THE EFFECTS OF A FIRM'S CAPITAL STRUCTURE ON THE RISK OF COMMON STOCKS A TEST OF THE NSE

BY

NDIANG'UI WAMBUGU

A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PART FULFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTERS OF BUSINESS AND ADMINISTRATION, FACULTY OF COMMERCE, UNIVERSITY OF NAIROBI

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DECLARATION

This Management Project is my original work and has not been presented for a degree in any other University.

Signed:-------------------------------Date: 30.9.92 -------------

James Ndiang'hi Wambugu

Student

This Management Project has been submitted for examination with my approval as University Supervisor.

Signed:-------------------------------Date: 8/10/92 ---------------

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DEDICATION

To my Late Grandmum Muthiri, my Father Wambugu and my Mum Wanjiru because it was because of they that I am.

To my Brothers, Muriithi and Wahome who are my childhood and

To My Future.

ACKNOWLEDGEMENTS

It is difficult and perhaps impossible for a single mind to accomplish work as simple or as hard as this Management Project. It requires a synthesis of a variety of skills - a kind of a mixed grill of Knowledge. It even needs some psychological and moral support. I cannot therefore pretend that I did this work alone.

Special and heartfelt thanks go to Mr. J M Karanja. As my supervisor, I appreciate all his generous and continous support that is the culmination of this Project. I am greatly indebted to Danny Fernades for his support particularly in writing the computer programs and generally throughout the MBA course. To Muitheri, thank you for all your assistance not only in this project but throughout my MBA course. And to Robert Mathu of the NSE, Wilfred Kamuyu of Francis Drummond and the staff of the NSE, thank you very kindly. There was my Sister Josephine, my brother Stephen and his friends, all my fellow classmates and all the unmentioned. Thank you also.

To all of you, thank you and to God my Father, Glory.

James Ndiang'ui

Nairobi, June 1992

List of Tables

ABSTRACT

The risk - return tradeoff is almost a concluded issue in finance today. Studies have shown that the higher the risk of a security, the higher the returns the investors require. However, two major questions that this research has not addressed satisfactorily are the risk preferences of the investor and the factors that determine the risk of a security. This study looks partly at the second.

Among the factors thought to influence the risk of a security is the capital structure of the firm issuing the the security. This study then, attempts to determine the effects of a firm's capital structure on the risk of its common stocks. In order to achieve this objective, a two part research design is followed. The first part relies on the theory of capital structure as advanced by Modigliani and Miller [1958 and 1963] and the second relies on a simple regression of leverage measures on risk measures. It relies on data on selected companies quoted at the Nairobi Stock Exchange - NSE - the only organized securities market in Kenya.

The study concludes that capital structure changes affect the risk of common stocks. The calculated levered variances are found to be larger than the corresponding unlevered variances. Therefore, the higher the debt level, the higher the risk of common stocks.

The implications of this conclusion are that when managers borrow, the investments to which the borrowed funds are put must earn more than the existing assets. For the investors, any increase in leverage will need them to require a higher return. Otherwise, it would be wise to reappraise their portfolio of investments. However, these conclusions are limited to the extent of the validity of the the assumptions made in the study.

CONTENTS

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

In investment analysis, it is generally agreed among finance scholars and practitioners that risk is an important ingredient in security choice analysis. Though the issue of the determination of the investors risk preferences is largely unresolved, finance literature is united in its premise that increased risk must be accompanied by increased return. Therefore any factor that affects the risk of a security has implications on the expected return of that security. This is nowhere else demonstrated clearly than in the Capital Asset Pricing model where the expected return is a function of the risk of the security as follows:

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f]$$

where,

R_f = the risk free rate of return

β_i = Beta coefficient which measures a security's systematic risk

$E(R_m)$ = the expected return on the market portfolio

One major factor believed to influence the risk of a firm's common stock returns is its capi[illegible] has received considerable attention from finance research particularly since Modigliani and Miller wrote their path-finding article, *The Cost of Capital, Corporation Finance and the Theory of Investment*, in 1958 in which they argued that capital structure is irrelevant to firm valuation. Most of the studies on capital structure have focused on the relevance or irrelevance of debt to the maximization of the value of the firm. However, only a few studies have concentrated directly on the relationship between the capital structure or leverage of a firm and the risk of a firm's common stock returns. However, a quick review of some of the major studies indicates that they are based on the presupposition that increased leverage breeds increased risk. This has been taken for granted in most studies although in others the relationship has been shown theoretically in the process of demonstrating the relevance or irrelevance of debt to firm value.

The first attempt to address the issue of leverage - risk relationship directly was by Hamada[1972]. This study led to the confirmation of a positive relationship between leverage and the systematic risk of common stocks. As more debt is used, the systematic risk of the common stock returns increases. This has been the basic building block on which a number of capital structure theories are built. For example, the bankruptcy costs issue is based on this relationship. As more debt is used, the probability of the firm going into bankruptcy due to inability to service the debt increases. The investors interpretation of this is in terms of increased risk. Agency theory also has implications for the leverage - risk relationship. As debt increases, it is assumed that debtholders recognise the increased risk and therefore monitor the activities of managers more closely. This reduces the agency costs of equity and increases the agency costs of debt. It follows therefore that through its effects on risk the capital structure decision has implications on the optimal choice of securities for investment by individual investors and by extension on the firm's value.

1.2 Definition of Terms

1.2.1 Capital Structure

The capital structure of a firm may simply be defined as 'the permanent financing represented by long term debt, preferred stock and shareholders equity'[Weston and Copeland, 1986]. Capital structure can be contrasted from financial structure because the latter includes short term debt in addition to the components of capital structure. In this study, reference to capital structure should refer to the capital arrangement of the firm in terms of equity and interest-earning debt.

