Division of Research
Graduate School of Business Administration
The University of Michigan

Preliminary Draft
November, 1983

FINANCIAL STRUCTURE DECISIONS IN AN UNCERTAIN ENVIRONMENT: A Cross Country Analysis

Working Paper No. 342R

Gunter Dufey*
and
Arvind K. Jain**

FOR DISCUSSION PURPOSES ONLY

* Professor of International Business and Finance, Graduate School of Business Administration, The University of Michigan; much of the research was done during 1981-82 while the author was National Fellow, Hoover Institution, and Visiting Professor, Stanford Graduate School of Business.

** Assistant Professor, International Business and Finance, Faculty of Management, McGill University.

The authors are grateful to the Center for International Business Studies, Dalhousie University, Halifax, and the Research Committee, Faculty of Management, McGill University, Montreal, which funded parts of this research.

Financial Structure Decisions In An Uncertain Environment

Introduction

Financial markets in different countries appear to react differently to internal and external shocks. The differences manifest themselves primarily through different degrees of variability of interest rates in markets for short-term credit.

Given these observations at the macro level, the question that arises is how companies -- domestic as well as international -- react to different degrees of financial market instability, as reflected in interest rate fluctuations. Specifically, the question is whether such fluctuations and the concomitant uncertainty affect corporate funding decisions.

This aspect of financial management is closely tied to the management of "financial risk." The essence of financial risk is the ability, or the lack thereof, of the firm to meet its obligations by making payments in a timely fashion. As such, it has traditionally been analyzed in the context of financial leverage.

The conventional analysis of leverage implicitly assumes that interest rates are fixed, while operating returns of firms in competitive markets vary in line with the business cycle. Interest rates, however, do fluctuate--and along with them the financial costs of the firm. Thus, the concept of financial risk must include consideration of the degree of covariance between the firm's net cash inflows (net operating revenues) and the firm's cash outflows for debt service.[1] Thus, the firm is better able to meet its financial obligations, ceteris paribus, when increases in debt service charges are accompanied by compensating increases in net operating income, and vice versa. Under this broad definition, the degree of financial risk is closely related to the relationship between net operating revenues and debt service charges, in

terms of both the degree of covariance and the time pattern of movements of these two variables.

In this study, we hypothesize that higher financial risk should induce management to pursue "conservative" financial policies. More conservative financial policies would manifest themselves, inter alia, in lower debt/asset ratios. Can this relationship be empirically shown to exist?

This, in essence, is the research question. The paper is organized as follows. First, we review the existing literature in the area of capital structure in order to show that financial structure is relevant and that it is related to financial risk; this provides a justification for a hypothesis that higher financial risk will cause "conservatism" in corporate funding policies. Subsequently, we introduce concepts and measurements that indicate the changes in financial risk brought about by the pattern of comovements in terms of production indices and interest rates. These stand as proxies for aggregate corporate cash flows and debt service charges, respectively. In the last part, we will provide data in support of the basic hypothesis: firms respond to changes in financial risk in a systematic and predictable way.

On the Relevance of Leverage

The relationship between capital structure and financial risk has been a subject of controversy. There is even a question as to whether the financial structure of a firm affects its value. In their seminal papers, Modigliani and Miller [33,34] argue that the financial structure should have no effect on the value of a firm.[2] Subsequent work has oscillated between proving the existence of an optimal capital structure and refuting this concept. In the meantime, corporate financial executives, rating agencies, and lenders of funds claim to behave as if an optimal debt/equity ratio for every industry did exist. Myers [35, p. 147] explains this difference

between theory and practice in a flattering way, calling it a "gap in modern finance theory."

Modigliani and Miller base their "irrelevancy proposition" on the existence of arbitrage in the market for financial assets and on some strong assumptions, including the absence of taxes, the proposition that the debt is risk free, and bankruptcy costs that amount to zero. In a follow-up paper, these authors show that when corporate taxes are introduced, the value of the firm increases by the tax subsidy on debt; hence, that firms should be leveraged to the hilt.

The irrelevancy of the financial structure decision is shown to exist even with risky debt by Stiglitz [41], using a state-preference approach and by Rubinstein [37], using a mean-variance approach. In fact, Stiglitz, using a general equilibrium analysis, proves other financial decisions, including the maturity structure of debt, to be irrelevant also. He also argues that the financial structure of the economy does not matter [41, p. 864-5].

In a subsequent paper, Miller reaffirms his previous conclusions on financial structure and states that "... there would be no optimum debt-ratio for any individual firm" [31, p. 269]. He allows, however, that there "will be an equilibrium level of aggregate corporate debt" (for the economy as a whole). Given the aggregate level of debt for the corporate sector, a clientele effect and the preference of the corporation will determine whether a particular firm follows a high or low debt/equity ratio strategy. But the question of how a firm is to determine exactly how much debt to raise is left unanswered.

The irrelevancy proposition has been challenged vigorously both on theoretical and empirical grounds. Deadweight costs arising from bankruptcy

[8, 9, 10, 25, 28] and from agency relationships [for example, 4, 24, 35,] prevent firms from raising all their capital in the form of debt. Bankruptcy costs can take three forms [25, pp. 47-48]: liquidation costs, administrative costs, and loss of tax-writeoffs. Agency costs may arise from [4, p. 8] information asymmetry and possible wealth transfer effects (a) between shareholders and bondholders, and (b) between management and bondholders through consumption of non-pecuniary benefits.

Existence of bankruptcy costs results in a tradeoff between the tax advantages of the debt and its potential costs.[3] As Brennan and Schwartz [8, p. 104] point out, additional debt (from an existing debt/equity structure) raised by a firm has two effects on the firm's value: on one hand, it will increase the tax savings to be enjoyed so long as the firm survives; on the other hand, it will reduce the probability of the firm's survival for any given period. Chen and Kim, after reviewing the extensions of the MM analysis on corporate debt policies, point out that "the optimal capital structure that maximizes the market value of the firm ... (occurs when) ... the marginal increase in present value of tax savings equals the marginal increase in present value of bankruptcy costs" [10, p. 376].[4]

These conclusions would, of course, be the same as Miller's, if the bankruptcy costs and tax savings from interest payments were negligible. Whether these two cash streams are significant is an empirical question, definitive answers to which have yet to come. Estimates by Cordes and Shahein [13] indicate that, although the tax advantage of debt varies between firms and is less than the statutory tax rate, it is still too high to be considered close to zero.

Consideration of other factors, such as managerial behavior and agency costs, however, indicates that an optimal capital structure for the firm may exist. It can be shown that with risky debt, the tax advantage associated with

corporate debt has to be traded off not only against bankruptcy costs, but also against the cost of financial distress (liquidity crises), the costs of monitoring and bonding activities by debt holders, and any loss in the economic value of the enterprise resulting from suboptimal investments undertaken by the managers [10, p. 378 and 4]. Thus, the tax advantage of the debt has to offset all other deadweight costs associated with debt. The presence of those costs makes debt risky and may give rise to an optimal capital structure for firms [25].

