	.28
1979	9.89	9.27	9.64	9.97	10.17	10.69	.37	.33	.53	1.05	.20	.72	.52
AVERAGE	5.74	5.90	6.69	6.85	7.03	7.32	.80	.15	.33	.62	.18	.47	.29
STANDARD DEVIATION							.54	.11	.20	.36	.12	.26	.17

Source: Standard & Poor, Security Price Index, 1979.

Figure A-1

RISK PREMIUMS ON TRIPLE B BONDS