1.2.2 Risk

While it is relatively easier to define what is meant by capital structure, the definition of risk needs to be clarified. According to classical decision theory, risk is perceived as a variation in the distribution of possible outcomes, their likelihoods and their subjective values[March and Shapira, 1987]. It is also possible to view risk as the possibility that expected returns are not actually achieved so that the actual returns are either greater or less than the expected returns[Gitari, 1990]. However, for most people, mainly managers and individual investors, risk is only associated with the possibility of loss[Machol and Lerner, 1987]. Thus, if an outcome is expected to be hazardous, it implies a connotation of risk. This study views risk as the probability of variation of the actual returns from expected returns.

The total risk of a risky asset can be decomposed into four components[Sharpe, 1981]. There is the specific risk, industry risk, common factor risk and the market-related risk. The first three are often grouped together and are taken to mean the non - market risk and are related to the characteristics of the individual security and the industry under study and are also called the unsystematic or diversifiable risk. The market - related risk is related to the market and therefore to all the securities in the market and is referred to as the systematic or undiversifiable risk.

Finance theory has shown through portfolio theory that owning a diversified portfolio can eliminate the unsystematic risk. This elimination it is assumed can be done without incurring any extra costs and the market therefore does not offer a premium for it[Weston and Copeland, 1986, 413: Brealey and Myers, 1988]. However the systematic component is usually compensated by the market by offering a risk premium that is proportional to it. The capital Asset Pricing Model demonstrates this clearly by specifying the risk premium as the product of the security's beta and the spread between the risk-free rate of return and the market rate.

This study focuses on the total risk rather than any of its specific components. Any attempt to distile the risk into its finer classifications would be met by measurement and methodological difficulties. Only when the Kenyan securities market is well known and researched would such concepts like security beta be easy to measure and use. In fact a study by Parkinson[1987] concluded that the Capital Asset Pricing Model(CAPM) did not explain the risk-return relationship at the NSE and that it was possible the market rewarded total rather than systematic risk.

1.3 Nature of the Problem

It is known by finance theorists and specialists that as the level of debt increases, the risk of the common stocks increases. This has been demonstrated theoretically. However, the problem is the lack of sufficient empirical work to support this theory. Finance theories are normally developed under stringent conditions, the most common being the assumption of efficient capital markets. This study therefore attempts to determine whether the widely held view of a positive relationship between leverage and risk actually exists in practice.

The relationship between risk and return appears almost a concluded issue in finance literature. Greater risk requires greater returns to the risk - taking investor. For the NSE, this has been demonstrated by Gitari[1990]. The importance of capital structure is derived via this relationship. If more leverage increases risk, then, more leverage leads to demand for higher returns. This implies that managers should only use more debt if the assets to be financed by such debt are expected to provide a commensurately higher rate of return than existing assets. For individual investors, additional borrowing by the company implies assumption of increased risk and they must demand higher returns. If such returns are not forthcoming the rational decision would be to realign the investment portfolio composition. This provides a sufficient justification for the present study.

Further, the fact that the setting is a developing stock market - the NSE - should be of some additional significance. It would be fair to say that the Nairobi stock exchange is yet to be fully discovered by finance explorers. The number of studies done on it are few and intermittent. Thus, relatively little is known about it. Most finance theories have been developed in foreign markets settings particularly in the US. Their applicability in developing markets elsewhere in the world should be of interest not just to finance scholars in these countries themselves but also to their foreign authors.

In order to study this problem, this study will test the following hypothesis:

Ho: Var (Levered Returns) = Var (Unlevered Returns)

Ha: Var (Levered Returns) <> Var (Unlevered Returns)

1.4 Objective of the Study

The study aims at determining the effects of a firm's capital structure on the risk of its common stock returns. It should be noted that the main aim is to determine the direction of this relationship and not to quantify it.

1.5 Need for the Study

The lack of empirical evidence to support the theoretical foundation of the leverage - risk relationship is a sufficient justification for this study. It is even more necessary to study the NSE which has received generally very little academic attention.

1.6 Importance of the Study

(i) Little is known about the Nairobi Stock Exchange and this study should put the NSE under scrutiny especially as regards the relevance of a finance theory developed in an exotic and a highly developed market. This would be of immense benefit to the Capital Markets Authority in providing additional insights into the characteristics of the NSE which is one of its major institutions of interest.

(ii) The study should be of benefit to security analysts, stock brokers, investors and other parties whose knowledge of the relationship between leverage and risk and by extension returns should form one of the ingredients of security choice in investment analysis.

(iii) To academicians, the study is important as a catalyst to explore the area further. This is particularly so because the study, besides answering some questions, is expected to raise others suitable for further research. It would also facilitate the conduct of other studies that require the results of this study as their foundation.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 The Theory of Capital Structure

Capital structure represents the long term financing of a firm's investments. It refers to the choice between debt and debt equivalent sources of finance on the one hand and the issue of common stock equity on the other to finance the firm's investment in assets. A definition by Weston and Copeland[1988] say that 'capital structure or capitalization of the firm is the permanent financing represented by long term debt, preferred stock and shareholders' equity'. It is further contrasted from financial structure which includes short term debt in addition to the components of capital structure.

Studies on capital structure have received considerable academic interest among finance scholars for over three decades since the MM[1958] break from what has come to be known as the traditional theory of capital structure. Most of these studies focus on the relevance - irrelevance of capital structure on the value of the firm. MM's capital structure theory was significant because it disapproved the traditionalists position. They argued that the firm's capital structure is irrelevant to firm value and therefore the choice between debt and equity is one of convenience rather than strategy. Further developments in capital structure theory were MM's interest tax shield advantage of debt, the incorporation of bankruptcy costs, the Agency Theory and information asymmetry Theory. Each of these is discussed briefly below.