Kim [26] has proven this proposition explicitly by incorporating leverage-related costs (defined as the discounted values of expected bankruptcy costs, agency costs and loss of tax-shields) in the general equilibrium framework. When these costs are positive (not zero, as assumed by Miller) the total level of debt in the economy will be less than in Miller's world [26, Figure 4]. Furthermore, he shows that with positive leverage-related costs, "firms will borrow up to the point where the marginal tax benefit is equal to the marginal ex ante leverage-related costs" [26, p. 23], thus resulting in an optimal capital structure for a firm. The same conclusion is arrived at by Taggert [44, p. 9], using Miller's framework for the aggregate corporate sector and applying the same framework to individual firms.

Barnea, Haugen and Senbet [4] have shown that agency costs may result in an optimal debt ratio for a firm being less than 99.99 percent. Agency costs of bankruptcy have the effect of creating the tax-advantage-versus-bankruptcy-costs tradeoff as discussed above. The agency costs of equity and debt have opposite effects: those of equity are reduced and those of debt increase as the debt/assets ratio increases. The optimal solution becomes neither zero debt nor all debt. Moreover, capital structure may be used by management to

signal the quality of projects they choose. All these considerations will determine an optimal capital structure.

Miller [31], while recognizing these deadweight costs of debt, bases his analysis on the assumption that the difference between individual tax rates on income from bonds vs. equity largely offsets the burden of corporate profit taxes, thus significantly reducing the "tax advantage of debt."[5] On the other hand, he interprets the empirical evidence on bankruptcy costs to indicate that these are insignificant.[6] He brushes aside other deadweight costs by arguing that these costs [as discussed in 24] can be avoided by using other forms of debt contracts [31, p. 263]. Thus, Miller's answer to the "tax benefit versus bankruptcy costs" controversy is that, numerically, both sides of the controversy are too trivial to have any meaningful impact on the corporate decision regarding the debt/equity structure.

Empirical Evidence of Target/Optimal Debt Ratios

While the controversy is unresolved on theoretical grounds, empirical studies tend to point to the existence of systematic differences between the financial structures of firms in different industries, and often between different countries. Some of these studies are summarized below, but it should be kept in mind that their main aim often is a purpose other than a comparison of financial structure norms.

There are at least two ways in which one might check for the existence of capital structure norms among firms. Either one may check whether the debt/asset (or debt/equity) ratios for firms with similar characteristics are similar at any given point in time; or, one may check if managers, when raising funds, choose between debt and equity so as to bring the actual debt/equity ratios for their firms in line with their target (or optimal)

debt/equity ratio norms. Both methods are based on the assumption that if managers believe that there are optimal capital structures, they will try to maintain their firms' leverage ratio around the optimal values.

We begin by reviewing the studies that have taken the first of these two approaches. The concern here is to determine if (a) firms indeed follow financial structure norms, and (b) if these norms are influenced by changes in business or financial risks. These two issues form the foundations for our research.

Schwartz and Aronson [38] were the first to look for empirical verification of the optimal financial structures after the Modigliani-Miller controversy began. They compare the data for four groups of industries within the United States for 1928 and 1961. Using one-way analysis of variance, they find that, although financial structures within industries does not vary significantly, there are significant differences in the common equity to total assets ratios among different industries for a given year. They also find that there are insignificant differences in this or other important financial ratios over time for the same industry. The analysis indicates existence of optimal capital structure for each industry, and stability of basic leverage structure over time. They indicate that a relationship between leverage and business risk, as proxied by industry classification may exist; yet their results are of limited value since they confine their study to only four industries, including two regulated and two unregulated industries.

A number of studies have been undertaken to extend the analysis to firms in countries other than the United States. Stonehill and Stitzel [43], for example compare the ratio of total debt to total assets for nine industries in nine different countries. Their interest is mainly in identifying environmental variables that can explain different financial structure norms between countries.

On the other hand, Remmers et al. [36] carry out analysis of variance for differences in debt ratios in the United States among nine industries over three years, and find that industry is not a determinant of debt ratios. Their sample, however, consists of large firms only. They also carry out similar analyses for four countries besides the United States and find that the size of the firm or industry does not influence financial structure. Belkaoui [5] finds similar results for Canada.

The results of these international studies are largely refuted by Scott [39] and Scott and Martin [40] who studied data for 12 industries in the United States. Scott [39] finds significant differences in financial structure among industries for the 1959-68 period. Comparing the same ratio as Schwartz and Aronson [38], Scott and Martin find that both industry and size of the firm influence the capital structure, and that industry is an important determinant of capital structure even when the effect of size is held constant using two-way analysis of variance [40, p. 71]. This study is also the first to use nonparametric tests for analysis of variance. Using a sample of 500 of the largest of European firms, Aggarwal [1] finds that only country and industry are significant determinants of financial structure. Tamari [45] finds differences in leverage ratios for firms in the United States, the United Kindgom, Japan, and Israel, even when firms are separated into different industrial categories.

Only one attempt has been made to compare financial structures of firms in developing countries. Analyzing data for four countries, using nonparametric tests, Errunza [18] shows industry to be an important determinant of capital structure in Central American countries, although, due to high linkages between the markets in these countries, structures tend not to differ between countries.

Coates and Wooley examine the financial structures (defined as gearing = total debt/debt + equity) for six European countries. Their interest is in examining the influence of various environmental determinants of capital structure on the gearing ratios. They identify inflation as having an influence on the capital structure of the firms, but see debt as a mechanism through which the owners of the firm pass on the burden of (unexpected) inflation on the issuers of debt. They identify the following factors as the determinants of the financial structure: differences in nominal rates of return on debt and equity, costs of issuing debt and equity, corporate tax rates, and inflation. Having failed to make much sense out of these variables, they attribute the differences to various characteristics of local capital markets [11, p. 15].

A survey of corporate executives during 1972-73 in five countries by Stonehill et al. [42] reveals that the perception of financial risk, defined as the ability to cover fixed charges on debt, plays a very important role in the determination of debt ratios. Executives in two countries (France and Japan) considered availability of capital as very important in their debt-ratio decisions, whereas executives in the Netherlands, Norway and the United States considered financial risk as the most important determinant of their debt/ equity ratios.

The main problem with the studies summarized above has been that the financial structure has been explained only in terms of business risk as proxied by industrial classification. It seems that financial structures differ between countries as well as between industries--but there are serious problems in comparing data between countries.

Studies that look at the issuance of debt or equity also come to the conlusion that firms may have target debt/equity ratios. Recently, Marsh has

summarized a large number of studies that have tried to explain the basis on which firms choose between debt and equity. His own analysis provides a proof that firms look at target debt/equity ratios when making their choice on financial instruments, but that market factors (like equity prices and availability of capital) may be even more important than the financial structure of the firm [29, p. 142].

Whatever the conclusions of empirical evidence on the leverage controversy, there is little dispute that, merely because of the contractual nature of the debt service charges, the debt equity ratio affects financial risk.

It has been established that firms' policies seem to reflect a negative association between business risk; that is, the variability of operating cash flows before interest, and financial leverage. Furthermore, there is evidence that firms do adjust financial leverage when business risk changes.[7] For example, Marsh [29] and Melicher and Rush [30], analyzing mergers and acquisitions, find that firms offset a diversification effect of corporate acquisition by increasing financial leverage.[8] Thus, both from a theoretical and an empirical point of view, there is support for a general hypothesis that debt/equity ratios matter, and that these ratios change in inverse proportion to changes in the degree of business risk.