2.1.1 Debt Level - The Traditional Position

Before MM[1958], finance theorists believed that an optimal debt level existed. These have come to be referred to as the traditionalists. They argue that the value of the firm can be maximized by minimizing the cost of capital by careful use of debt. It is therefore based on the weighted average cost of capital. The argument is that at low levels of debt, increased leverage does not increase the cost of debt until a certain level when it shoots up. We can therefore expect the weighted average cost of capital to decline first, reach a minimum and start rising. When it is at the minimum, firm value is maximized because this objective is similar to minimizing the weighted average cost of capital. Therefore, so long as the firm finances its investment with cheaper debt whose costs are less than their returns the value of the firm will rise.

The traditional position, according to Brealey and Myers[1988] can be supported on two arguments. First, it could be that investors are ignorant of the increased risk due to increased but 'moderate' debt and therefore continue demanding the same return on debt. However, when the same debt becomes 'excessive' they demand increased return. Actually, this may be the case because at low levels of debt an increase in debt level increases risk by a proportionately less value than at higher debt levels. The risk of bankruptcy, for example, may be very low and increases proportionately slowly at low debt levels but rises proportionately faster with debt increases at higher debt levels. The problem here is that this has not been demonstrated beyond mental reasoning.

Second, there may be imperfections in the markets that may allow firms that borrow to provide valuable service to investors. If such conditions exist, shares of levered companies would trade at a premium compared to what they would theoretically trade in perfect markets. For example, corporate borrowing may be cheaper than individual borrowing and holding leveraged shares would be equivalent to borrowing at lower effective rates. But evidence of this is hard to come by.

The behavior of the cost of equity is not very clearly agreed upon among the traditional theorists. It is generally agreed that share prices increase because the increase in earnings exceeds the added risk of financing. However, an unresolved issue is what happens to the cost of capital when financial risk increases. The expectation is that the expected return should increase with increased risk occasioned by increased debt level.

Another issue in this theory is the exact shape of the cost of capital curve[Kamere, 1987]. Some theorists see it as V-shaped suggesting a unique optimal debt level while others believe it is U-shaped therefore suggesting a range of debt levels at which the capital structure is optimized. Empirical evidence that shows that firms expected to have the same debt ratio actually vary within a range would seem to support this argument. Either view indicates that excessively low debt or high debt level should be avoided. The traditional position may be simple and unsubstantiated but it was probably the foundation on which MM and subsequent researchers built their arguments. The contention of an optimal capital structure is not all unconvincing. It is derived in more rigorous ways by such capital structure theories like the debt interest tax shields - bankruptcy costs trade-off, agency and information asymmetry theories, among others.

The implications of the traditional position on risk are not clear. The fact that the cost of capital does not rise with increased debt at lower levels of leverage may imply that leverage does not contribute to increased risk. But why the cost of capital and therefore the risk shoots up after a certain level of leverage is not explained by the traditional theory.

2.1.2 The MM Debt Irrelevance Theory

The above discussion of the traditional view implies an optimal debt level. This is perfectly the reason why MM [Modigliani and Miller, 1958] are significant. Through arbitrage process, supported by a number of assumptions, they successfully demonstrated that the fact that a firm was levered or unlevered would not affect its value.MM argued that arbitrage activities by investors would wipe out any advantage of debt or equity and that the choice between the two becomes one of convenience rather than strategy. They showed that identical income streams would sell at similar prices if certain assumed conditions exist.

To arrive at their 'revolutionary' conclusions MM assumed that:

i) The mean value of the stream of income over time or average profit per unit of time is finite and represents a random variable subject to a probability distribution. Further, all the investors are in agreement as to the expected return even though it is uncertain.

ii) It is possible to divide firms into 'equivalent return' classes such that the returns to shares of any firm in a given risk class are proportional and therefore perfectly correlated with returns to shares of any other firm in the same risk class. We can therefore describe a share by the class to which it belongs and its expected return.

iii) There are perfect markets in which shares and bonds are traded 'under conditions of atomistic competition'. In such markets any two commodities that are perfect substitutes for each other sell at the same price.

iv) The income yield of debt is constant per unit of time and is regarded as constant by all traders regardless of who has issued it.

v) There are no taxes or transaction costs.

vi) Individuals have the ability to borrow at the same rate of interest as the firms.

Making these assumptions, MM used partial equilibrium analysis to arrive at their revolutionary conclusions. Their arguments are presented below in their original form with only slight modifications.

Proposition I

Given that,

V_j = the value of firm j

X_j = expected return of firm j

D_j = the market value of firm j's debt

S_j = market value of firm j's common stock

then,

$V_j \equiv (S_j + D_j) = X_j/P_k$ for any firm j in class k

P_k = required rate of return for all assets in k risk class.

This is the mathematical form of Proposition I which simply states that the "market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate P_k appropriate to its risk class.

Stated another way,

$X_j/(S_j + D_j) \equiv X_j/V_j = P_k$ for any firm j, in class k

i.e. the average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class.

The sustenance of these relationships is based on arbitrage. If they did not hold then an ingenious investor would use them to make free money. If we all agree that what Brealey and Myers[1988] call 'money machines' do not exist, then such arbitrage opportunities would disappear as quickly as they arose.

To prove Proposition I let's assume the existence of two companies, one unlevered which we call U and the other, levered and we call it L. Suppose then that,

$V_l > V_u$

i.e. the value of the levered firm, V_l, were greater than the value of the unlevered firm, V_u. An investor holding a proportion of the stock, S_l, of the levered firm would obtain a fraction of the firm's return such that,

$$Y_l = a\ (X - rD)$$

where,

r = rate of interest on debt

Y_l = return received from firm l

Suppose the investor then sold his aS_l shares in L and acquired $Su = a(S_l + D_l)$ of shares of U. To do this he could utilize the amount aS_l realized from selling his stock in L and borrowing an additional amount aD_l on his own credit secured by his new holding in U. The new portfolio would earn a return of,

$$Y_u = a(S_l + D_l)/S_u * X - raD_l = aV_l/V_u * X - raD_l$$

Then,

As long as $V_l > V_u$, $Y_u > Y_l$. Holders of the levered companies shares would gain by selling their shares and buying the unlevered company's shares. However, this would depress the levered company's shares and raise the value of the unlevered company's shares. Unfortunately, this cannot happen because investors have the opportunity to put the equivalent leverage in their portfolio directly by borrowing on personal account. A similar argument can be used to show that $Y_l <> Y_u$. The equilibrium would only be found where, $V_u = V_l$, the value of the levered firm has to equal the value of the unlevered firm.

Proposition II

The expected rate of return on equity, i_j, is given by;

$$i_j = X_j - rD_j/S_j$$

Since we know from Proposition I that,

$$X_j = P_k(S_j + D_j)$$

substituting the latter into the former for X_j gives

$$i_j = \frac{P_k(S_j+D_j) - rD_j}{S_j}$$

Simplifying we get

$$i_j = P_k + (P_k - r)D_j/S_j$$

That is the expected yield of stock is equal to the appropriate capital rate P_k for a pure equity stream in the class plus a premium related to the financial risk equal to debt-to-equity ratio times the spread between P_k and r. Therefore, the cost of equity increases with greater financial leverage because of equity holders exposure to greater risks.

2.1.3 MM and Corporate Taxes

The greatest weakness with MM proposition I was probably the assumption of a no-tax world. In the practical world, taxes exist. It is not surprising therefore that they corrected their argument to take into account corporate taxes in 1963. So far they assumed that either personal taxes did not exist or if they existed, were equal in case of either equity income or debt income. When the corporate taxes were introduced into the analysis, the conclusions supported the relevance of debt. The analysis can be described as follows:

Suppose we have corporate taxes on corporate income at the rate of T. We can compare the two decisions.

i) The first decision would be to buy a% of the stock of the levered firm L. The value of the investment would be

aS_1

and the expected return would be

$a(X-rD)(1-T)$

Where,

X = Earnings before interest and taxes

r = rate of interest on debt

D = Total market value of debt

T = the corporate tax rate

ii) The second alternative is to buy a% of the stock of unlevered firm U, and borrow (a(1-T))% of debt at a rate similar to that at which the corporation borrows. The investment value would then be

$aSU - a(1-T)D$

The expected returns would be

$aX(1-T)-a(1-T)rD = a(X-rD)(1-T)$

Notice that for both the alternatives the expected return is the same. Now a characteristic of a well functioning capital market is that any investment offering the same return must cost the same. If not, an arbitrage opportunity would exist and again 'money machines' do not exist. Therefore,

$$aS_l = aS_u - a(1-T)D$$

$$\Rightarrow S_l = S_u - (1-T)D$$

$$\Rightarrow S_l = S_u - D + TD$$

$$\Rightarrow S_l + D = S_u + TD$$

Since $S_l + D = V_l$ and $S_U = V_u$

Then,

$$V_l = V_u + TD$$

i.e. the value of the levered firm L is equal to the value of the firm if unlevered plus the amount of debt times the tax rate. Because of using debt the value of the firm increases by the value of debt times the the tax rate. This increase represents what has been called the tax subsidy or tax shield of interest deductibility. In effect the value of the firm increases because the government's share in its value declines when it is financed by debt rather than equity. Brealey and Myers[1988] argue that since interest is deductible for tax purpose - and dividends are not - the government ends up paying an amount of interest equivalent to the tax rate times the debt value. This position was clarified in MM's correction of their Proposition I in 1963.

The increased value of a firm obtained from debt interest tax shields imply that a firm should borrow to the hilt - 100 per cent financing. However, this is absurd. We do not find 100 per cent debt financed firms. This empirical anomaly has been solved neatly by the introduction of bankruptcy costs. The higher the debt ratio, the higher the probability of financial distress. The present value of costs of bankruptcy, both direct and indirect, therefore increases with leverage. This has the effect of offsetting the interest tax shields and an optimal level of debt is obtained where the difference between the two is maximized. Nevertheless, debt interest tax shields are still important in capital structure choice as argued by Miller[1991] and MaCkie-Mason[1990].

The risk implications of the trade-off theory are clear. As more debt is utilized the risk of the common stocks increases. This is indirectly deduced from the increase in the cost of equity capital as debt increases. For example Weston and Copeland[1986] show that, K_s, the cost of equity capital can be represented as:

$$K_s = K_u + (K_u - K_b)(1 - T)(B/S)$$

Where,

K_u = cost of capital if the firm was unlevered

K_b = Marginal cost of debt

T = tax rate

B = Market value of debt

S = Market value of equity

The risk premium is presented as $[(k_u - k_b)(1-T)(B/S)]$

Weston and Copeland[1986] account for this relationship thus:

> "it makes sense that the cost of equity increases with greater financial leverage because shareholders are exposed to greater risk".p.582.

2.1.4 The Effect of Personal Taxes

We have already said that the idea of 100 per cent debt financing is unacceptable much more because we do not find such companies in existence. No doubt then MM were bound to face some challenge. Many questions were asked and although MM wrote a series of comments and replies their basic stand did not shift. One of the weaknesses of their analysis was the assumption of the absence of personal taxes or their equivalence, if they exist, among all investors. We know that personal taxes on income received as either debt interest or equity dividends or capital gains exist. If the tax rates on these incomes were the same, they would not have an effect on debt policy and the revised Proposition I of debt relevance would hold. But we also know that personal taxes on income vary depending on the type of income.