Business Risk and Financial Risk

Two sources of risk have been identified in the previous section: first, that of business risk stemming from variability of cash flows before interest; and second, that of risk stemming from financial leverage. Together, these two are recognized as giving rise to bankruptcy risk. To avoid the costs of financial distress, firms are advised to reduce the proportion of debt relative to equity as their business risk increases [7, p. 394].

One aspect of the interaction of these risks has generally been omitted. It is associated with the variability of interest rates.[9] Whatever the proportion of debt, when interest rates fluctuate, so will the cost of debt.[10]

The fluctuations in the cost of debt arising from interest rate variability constitute the first dimension of risk that concerns this study; the second dimension risk arises from the lack of comovement between the cost of debt to the firm and its net operating revenues. We shall refer to it as the risk related to "environmental uncertainty," or EU-risk for short.

The effect of interest rate variability on the cost of debt could be safely ignored if the rise in financing costs coincided with an equivalent rise in operating cash flows of the firm. This may be seen by looking at the relationship between real and nominal interest rates, and inflation rates. According to the traditional Fisher relationship, nominal interest rates are the sum of real rates of interest plus expected inflation rates. If nominal interest rates rise due to heightened expectation of inflation, the financing costs of the firm will increase. If inflation also increases the prices of the firm's output and costs, net operating revenues should increase simultaneously with financing costs, and offset the negative effects of inflation on financing costs.

Obviously, as is the case with other equilibrium relationships, this relationship will not hold in the short or medium term, and rarely at the level of the individual firm. To the extent that operating cash flows and interest rate changes are not perfectly correlated, additional risk exists (which we refer to as EU-risk), distinct from financial risk associated merely with the degree of leverage. The risk is that a firm may face higher debt costs due to an increase in interest rates without a parallel increase in its (net operat-

ing) cash inflows. Of course, the opposite may also happen--the cost of debt may decline due to a fall in interest rates with either unchanged or increased cash inflows. The risk that the firm faces is that of a higher variability of its net cash flows (defined here as net operating cash flows less debt service payments) when financing costs and operating revenues are not correlated with each other. These relationships can be expressed more formally. If the net cash flows of the firm, $\tilde{NCF}$, consist of net operating cash flows, $\tilde{OCF}$, less the debt service costs, $\tilde{DSC}$, then

$$\begin{aligned} \text{Var}(\tilde{NCF}) &= \text{Var}(\tilde{OCF} - \tilde{DSC}) \\ &= \text{Var}(\tilde{OCF}) + \text{Var}(\tilde{DSC}) - 2\text{Cov}(\tilde{OCF}, \tilde{DSC}). \end{aligned}$$

Thus, a positive covariance between $\tilde{OCF}$ and $\tilde{DSC}$ results in a lower variance of $\tilde{NCF}$ than does an absence of covariance between these two variables, and an even lower variance of $\tilde{NCF}$ when there is a negative covariance between the two variables.

The concept can be further illustrated by considering the example of two firms in different industries whose net operating cash flows follow the same distribution, except in their responses to changes in interest rates. Thus, given certain interest rates, the two firms, or rather, their stockholders, face exactly the same expectations regarding the distribution of future cash flows. Where the two firms differ is in the response of their cash flows to changes in interest rates.

Formally this may be presented as follows. If $\tilde{OCF}_i$ represents the cash flows of the two firms ($i = 1, 2$), X_j the n independent variables that affect the cash flows ($j = 1$ to n), and R the relevant interest rate in the economy,

then,

$$\widetilde{OCF}_i = f_i(X_j, R),$$

such that,

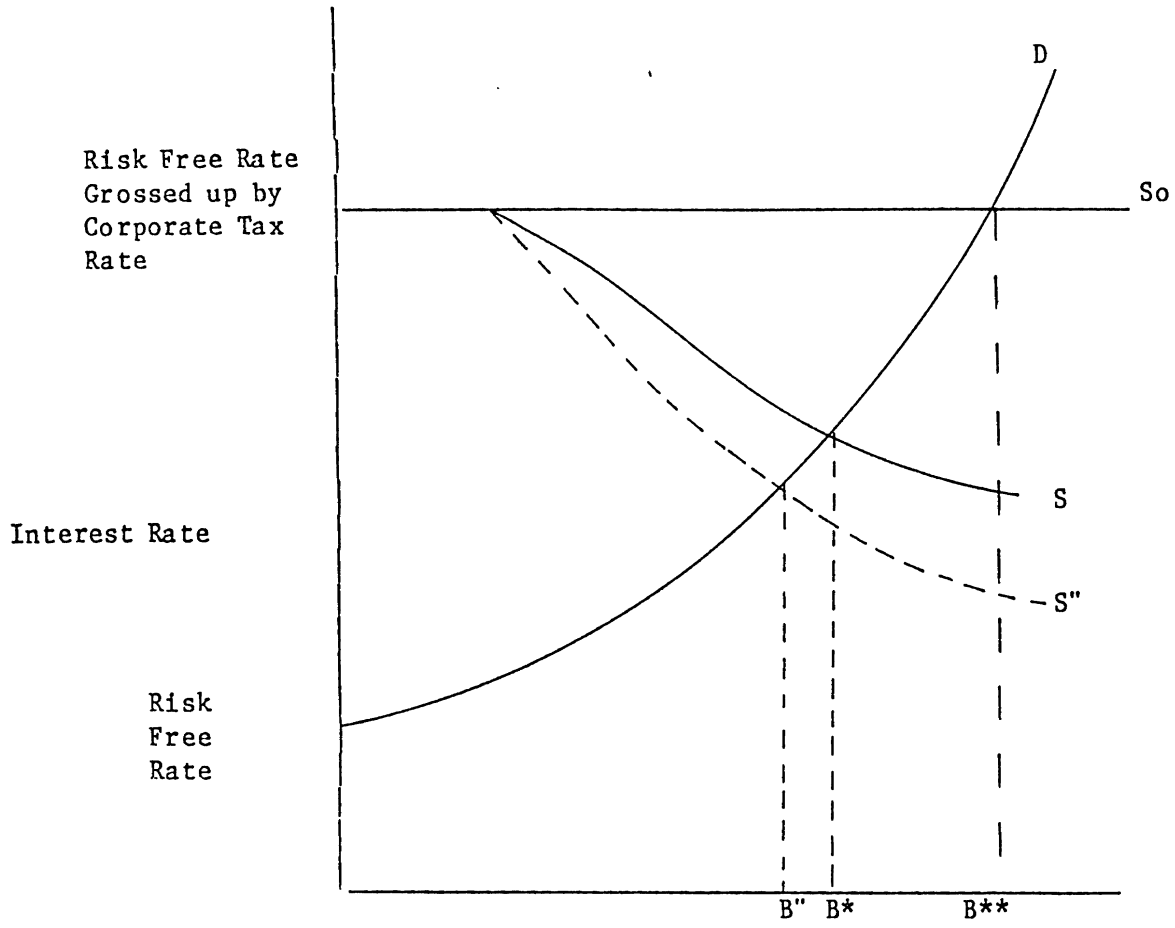
$$\frac{\Delta\ \widetilde{OCF}_1}{\Delta\ X_j} = \frac{\Delta\ \widetilde{OCF}_2}{\Delta\ X_j}$$

but

$$\frac{\Delta\ \widetilde{OCF}_1}{\Delta\ R} \neq \frac{\Delta\ \widetilde{OCF}_2}{\Delta\ R}\ .$$

In this situation, the business risks of the two firms differ only in their responses to interest rate changes. When the impact of debt-financing on these firms is being considered, we find that with exactly the same leverage, the two firms face different risks of financial distress. While the financing costs of the two firms will change in the same manner, net cash flows (= net operating cash flows - financing costs) will now follow different distributions. Thus, the firm whose changes in operating cash flows are positively correlated with changes in interest rates faces a smaller risk of financial distress than the firm whose cash flows are uncorrelated, and whose net cash flows, therefore, exhibit a relatively higher degree of variability, and, hence, of financial distress.