Suppose we let

T_c = Effective corporate tax rate.

T_p = Effective Personal tax rate on interest and,

T_{pe} = Effective personal tax rate on equity income.

Then, operating income of a firm can be paid out as either debt interest or equity income. The latter is divided into dividend income and capital gains. The two may be taxed at different rates but for purposes of analysis we assume they are equal.

Each shilling of operating income paid out as interest would attract total taxes equal to T_p the personal tax rate on interest. The final income accruing to the investors per shilling of investment(debt) would then be;

$$(1 - T_p)$$

Corporate tax is irrelevant because interest is paid before taxes are determined. Hence only a personal tax at T_p is levied.

On the other hand each shilling of operating income received as equity income would be reduced by tax equal to;

$$T_c + (1 - T_c)T_{pe}$$

Therefore the final income that the shareholder receives would be:

$$1 - T_c - (1 - T_c)T_{pe}$$

Since investors are interested in the final (after - tax) return, they would choose that form of security that guarantees the highest after tax return. But it is not easy to determine which one. This would depend on the effective tax rate on debt and on equity.

Therefore as long as ,

$$1 - T_p > 1 - T_c - (1 - T_c)T_{pe}$$

the choice is to finance with debt. Otherwise issue equity.

This is only a step into the problem. We would like a framework that gives us a clear-cut answer as to whether debt or equity is to be issued. A solution to this problem was provided by Miller[1977]. However, Miller's conclusions were even more divergent. They took the debate back to partial irrelevance of the debt choice. Miller's arguments were contained in his Presidential Address, "*Debt and Taxes*", to The American Finance Association.

To present Miller's argument we can use a simple arbitrage process as outlined by Weston and Copeland[1986, p. 589]. Suppose there are two alternative investments:

i) One, buy a% of the equity of the levered firm L. The cost of the investment is thus $aS_l = a(V_l - D)$ and the shilling return is $a(X - rD)(1 - T_c)(1 - T_{pe})$.

ii) Alternatively, buy a% of the equity of the unlevered firm V_u and borrow a% of $(1 - T_c)(1 - T_{pe})D/1 - T_p$. The cost of the investment is,

$$aS_u - a[(1 - T_c)(1 - T_{pe})/1 - T_p]D$$

and the shilling return is,

$$aX(1 - T_c)(1 - T_{pe}) - a[(1 - T_c)(1 - T_{pe})/1 - T_p]rD(1 - T_p)$$
$$= a(X - rD)(1 - T_c)(1 - T_{pe})$$

But the two alternatives have identical returns. Again in well functioning capital markets, investments that give identical returns must cost the same. Therefore,

$$a(V_l - D) = aS_u - a[(1 - T_c)(1 - T_{pe})/1 - T_p]D$$

Then,

$$V_l - D = S_u - [(1 - T_c)(1 - T_{pe})/1 - T_p]D$$

Recall that $S_u = V_u$,

Therefore,

$$V_l = V_u + D - [(1 - T_c)(1 - T_{pe})/1 - T_p]D$$

$$V_l = V_u + [1 - (1 - T_c)(1 - T_{pe})/1 - T_p]D$$

The gain from leverage, P, with both corporate and personal taxes is,

$$P = [1 - (1 - T_c)(1 - T_{pe})/1 - T_p]D$$

From this we would determine whether debt or equity is better depending on the values of T_c, T_{pe} and T_p which represent the corporate tax rate, the personal tax rate on equity income and the personal tax rate on debt interest respectively. As already stated if tax rates on common stock equity T_{pe} and on debt interest, T_p are equal then they become irrelevant and the gain from leverage becomes the interest tax shield as computed earlier. Thus,

$$V_l = V_u + (1 - 1 + T_c)D = V_u + TD$$

Miller [1977] used this argument to arrive at his aggregate equilibrium debt level in which he argued that taxes were only important in determining the aggregate amount of debt and not the amount issued by any one firm. To arrive at this, he assumed a simple world in which the tax rate on equity income is zero and is received in unrealized capital gains while letting the personal tax rate on interest to fluctuate.

Recall that the gain from leverage when there are corporate taxes, personal taxes on interest and equity income is,

$$P = [1 - (1 - T_c)(1 - T_{pe})/1 - T_p]D$$

If $T_{pe} = 0$, then,

$$P = [1 - (1 - T_c)/1 - T_p]D$$

Suppose $T_c > T_p$, then, $P < 0$

If $T_c < T_p$, then $P > 0$

If $T_c = T_p$, then $P = 0$

This means that as long as the personal tax rate on debt interest is greater than the corporate tax rate it pays to issue more debt. All investors with personal tax rates on debt interest less than corporate tax rate would buy debt instruments. Otherwise no debt should be issued if the corporate tax rate is lower than the personal tax rate on debt interest. But notice that this holds for the aggregate supply and demand for debt and not for any single firm. This was Miller's argument. And it pushed back the debate where it had began - debt is irrelevant to the individual firm's value. This hypothesis is supported by Taggart[1980]

The conclusion that one can draw from the discussion so far is that debt does not matter in financing decisions. To MM the value of the firm increase by the present value of the interest tax shields obtained through interest tax deductibility. The advice on this basis is to borrow to the hilt. But for Miller, debt only matters in aggregate terms. Equilibrium is reached when the corporate tax benefits to the borrower equals the marginal tax cost to the marginal lender. And this occurs when the personal tax rate equals the corporate tax rate. If the market for debt then is in equilibrium no firm benefits from issuing debt. Only when tax rate changes cause a disequilibrium do the quickest firms to issue debt benefit. This implies partly that firms should not borrow.

These two represent similar but divergent views. A question then that arises is whether there is a compromise between them. This is theoretically narrated by Brealey and Myers[1988, p.419]. They use the American tax system to present their argument. We have already said equilibrium occurs when the personal tax rate equals the corporate rate. In the U.S the latter was 34 per cent and the former was 28 per cent in 1986. Therefore, firms should be perpetually borrowing in an attempt to reach the equilibrium. But they cannot reach it because 28% < 34%. The tax shield cannot remain at 34 per cent of each shilling of debt. As a firm borrows more and more, the value of the tax shield would be expected to decline owing to increased probability of tax exhaustion. Therefore the marginal corporation tax rate declines as more is issued. Equilibrium is reached when the effective interest tax shield is equal to 28 cents per shilling of debt. This is the compromise theory that Brealey and Myers[1988] try to advance.

2.1.5 Capital Structure and Costs of Financial Distress

Financial distress occurs when due to operating difficulties the firm fails to honour promises to creditors or honours them with difficulty. This is a costly process whether the firm goes through bankruptcy or not. The presence of these costs may cause the cost of debt to rise with leverage. MM's propositions can still hold as long as bankruptcy is not brought into the picture.

Bankruptcy costs may either be direct or indirect. Direct costs are the most obvious and include the legal, accounting and other administrative costs that are involved whenever a restructuring is necessitated by bankruptcy. Indirect costs begin to be incurred even before the firm goes into bankruptcy. As debt increases with a given operating performance or the performance of the firm deteriorates given a certain level of debt, there arises difficulties of raising finance. The evidence of increased inadequacy of the firm to meet its obligations increase these costs. Weston and Copeland [1986, p.597] outline these 'in order of seriousness'

(i) The firm faces increasingly difficult, onerous terms, conditions and rates.

ii) It may lose key employees particularly because of the uncertainty it causes.

iii) Suppliers also may desert the company for fear of no-payment or poor sales prospect in the future.

iv) Loss of sales because customers doubt the availability of after-sales service.

v) Lenders may simply refuse to lend the firm under any terms because the overall prospects are not favourable in relation to the existing obligations.

vi) Some fixed assets may have to be liquidated to meet working capital needs.

vii) The formal bankruptcy proceedings will incur legal and administrative costs and the receiver's operations may disrupt operations.

viii) There are also bankruptcy costs associated with the decline in value when assets are on a going concern and on liquidation basis.

Other costs, though not really bankruptcy costs but result from financial distress are those that arise from the conflicts of interests between debt holders and equity holders. Because equity holders are in control, debt holders impose a lot of restrictions on the actions of equity holders as the debt ratio rises. Such costly restrictions may be put in form of debt contracts that may, in addition to preventing decisions detrimental to the debt holders, prevent decisions beneficial to the firm as a whole.

The impact of bankruptcy costs on the choice of capital structure arise from their relationship with debt level. As the level of debt increases the probability of bankruptcy arises. And as bankruptcy becomes more and more likely some of the previously remote costs of bankruptcy become probable. Since the privilege of limited liability limits the loss that equity holders can bear in case of bankruptcy, most of the costs of bankruptcy are borne by debt holders. They will therefore demand a higher rate of return to compensate them for increased bankruptcy costs as the debt level rises. As the rate of required return on debt increases the amount available to stock holders decrease reduce the value of their shares. And since bankruptcy implies that other parties other than equity holders and debt holders, such as lawyers, have claim to the assets of the firm, the value of the firm declines with increased bankruptcy. This decline is equal to the Present Value of bankruptcy costs. Brealy and Myers (1988) gives the value of the firm as:

Firm Value =	Firm Value if unlevered	+ PV of interest tax shields	- PV bankruptcy costs

The same result is given by Turnbull (1979). The arguments about bankruptcy costs boils down to a trade-off between the present value of interest tax shields and the present value of bankruptcy costs. As the risk of bankruptcy rises the increased value of bankruptcy costs reduces the value of interest tax shields and the optimal level of debt occurs when bankruptcy costs begin to overshadow the interest tax shield. Following this argument an acute problem surfaces. The argument is theoretically sound but the question is the actual optimal level of debt using this trade-off. The problem becomes one of determining the exact magnitude of bankruptcy costs. (Altman, 1984).

Research into the magnitude of bankruptcy costs has given mixed results. But it may be safe to say that they can be significant (Weston and Copeland, 1986,pp. 599). Warner (1977) studied the bankruptcy costs of 11 railroad bankruptcies and concluded that there were substantial fixed costs related to the bankruptcy. He found that direct bankruptcy costs were 5.3 per cent of overall market value of the railroad's debt and equity securities estimated just before bankruptcy. They were only 1.4 per cent of the same when estimated 5 years prior to bankruptcy. These were only direct costs. If indirect bankruptcy costs are brought into the picture we would expect costs to increase substantially. Altman (1984) argued that this could become substantial, even upto 20 per cent of the value of the firm.

The opposing view asserts the insignificance of bankruptcy costs. The insignificance of bankruptcy costs was derived by Haugen and Senbet (1978). They used theoretical reasoning to assert that bankruptcy costs, even if they exist are insignificant and the theory of capital structures based on a trade-off between tax shield and bankruptcy costs has no basis. This theory can only be upheld if the markets were imperfect. The thrust of their argument was that other studies found significance of bankruptcy costs because most of the costs attributed to bankruptcy were actually liquidation costs that have nothing to do with bankruptcy.