The risk of financial distress arising from the lack of comovement between the operating cash flows and the financing costs give rise to the possibility of the firm incurring dead weight costs in the event of bankruptcy. Using the terminology of Kim [26] the analysis of the firm can be extended to the entire corporate sector for an economy. Firms that face higher risk of financial distress will find that their bondholder will have to pay higher leverage-related



B* = Kim's Equilibrium debt level
B** = Miller's Equilibrium debt level

Aggregate Volume of Debt for the Economy

Exhibit 1

costs for issuing debt. Thus, if, for an economy as a whole, the correlation between corporate cash flows and financial flows decreases, the equilibrium level of total debt will decrease from B* to B" as shown in Exhibit 1 [adapted from 26, Figure 4]. This decrease will take place because of a downward shift in the supply curve from S to S" due to increased leverage-related costs arising from higher bankruptcy costs. See Kim [26] and Miller [31] for details on how B* and the supply and demand curves are derived.

EXHIBIT 1 HERE

Hypothesis and Research Method

Given that leverage is inversely related to business risk, the above analysis would suggest that the firm with higher variability of net cash flows, due to a smaller correlation between operating cash flows and debt financing charges, will, ceteris paribus, have a lower degree of leverage than the firm whose net cash flows are less subject to the vagaries of interest rates. Analogously, a change in EU-risk over time should result in an offsetting change in leverage ratios for firms operating in that environment.

This proposition could be tested in a number of ways. One way would be to examine whether firms in a representative sample have changed their leverage ratios when EU-risk has changed. Alternatively, cross-sectional analysis of EU-risks and debt ratios of a number of firms in different industries might provide support for this proposition. A third approach might involve the use of cross-sectional analysis across a number of countries. The EU-risk for each country could be different and financial structure norms in different countries should reflect these differences in EU-risks. However, all three approaches to empirical verification of the underlying proposition suffer not

only from data problems, but also from the severe difficulty of establishing cause and effect relationships, because of the presence of other variables that can influence debt/equity ratios.

Instead, we propose to use cross-sectional analysis over different time periods by testing our proposition across a range of industrialized countries, examining changes in capital structures between two distinct and separate time periods. Following the tradition of Miller [31] and Kim [28] we look at economy-wide capital structures rather than at those of individual firms.

While we are able to rely on the work of others in terms of the concept of economy-wide capital structure, the concept of EU-risk has not been used previously.[11] We estimate EU-risk by relating changes in interest rates charged to business firms to a measure of aggregate operating revenues for the corporate sector.

For the economy as a whole, changes in debt payments can be proxied by changes in interest rates. If the term structure of debt does not change significantly over short periods of time, total debt service payments of the corporate sector can be assumed to be proportional to the corporate borrowing rate.

As a proxy for the aggregate operating revenues for the corporate sector, we calculate the nominal rate of return on assets, which can be compared directly to the interest rates. The aggregate return in nominal terms for the corporate sector can be conceptualized as consisting of three elements: a real rate of return that consists of a risk free rate of return and a compensation for the systematic (or undiversifiable) risk at the market price of risk, a premium for inflation; and an abnormal return for the unsystematic risk which varies with the phase of the business cycle. For our analyses, these returns are calculated from the index of industrial production in the economy and a price index for the corresponding period.

For our analysis, we assume that the real rate of return remains constant for an economy, and its risk free component, following Fisher, is the same real rate of return that is incorporated in the interest rates. Since the subsequent analysis and the estimation of EU-risk is not affected by a constant factor, the actual estimation of this component of the aggregate nominal return becomes unnecessary. The second element, the premium for inflation, is estimated by the actual inflation as incorporated in the price index. The third element represents the excess (or negative) return that the business sector earns because of a boom or a recession. When the business cycle is in a boom phase, the actual production is above the long term trend value, and, by implication, since the total size of assets of the corporate sector does not change in anticipation of a boom, the business sector earns an excess return. We estimate the excess (or negative) return as being equal to the percentage by which actual production differs from the long term trend.

The estimate of the aggregate operating return, thus, is a sum of the inflation rate and the rate by which the real industrial production differs from its long term trend.[12]

These two proxies for cash flows, one related to debt and the other to net operating revenues, will be used to estimate EU-risk in two ways. First, we measure EU-risk by examining the behavior of the residuals of the regression of operating revenues on interest rates. These residuals are a measure of the lack of comovement of interest rates and industrial production, and are used as a proxy for the lack of comovement of the financing costs and the revenues of the corporate sector. There is a direct relationship between the variance of these residuals and the E-U risk: Higher the variance, higher the E-U risk. The second measure of EU-risk is based on the significance of the simple regression between the interest rates and the index of (nominal)

industrial production and the value of the coefficients of the independent variable. The relationship between these two measures and E-U risk is complex. Negative coefficient as well as insignificant coefficient imply high E-U risk, because of negative correlation between the operating cash flow and the financing costs in the first case and because of absence of any correlation between these two variables in the second case.

Based on these measures of EU-risk, our hypothesis is that an increase in this risk will result in a decrease in the weighted average of the debt-equity ratios for firms in the economy. In testing this hypothesis over more than one country, we minimize the problem of changes of other factors in any one economy that might cause changes in the debt-equity ratios.

Thus, our analysis consists of comparing changes in economy-wide debt-equity ratios in eleven European countries from end-1973 to end-1978, to changes in the measures of EU-risk at the same points in time. In using these measures of EU-risk at a given point in time, we make the assumption that the experience of the past four years influences the estimate of future EU-risk of the corporate managers. Thus, the measure of EU-risk at the end of 1973 is calculated from the data on the interest rates and a measure of aggregate operating revenues for the corporate sector for the 1970-73 period.

Analysis

The hypothesis outlined above was tested with data from the 5,000 largest European companies [16], done separately for each country from which these companies originate. Table 1 shows the changes in the debt/asset ratio for these countries.[13] The changes in economy wide debt/asset ratios are consistent with the direction of change of the debt/asset ratio for the majority of the industries. The table also shows the number of (SITC)

industries for which the debt/asset ratio increased, versus the number of industries for which the ratio decreased. The conclusions from the analysis of the two data sets are consistent with each other.