Therefore, it may be concluded that the empirical and theoretical importance of bankruptcy costs to the capital structure theory appears inconclusive so far. However, the theoretical arguments advanced to support their relevance appear convincing. Of significance here are the results of MacCkie-Mason's (1990) work. He uses discrete choice analysis in which new debt issues, rather than aggregate debt ratio that is the result of many past decisions, are studied. The results, inter alia, show that bankruptcy costs are significant. We can go along with him and conclude that bankruptcy costs are actually important in the choice of capital structure. The problem lies in pinning them down to figures - the principal language that finance specialists understand.

The implications of the bankruptcy costs argument on risk are that as more debt is issued, the risk of the common stock increases. More debt increases the probability of bankruptcy and therefore the overall risk of the firm's securities, both the debt instruments and common stocks.

2.1.6 Other Theories of Capital Structure

Besides the theories already explained, there are a few other theories that attempt to explain the leverage issue. The major among these are the agency theory and the information asymmetry theory. They are briefly discussed below.

The Agency Theory was introduced into the theory of capital structure by Jensen and Meckling[1976] who borrowed it from economics[Kamere, 1987]. It introduces the agency costs - costs due to conflicts of interests - as determinants of capital structure. Such costs include the costs of internal controls and the extra benefits given to managers to align their interests with those of the shareholders. As more debt is issued, the agency costs of debt increase against the agency costs of of equity. At some point an equilibrium debt level is reached. In a summary of research on Agency Theory as applied to capital structure, Harris and Raviv[1991] conclude that: .cw9

> "leverage increasing (decreasing) changes in capital structure .... will be accompanied by stock price increases (decreases)". p.306.

The explicit modelling of private information in economics has been applied to the study of capital structure[Harris and Raviv, 1991]. This has led to what is called asymmetric information. It rests on the contention that managers, and other privileged parties like auditors, have inside information that investors do not have. The investors try to interpret managers decisions on capital structure in terms of whether they reveal a bright or a bleak future for the firm. For example, Myers and Majluf[1984] show that if information asymmetry between investors and insiders exist, the investors may underprice an issue of equity shares and overprice a debt issue. The firm may therefore find that the only alternative would be to issue debt which would not be undervalued. Other important studies on this area are Dierkens[1991]; Ravid and Sarig[1991]; and Flannery[1986].

There are a few other theories that attempt to explain the firm's capital structure. Foremost among these are models based on product/input market interactions and theories driven by corporate control considerations. However, these are yet sufficiently developed and are therefore not discussed here. Never-the-less they may be the new frontiers of research in capital structure studies.

The general conclusion to be drawn from research in capital structure is that increased leverage is associated with increased firm value. This is the result reached by the major theories of capital structure. A further result reached is that increased debt increases the risk of the firm and that of common stocks. The only problem is that the specific relationship except for MM, has not been clearly delineated. This result has important implications for this study.

In summary, the arguments advanced by MM perhaps form the pillar of capital structure theory. They form the basis of almost all subsequent research, both empirical and theoretical, in the field. Kamere[1987, p.20] concludes that;

> "The theory of capital structure .... owes a lot to MM because the amount of theoretical and empirical work that has been done has been the result of of questions arising out of their path-finding article in 1958".

2.2 Capital Structure Decisions in Kenya

Relatively little is known about the capital structures of Kenyan firms. There has been very little academic research into capital structures in Kenya. Perhaps the only two major exceptions are Mbogo[1983] and Kamere[1987]. Among the major features of debt financing in Kenya as outlined by Kamere[1987] is the dual role of lender and shareholder played by a number of Kenyan lenders. When this occurs, the perceived risk of default is reduced and firms tend to rely heavily on debt financing. This co-ownership by shareholders and lenders is evident particularly among government corporations like the Industrial and Commercial Development Corporation (ICDC), the Industrial Development Bank (IDB) and the Development Finance Company of Kenya (DFCK). They own shares in some companies to which they lend. What is not yet known is whether the recipient companies tend to over-rely on debt financing.

Another feature of debt financing in Kenya is the non-uniformity of borrowing rates faced by different firms. For example, some firms may borrow at lower rates owing to their long term relationships with the lenders or their connections with public lenders like the development corporations which lend more cheaply. Others may receive government guarantees on their loans which reduces the rates charged on them or enjoy substantial government support that they can continue operations even when they are unable to meet their debt obligations like the case of Uplands Bacon Factory where the government stepped in to stop a court order to auction the companies assets[Kamere 1987]. Firms that can borrow at lower rates can therefore use more debt than those that cannot.

On the other hand Mbogo[1983] concludes, inter alia, that public companies in Kenya are heavily indebted. There were increasing debt ratios in the study period between 1972 - 1981 as debt financing increased against almost stagnant equity. There were no fresh issues of equity. The ratio of equity in total finance continued to decline over the study period - 1972 -1981. A recent feature however is an increase in new equity issues especially by the commercial banks and more is expected from the privatising parastatals.

The study by Kamere[1987] aimed at discovering the factors that are considered in making capital structure decisions in Kenyan firms. It concluded that 'there was either very little or no change in the amount of stock issued' and there is thus a high reliance on debt financing and internally generated funds. In determining how much a firm should borrow, finance managers and business advisors gave several factors that they take into account. Foremost among these were:

(i) the stability of future cashflows because default in debt repayment may force a business firm into liquidation.

(ii) the level of interest rates.

(iii) the firm's asset structure.

(iv) the firm's tax advantage of debt.

(v) the term maturity of debt.

The risk implications of these results are discernible. Most of them show that finance managers use debt more modestly to avoid the risks of high debt levels. Of course there could be other interpretations. But it appears that financial managers and business advisors associate high debt levels with higher levels of risk.