The calculations of EU-risk are shown in Table 2 for both measures described above, that is, using the variance of the residuals and the significance of regressions and the regression coefficient. Variances of the residuals, because they reflect the extent of deviation between the revenues and the debt costs, provide the better indication of EU-risk; these show that for seven out of eleven countries, the debt/asset ratios changed in the direction predicted by the theory. Of these seven countries, five faced lower EU-risk in 1975-78 than in 1970-73, and consequently, as our theory would predict, the debt/asset ratios for these countries increased from 1973 to 1978. The opposite was the case for the other two countries: their EU-risk increased from 1970-73 to 1975-78, and consequently their debt/asset ratios decreased between 1973 and 1978.

When the degree of significance of the regression relationships between the operating returns and interest rates and the regression coefficient are used as measures of EU-risk, the hypothesis is supported in three out of seven cases. The hypothesis is deemed valid if the regression coefficient is significant and has a higher value during the period which had higher debt/asset ratio. In other words, the period during which the regression coefficient is lower is considered to be the period with higher EU-risk. For the other four of the countries analyzed, the regressions are not significant in either period and hence, no conclusions can be drawn about the period with higher EU-risk.

The two measures of EU-risk support the hypothesis on the relationship between debt/asset ratios and EU-risk unambiguously for four of the eleven countries; contradicting results are obtained for four countries, and the hypothesis is rejected in three cases. Of the four cases in which the hypothesis is supported, two are supported by both measures; in the other two the regression relationships were not significant. In two of the three cases where the hypothesis is rejected, it is done so by only one measure, that is, by the variance of residuals for the two time periods.

Conclusion

The results are sufficiently robust to lead to the conclusion that the change in the discrepancy between aggregate operating returns and interest variability (or the cost of debt) affects aggregate debt/asset ratios. These effects are sufficiently strong to be noticeable on the basis of average data taken across all industries of various European countries. It thus confirms tentative results found in single-country studies across industries.[14] The work presented here warrants further investigation into the determinants of EU-risk at the macroeconomic level as well as explicit consideration of EU-risk as a determinant of the optimal capital structure of individual firms.

FOOTNOTES

1. This basic idea has been explained in respect to exchange rate variability [17].

2. We review only that part of the controversy on the optimality of the capital structure that is relevant to this study. More detailed discussions have appeared elsewhere; see, for example, Chen & Kim [10], Copeland & Weston [12], Kim [25], and Myers [35].

3. This proposition would imply that financial structures should change in response to changes in tax rates. Grier and Strebel [22], however, failed to find an empirical relationship between the changes in financial structures and the changes in tax rates.

4. Flath and Knoeber have attempted to provide empirical proof for the existence of the tradeoff between tax benefits and bankruptcy costs of debt. Estimating tax benefits and bankruptcy costs for 38 industries, they lend "empirical support to the theoretical assertions that taxes and failure costs do imply optimal capital structure, at least for industries," [20, p. 113].

5. Miller and Scholes [32] have shown that the effective tax rates on dividend income may be very low indeed.

6. The bankruptcy costs have also been shown to be irrelevant by Haugen and Senbet [23], although on different grounds. The notion of irrelevancy of bankruptcy costs is not consistent with the observed behavior of the equity and debt holders and other market participants. Every major bankruptcy or its possibility has caused shocks in the financial markets.

7. See Boettcher and Sotelina [6, p. 80] for examples of how firms react to increased variability of interest rates.

8. See Asquith and Kim [3] for details on this issue.

9. To be sure, others have looked at problems of debt servicing arising from increased variability of interest rates. See for example, Belkaoui [5] and Haugen and Senbet [23].

10. We assume that debt contracts are renewable or that price of debt contracts is based upon the prime rate, London Interbank rate or a similar base rate in use in other financial markets.

11. Boettcher and Sotelina [6, p. 86] recognize that firms may face financial risk due to swings in interest rates and their interrelationships with sales.

12. Appendix A provides an alternate method for estimating the aggregate operating revenues, and shows the results of the calculation of EU-risk using that measure.

13. Appendix B discusses the quality of the data.

14. Fisher [20] has argued that the correlation between profits and inflation rates should affect the type of debt instruments firms issue.

TABLE 1

Changes in Financial Structures: 1973 to 1978

Top 5,000 Firms in Europe

Country:	Debt/Asset Ratios For all Firms		Changes in Debt/Asset Ratios By Industry, Between 1973 and 1978						
			All Industries			Manufacturing Sectors Only			
			No. of Industries with			No. of Industries with			
	1973	1978	Increase D/A Ratio	Decrease D/A Ratio	Net Change	Increase D/A Ratio	Decrease D/A Ratio	Net Change	Period of Higher Debt/ Asset Ratio
Austria	.663	.763	12	1	11+	6	1	5+	1978
Belgium	.656	.689	18	9	9+	10	7	3+	1978
Denmark	.676	.658							1973
France	.671	.732	23	5	18+	13	3	10+	1978
Germany	.712	.718	20	16	4-	10	7	3+	1978
Italy	.708	.866	6	2	4+	4	2	2+	1978
Netherlands	.621	.671	14	8	6+	8	4	4+	1978
Norway	.811	.844	24	9	15+	8	7	1+	1978
Sweden	.796	.775	10	27	17-	4	13	9-	1973
Switzerland	.549	.583	16	3	13+	9	2	7+	1978
U.K.	.553	.404	5	34	29-	2	14	12-	1973

TABLE 2

ESTIMATION OF EU-RISK

Country:	Variance of Residuals: 1970-73	Variance of Residuals: 1975-78	Period of Higher EU-Risk	Estimates of Coefficients and Their Significance: 1970-73	Estimates of Coefficients and Their Significance: 1975-78	Period of Higher EU-Risk
Austria	5.00	2.09	1970-73	NS	NS	-
Belgium	4.00	2.39	1970-73	NS	NS	-
Denmark	2.53	2.91	1975-78	6%	NS	1975-78
France	4.80	3.80	1970-73	4.02 @ 7%	9.38 @ 1%	1975-78
Germany	0.74	0.50	1970-73	0.97 @ 4%	NS	1975-78
Italy	6.79	8.22	1975-78	NS	2.10 @ 8%	1970-73
Netherlands	1.22	2.04	1970-73	NS	NS	-
Norway	1.23	1.86	1975-78	NS	NS	-
Sweden	3.33	2.09	1970-73	-9.88 @ 9%	-2.35 @ 8%	1970-73
Switzerland	2.99	1.13	1970-73	21.1 @17%	-3.02 @ 4%	1975-78
U.K.	0.47	1.49	1975-78	1.92 @.01%	1.23 @ 11%	1975-78

NS: Not Significant.

TABLE 3

EU-RISK & FINANCIAL STRUCTURE CHANGES

Country	Period of Higher Debt/Asset Ratio (Table 1)	Period of Higher EU-Risk (Table 2)		Validation of Theory?
		Based on Variances	Based on Regression	
Austria	1978	1970-73	-	Hypothesis is validated
Belgium	1978	1970-73	-	Hypothesis is validated
Denmark	1973	1975-78	1975-78	Hypothesis is validated
France	1978	1970-73	1975-78	Hypothesis is partially validated
Germany	1978	1970-73	1975-78	Hypothesis is partially validated
Italy	1978	1975-78	1970-73	Hypothesis is partially validated
Netherlands	1978	1975-78	-	Hypothesis is not supported
Norway	1978	1975-78	-	Hypothesis is not supported
Sweden	1973	1970-73	1970-73	Hypothesis is not supported
Switzerland	1978	1970-73	1975-78	Hypothesis is partially validated
UK	1973	1975-78	1975-78	Hypothesis is validated

APPENDIX A

The measurement of aggregate operating for the corporate sector is, conceptually and empirically, a difficult task. To eliminate any bias in the study that might be introduced by errors in the calculations of the aggregate operating revenues, we used an alternate method to estimate that series. In this approach, the series was calculated as the nominal value of deviations of aggregate production from its long-term trend values.

The aggregate operating revenues for the corporate sector are proxied by the index of industrial production (which represents real quantities), adjusted by the price index to reflect nominal values. The use of the index of industrial production as an estimator of corporate operating revenues rests on the assumption that companies whose changes in operating margins lead the change in the index of industrial production are as numerous and important as those for whom operating margins lag the change in output. Thus, we assume that there is no systematic bias in the impact of inflation on aggregate operating cash flows of the corporate sector. (Appendix C provides empirical support for this assumption. Analysis of the U.S. economy shows that the estimates of EU-risk for a number of disaggregated industries yield very similar results.)

Furthermore, to allow for the fact that it is only the unexpected changes in revenues that are a source of risk, we carried out the analysis for a detrended nominal industrial production, which represents the deviation of nominal industrial production from its trend line. The use of this detrended industrial production is based on the premise that if the industrial production follows a secular trend, then the uncertainty, or EU-risk, is created by shocks which cause the industrial production to deviate from its trend value, and not by an expected growth in the volume of the industrial production.

Thus, the detrended industrial production is calculated by first regressing the real value of industrial production on time, and then adjusting the residuals of this regression by prices. To allow a comparison between these corrected residuals from different years, each value was divided by the trend value of the price index for that period. These adjusted residuals represent the extent to which actual cash flows of the corporate sector deviate from their trend values. This correction in the industrial production series takes out the effects the underlying economic growth (which may differ from country to country), but retains the effects of inflation in the time series, as the latter is also present in the nominal interest rates.

The calculations for EU-risk are shown in Table A-1 and compared to the debt/asset ratios in Table A-2. For ten out of eleven countries, the variances of the residuals support the hypothesis. The significances of the regression support the hypothesis in six out of eight cases and contradict the hypothesis in the other two.

Taken together, the hypothesis is supported in eight out of eleven cases, contradicted in one and supported by one of the two measures in the other two.

TABLE A-1

ESTIMATION OF EU-RISK

Country:	Variances of Residuals: 1970-73	1975-78	Period of Higher EU-Risk	Significance of Regressions 1970-73	1975-78	Period of Higher EU-Risk
Austria	3•6	1•6	1970-73	1%	10%	1975-78
Belgium	9•1	4•1	1970-73	NS	1%	1970-73
Denmark	14•5	25•4	1975-78	10%	NS	1975-78
France	7•8	5•	1970-73	NS	NS	-
Germany	2•8	2•-7	1970-73	5%	1%	1970-73
Italy	13•0	8•6	1970-73	NS	1%	1970-73
Netherlands	8•3	6•0	1970-73	NS	NS	-
Norway	2•7	10•7	1975-78	NS	NS	-
Sweden	8•3	28•6	1975-78	NS	5%	1970-73
Switzerland	6•2	5•7	1970-73	5%	1%	1970-73
U.K.	3•7	8•0	1975-78	0.1%	NS	1975-78

NS: Not Significant.

TABLE A-2

EU-RISK & FINANCIAL STRUCTURE CHANGES

Country	Period of Higher Debt/Asset Ratio (Table 1)	Period of Higher EU-Risk (Table 2)		Validation of Theory?
		Based on Variances	Based on Regression	
Austria	1978	1970-73	1975-78	Hypothesis is partially supported
Belgium	1978	1970-73	1970-73	Hypothesis is supported
Denmark	1973	1975-78	1975-78	Hypothesis is supported
France	1978	1970-73	-	Hypothesis is supported
Germany	1978	1970-73	1970-73	Hypothesis is supported
Italy	1978	1970-73	1970-77	Hypothesis is supported
Netherlands	1978	1970-73	-	Hypothesis is supported
Norway	1978	1975-78	-	Hypothesis is not supported
Sweden	1973	1975-78	1970-73	Hypothesis is partially supported
Switzerland	1978	1970-73	1970-73	Hypothesis is supported
U.K.	1973	1975-78	1975-78	Hypothesis is supported

APPENDIX B

The purpose of this appendix is to provide evidence to show that the debt/asset ratios are different for different countries and different industries. Furthermore, certain statistical characteristics of the data are also presented in this appendix.

The analysis has been carried out on the data for the top 5,000 European firms from Dun and Bradstreet's, Europe's 5,000 Largest Companies, 1973 and 1978. Of these 5,000 firms, complete equity and asset figures were available only for 3932 firms from 14 countries. Table B-1 shows the debt-asset ratios for all the firms in each country. The F-statistic for one-way analysis of variance between countries for 1978 data is 218.4 and K-W statistic is 1,499.8, strongly indicating that the debt asset ratios between countries are different. To check if firms for which debt or equity figures were not available are different from those for which data was analyzed, one-way analysis of variance was carried out for each country to check if the total assets for firms with equity data differ from the total assets for firms without that data. The results, summarized in Table B-2, show that the exclusion of firms for which data is not available does not introduce any bias in our analysis.

Finally, Table B-3 summarizes the results of one-way analysis of variance for differences in the debt/asset ratios between countries, within each industry. The results show that the financial structure of the firm in the same industry differs from country to country.

TABLE B-1

ANALYSIS OF VARIANCE FOR DIFFERENCES OF DEBT/ASSET RATIOS

BETWEEN COUNTRIES, 1978

		Debt/Asset Ratios		
Country	No. of Companies	Mean	Variance	Standard Deviation
(1)	263	.67122	.32456 -1	.18016
(2)	614	.40393	.43967 -1	.20968
(3)	749	.71842	.18181 -1	.13484
(4)	75	.58266	.36133 -1	.19009
(5)	398	.86623	.73058 -2	.85474 -1
(6)	505	.73175	.27259 -1	.16510
(7)	297	.68693	.42126 -1	.20525
(8)	318	.77490	.15024 -1	.12257
(9)	59	.76306	.13726 -1	.11716
(10)	237	.65428	.26467 -1	.16269
(11)	113	.84441	.13234 -1	.11504
(12)	122	.82042	.14360 -1	.11984
(13)	166	.65845	.29797 -1	.17262
(14)	16	.50455	.19999 -1	.14142
GRAND				

1-WAY ANOVA

ANALYSIS OF VARIANCE OF DEBT/ASSET RATIO, N = 3932 OUT OF 4976

SOURCE	DF	SUM OF SQRS	MEAN SQR	F-STATISTIC	SIGNIF
BETWEEN	13	73.232	5.6333	218.36	0.
WITHIN	3918	101.08	.25799 -1		
TOTAL	3931	174.31	(RANDOM EFFECTS STATISTICS)		

ETA= .6482 ETA-SQR= .4201 (VAR COMP= .20876 -1 %VAR AMONG= 44.731

TABLE B-2

BIAS INTRODUCED BY EXCLUSION OF FIRMS WITHOUT EQUITY DATA

ANALYSIS OF VARIANCE OF TOTAL ASSETS, 1978

	ANOVA FOR FIRMS WITH & WITHOUT EQUITY DATA	
Country	F-Statistic	Significance
Netherlands	.05	83%
U.K.	.55	46
Germany	1.25	-27
Switzerland	1.27	27
Italy	.02	90
France	.06	81
Belgium	.06	94
Sweden	.02	88
Austria	1.67	20
Spain	.85	36
Norway	.52	48
Finland	0.0	99
Denmark	1.5	23

TABLE B-3

DIFFERENCES IN DEBT/ASSET RATIOS BETWEEN COUNTRIES

FOR EACH INDUSTRY, 1978

Industry	No. of Countries	F-Statistic for ANOVA	Significance	K-W Statistic	Significance
Forestry	3	.24	80%	1.09	58%
Metal Ore Mining	8	1.18	37	12.7	8
Other Mining	10	8.8	*	24.5	*
Food Manufacturing	15	21.2	*	165	*
Beverages	15	13.7	*	81.8	*
Tobacco	14	3.8	1	22.2	5
Textiles	15	11.7	*	86	*
Clothing	11	7.6	*	36	*
Wood	11	18.5	*	35	*
Furniture	10	13.1	*	25	1
Paper	15	16.6	*	104	*
Printing	14	8.8	*	71	*
Industrial Chemicals	14	15.2	*	124	*
Other Chemicals	13	15.3	*	114	*
Petroleum	12	4.5	*	38	*
Petroleum Products	12	2.3	2	26.3	1
Rubber Products	13	8.8	*	42.3	*
Plastic Products	14	13.5	*	89	*
Pottery, China	9	6.6	*	25	1
Glass	12	9.8	*	43	*
Cement	15	11.4	*	85	*
Iron, Steel & Alloys	14	14.2	*	86	*

TABLE B-3 (Cont'd.)

DIFFERENCES IN DEBT/ASSET RATIOS BETWEEN COUNTRIES

FOR EACH INDUSTRY, 1978

Industry	No. of Countries	F-Statistic for ANOVA	Significance	K-W Statistic	Significance
Non-Ferrous Metals	13	3.3	*	30	1%
Fabricated Metal	15	50.4	*	345	*
Machinery	13	49.0	*	263	*
Electrical Machinery	15	25.1	*	207	*
Transport Equipment	14	33.2	*	182	*
Scientific Instruments	11	3.1	1%	26	1
Other Manufacturing	12	8.5	*	48	*
Electricity	11	9.1	*	38	*
Water Works	3	24.7	*	9.3	1
Construction	15	33.2	*	201	*
Wholesale: Consumer Goods	11	9.7	*	51	*
Wholesale: Producer Goods	10	15.4	*	72	*
Wholesale: Motor Vehicles	10	2.5	3	16.5	6
Real Estate	7	4.0	1	16.8	1
Business Services	8	8.9	1	16.5	3

*: Significant at .01 percent level

APPENDIX C

The purpose of this appendix is to provide empirical support for the use of only one index, the economy-wide industrial production index, rather than the use of different production indices for each industry. It could be argued that since each industry is in a different phase with respect to the economic cycle, its response to the changes in interest rates would be different. Although it is true that all the industries are not in the same phase, we will show that as long as there is no systematic change in "phase" of a particular industry, its cash flow fluctuations maintain the same relationship with interest rate fluctuations as does the economy-wide industrial production index.

This conclusion is supported by data for a large number of industries from the U.S. economy. Table C-1 summarizes the results of the same analysis carried out at the level of various industries for the U.S. economy as was done at the economy-wide level for this study. Table C-1 shows the analysis for the detrended values of the industry's industrial productions.

Data in the table show that the measures of environmental uncertainty used in this study validate the use of one economy-wide measure of environmental uncertainty rather than requiring analysis at a disaggregated industry level. When uncertainty is measured by simple correlations, only one out of 14 industries faces greater uncertainty in a different period.

Thus, analysis at an industry level would lead to the same conclusion as an analysis carried out at the aggregate level.

TABLE C-1

DETRENDED INDUSTRIAL PRODUCTION VALUES

INDUSTRY	Period of High Uncertainty, As Measured By:		1970 - 73 Analysis				1975 - 78 Analysis			
				Regression Results				Regression Results		
	Correlation	Variance of Residuals	Simple Correlation	F-stat.	Significance of Coefficient	Variance of Residuals	Simple Correlation	F-stat.	Significance of Coefficient	Variance of Residuals
Motor Vehicles and Parts	1970-73 in both cases		.009	=0	-	1.82	.48**	13.8	1%	1.22
Transportation Equipment	1970-73 in both cases		.14	.98	-	1.80	.58**	23.7	1%	1.13
Apparel	1975-78	1970-73	.45**	11.9	1%	1.62	.29*	4.3	5%	1.33
Paper	1970-73 in both cases		.28*	3.86	6%	1.75	.44**	11.2	1%	1.25
Manufacturing	1970-73 in both cases		.29*	4.35	5%	1.74	.51**	16.4	1%	1.20
Drugs & Medicine	1970-73 in both cases		.24	2.8	11%	1.77	.50**	15.0	1%	1.21
Chemicals and Products	1970-73 in both cases		.32*	5.4	5%	1.72	.48**	13.5	1%	1.22
Construction Supplies	1970-73 in both cases		.31*	4.96	5%	1.73	.60**	25.8	1%	1.11
Manufacturing Equipment	-	1970-73	-.63**	31.0	1%	1.41	.63**	30.8	1%	1.08
Household Appliances	1970-73 in both cases		.15	1.07	-	1.80	.44**	10.8	1%	1.26
Lumber & Products	1970-73 in both cases		.33*	5.76	5%	1.72	.54**	18.8	1%	1.17
Foods	-	1970-73	.58**	23.1	1%	1.49	.62**	28.2	1%	1.10
Rubber & Plastic Products	1970-73 in both cases		.18	1.62	-	1.79	.50**	15.7	1%	1.20
Beverages	1970-73 in both cases		.17	1.38	-	1.79	.46**	12.1	1%	1.24

* Correlation coefficient significant at 5%.
** Correlation coefficient significant at 1%.

REFERENCES

[1] Raj Aggarwal, "International Differences in Capital Structure Norms," Management International Review, 21 (1981), 75-88.

[2] T. Agmon, A. R. Ofer and A. Tamir, "Variable Rate Debt Instruments and Corporate Debt Policy," Journal of Finance, 36 (March 1981), 113-125.

[3] Paul Asquith and E. Han Kim, "The Impact of Merger Bids on the Participating Firm's Security Holders," Journal of Finance, 37 (December 1982), 1209-1228.

[4] Amir Barnea, Robert A. Haugen and Lemma W. Senbet, "Market Imperfections, Agency Problems, and Capital Structure," Financial Management, 10 (Summer 1981), 7-22.

[5] Ahmed Belkaoui, "A Canadian Structure of Financial Structures," Financial Management, 4 (Spring 1975), 74-79.

[6] James H. Boettcher and Fernando B. Sotelina, "A Look at the Variable-Maturity Loan," Harvard Business Review, 60 (May-June 1982), 80-86.

[7] Richard Brealey and Stewart Myers, Principles of Corporate Finance. New York: McGraw Hill, 1981.

[8] M. J. Brennan and E. S. Schwartz, "Corporate Income Taxes, Valuation and the Problem of Optimal Capital Structure," Journal of Business, 51 (1978), 103-114.

[9] Andrew H. Chen, "Recent Developments in the Cost of Debt Capital," Journal of Finance, 33 (June 1978), 863-877.

[10] Andrew H. Chen and E. Han Kim, "Theories of Corporate Debt Policy: A Synthesis," The Journal of Finance, 34 (May 1979), 371-384.

[11] J. H. Coates and P. K. Wooley, "Corporate Gearing in the EEC," Journal of Business Finance and Accounting, 2 (Spring 1975), 1-18.

[12] Thomas E. Copeland and J. Fred Weston, Financial Theory and Corporate Policy, 2nd ed. Massachusetts: Addison-Wesley, 1983.

[13] Joseph R. Cordes and Steven M. Shohein, "Estimating the Tax Advantage of Corporate Debt," Journal of Finance, 38 (March 1983), 95-106.

[14] Harry DeAngelo and Ronald W. Masulis, "Optimal Capital Structure Under Corporate and Personnel Taxation," Journal of Financial Economics, 7 (March 1980), 3-30.

[15] Harry DeAngelo and Ronald W. Masulis, "Leverage and Dividend Irrelevancy Under Corporate and Personal Taxation," Journal of Finance, 35 (May 1980), 453-467.

[16] Dow Jones, 5,000 Largest European Companies.

[17] Gunter Dufey and Ian Giddy, "International Financial Planning: The Use of Market-based Forecasts," California Management Review, 21 (Fall 1978), 69-81.

[18] V. Errunza, "Determinants of Financial Structure in Central America," Financial Management, 8 (Fall 1979), 72-77.

[19] M. G. Ferri and W. H. Jones, "Determinants of Financial Structure: A New Methodological Approach," Journal of Finance, 34 (June 1979), 631-644.

[20] Stanley Fisher, "On the Non-existence of Privately Issued Index Bonds in the United States Capital Market," in Erich Lundberg, Inflation Theory and Anti-inflation Policy. Boulder: Westview Press, 1977.

[21] David Flath and Charles Knoeber, "Taxes, Failure Costs and Optimal Industry Capital Structure: An Empirical Test," Journal of Finance, 35 (March 1980), 99-119.

[22] Paul Grier and Paul Strebel, "The Empirical Relationship Between Taxation and Capital Structure," Financial Review (1980), 45-57.

[23] Robert A. Haugen and Lemma W. Senbet, "The Insignificance of Bankruptcy Costs to the Theory of Optimal Capital Structure," The Journal of Finance, 33 (May 1978), 383-394.

[24] Michael C. Jensen and William H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," Journal of Financial Economics, 3 (October 1976), 305-360.

[25] E. Han Kim, "A Mean-Variance Theory of Optimal Capital Structure and Corporate Debt Capacity," Journal of Finance, 33 (March 1978), 45-63.

[26] E. Han Kim, "Miller's Equilibrium, Shareholder Leverage Clienteles and Optimal Capital Structure," Journal of Finance, 37 (June 1982).

[27] E. Han Kim and J. J. McConnell, "Corporate Mergers and the Co-Insurance of Corporate Debt," Journal of Finance, 32 (May 1977), 349-366.

[28] Alan Kraus and Robert Litzenberger, "A State Preference Model of Optimal Financial Leverage," Journal of Finance, 28 (September 1973), 911-922.

[29] Paul Marsh, "The Choice Between Equity and Debt: An Empirical Study," Journal of Finance, 37 (March 1982), 121-144.

[30] R. W. Melicher and D. F. Rush, "Evidence on the Acquisition-Related Performance of Conglomerate Firms," Journal of Finance, 29 (March 1974), 141-149.

[31] Merton H. Miller, "Debt and Taxes," Journal of Finance, 32 (May 1977), 261-275.

[32] Merton H. Miller and Myron S. Scholes, "Dividend and Taxes," Journal of Financial Economics, 6 (1978), 333-364.

[33] F. Modigliani and M. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment," American Economic Review, 48 (June 1958) 261-297.

[34] F. Modigliani and Merton H. Miller, "Taxes and the Cost of Capital: A Correction," American Economic Review, 53 (June 1963), 433-443.

[35] Stewart C. Myers, "Determinants of Corporate Borrowing," Journal of Financial Economics, 5 (November 1977), 147-175.

[36] Lee Remmers, A. Stonehill, R. Wright and T. Bekkhuisen, "Industry and Size as Debt Ratio Determinants in Manufacturing Internationally," Financial Management, (Summer 1974), pp. 24-32.

[37] M. Rubinstein, "A Mean-Variance Synthesis of Corporate Financial Theory," Journal of Finance, 28 (March 1973), 167-181.

[38] E. Schwartz and J. R. Aronson, "Some Surrogate Evidence in Support of the Concept of Optimal Financial Structure," Journal of Finance, 22 (March 1967), 10-18.

[39] David F. Scott, Jr., "Evidence on the Importance of Financial Structure," Financial Management, 2 (Summer 1972), 45-50.

[40] David F. Scott, Jr., and J. D. Martin, "Industry Influence on Financial Structure," Financial Management, 4 (Spring 1975), 67-73.

[41] Joseph E. Stiglitz, "On the Irrelevance of Corporate Financial Policy," American Economic Review, 64 (December 1974), 851-866.

[42] A. Stonehill, T. Beekhuisen, R. Wright, L. Remmers, N. Toy, A. Pares, A. Shapiro, D. Egan and T. Bates, "Financial Goals and Debt Ratio Determinants: A Survey of Practice in Five Countries," Financial Management, 4 (Autumn 1975), 27-41.

[43] A. Stonehill and T. Stitzel, "Financial Structure and Multinational Corporation," California Management Review, (Fall 1969), pp. 91-96.

[44] Robert A. Taggert, Jr., "Secular Patterns in Corporate Finance," Unpublished paper, Northwestern University, November 1981.

[45] Meir Tamari, "Equity Financing and Gearing in the U.K., U.S., Japan and Israel," Management International Review, 2 (1981, No. 3), 90-98.

[46] Norman Toy, A. Stonehill, L. Remmers, R. Wright and T. Bekkhuisen, "A Comparative International Study of Growth, Profitability, and Risk as Determinants of Corporate Debt Ratios in the Manufacturing Sector," Journal of Financial and Quantitative Analysis, (November 1974), pp. 875-886.

[47] Jerold B. Warner, "Bankruptcy Costs: Some Evidence," Journal of Finance, 32 (May 1977) 337-347.