2.3 Risk - Nature and Its Measurement

The definition of risk and its decomposition into different types has already been discussed in the introductory chapter. Systematic is the type that cannot be diversified away by diversification through portfolio construction. It is important because the fact it cannot be diversified away means the market must compensate any investor who assumes it. Systematic risk or undiversifiable risk, is a residual of the diversification process and 'can be attributed to the beta coefficients of the individual securities and to a market factor common to all securities. It is 'perfectly correlated among all assets' [Beja, 1972, 43].

The unsystematic risk, as Evans and Archer [1968] show empirically can be eliminated by diversification. The elimination needs the construction of a portfolio of a few securities because the relationship between the number of securities in a portfolio and the level of portfolio dispersion 'take the form of a rapidly decreasing asymptotic function, with the asymptote approximating the level of systematic variation in the market' [Evans and Archer, 1968, 767]. For the Nairobi Stock Exchange, a similar result is arrived at by Muli[1991].

There are several approaches of measuring the risk of an asset. These may be broadly classified into either accounting based or market based measures [Gitari, 1990]. The former utilizes accounting data while the latter relies on stock market variables mainly stock prices. Market based measures are preferred for three reasons [Gitari, 1990]. One, accounting based measures of return from which corresponding risk measures are derived are rarely an indication of return. Two, accounting data requires to be adjusted for inflation. However, inflation adjustment to accounting data is not yet a resolved issue. Finally, it is relatively easier to obtain market based data than accounting data.

Among the market based measures, we can distinguish two main measures of risk. The first is the beta coefficient. It represents the coefficient of systematic risk in the market model. The second is the statistical measure of variation in form of variance. The use of variance as a measure of risk flows directly from the definition of risk as the variation of expectations from the actuals. Variance is actually a measure of total risk and does not distinguish between the systematic and unsystematic risk components.

The use of beta as a measure of systematic risk is supported on several grounds. Blume [1971] advances two arguments to justify beta as a measure of risk. The first argument based on portfolio approach shows that much of the variance - type risk of an individual security is diversified away through portfolio construction. The residual risk that is not diversifiable - 'can be attributed to the beta coefficients of the individual securities and to a market factor common to all securities [p.699]. Second, the beta coefficient can be shown as a constant of proportionality between an individual security's risk premium and that of the market. Babcock [1972] further shows that for a risky security to lower the overall risk of a portfolio, it should negatively covary with the portfolio. This is shown to be similar to the beta of the risky security being less than one.

This study attempts to relate the capital structure of a firm to the total risk of its common stocks. The classification into systematic and unsystematic components is not emphasized for reasons outlined earlier. Risk is defined in the introductory chapter as the variation of actual returns from the expected returns. The variance will therefore be used as the measure of risk.

2.4 Risk Vs. Capital Structure

2.4.1 Interaction Between Risk and Capital Structure.

Although finance literature associates increased leverage with increased risk, theoretical and empirical studies on the interface between capital structure and risk are few. The two major exceptions are Hamada [1972] and Hill [1980]. The study by Hamada concludes that leverage increases the systematic risk of common stocks. This position is also taken by Miller[1991]. Miller argues that leverage increases the risk of both common stocks and debt. However it is demonstrated that it does not increase the total risk in the economy. It would be expected that as the debt level rises, the level of risk should increase.

This relationship can be accounted for in terms of the variability of returns due to the fixed nature of debt interest and the increased probability of bankruptcy. As more debt is used, the fixed interest charges increase with the effect of magnifying the variability of returns to the shareholders. The coefficient of variation is magnified. This increased variability increases the probability of either loss or gain and therefore risk to the investor. This effect is neatly demonstrated theoretically by Weston and Copeland [1985]. Thus, the expected return is also increased. The same authors demonstrate the relationship between beta and leverage. They show that increased leverage results in increased betas.

The increased variability of returns due to increased leverage have implications for bankruptcy. The higher the level of debt the greater the probability that the firm will be unable to meet the fixed interest charges thereby triggering bankruptcy. The possibility of bankruptcy is enough to send chill down the spines of investors. Therefore, the higher it is the higher the investors perceive the risk of the securities of the firm. Thus, more leverage can be associated with more risk. This appears to be the argument advanced by Brealey and Myers [1988].

2.4.2 Approaches to the Study of Leverage - Risk Relationship

Though the relative absence of empirical studies on the leverage-risk relationship may be attributed to researchers' obsession with the value of leverage to the firm, the difficulty in designing such studies could also be partly the course and a result. No clear cut research methodology has been developed for such studies. However, Hamada [1972] summarizes four possible approaches to the study of this relationship.

The first involves the MM valuation model approach. It requires the estimation of the firm's capitalization rate for an all-common equity firm with an explicit valuation model. This rate is then related to a non-leveraged measure of risk through the Capital Asset Pricing Model. The difficulties involved here are that it requires the specification, in advance, of risk classes and the estimation of the expected asset earnings and the capitalized growth potential implied in stock prices. Such a specification is almost impossible in the Kenyan context because of the limited number of quoted common stocks and lack of previous studies to help specify the exact nature of the risk classes. Firms in any risk class would be so few or none that it would be difficult to analyse any data.

The second approach to the study of leverage-risk relationship is to run a regression of the observed risk of a stock on a number of accounting and leverage variables. The objective here is to explain this observed risk. The major problem is the choice of the right accounting and leverage variables.

A third approach is to measure the risk of common stocks before and after a new debt issue. The difference in the risk would be attributed to changes in leverage. A weakness with this method is that the change in risk may be due to other unidentified factors in addition to leverage and there is no way to control for them. In fact the reason for which debt is issued may account for this difference in the observed systematic risk. A further problem in the Kenyan security markets is that most of the corporations borrow privately in form of loans and private debentures whose issue is not public. It would be difficult to know when such private borrowings and issues were made. This would make the development of a research setting very difficult.

Finally, it is possible to assume that MM theory is valid. This would allow the researcher to determine what the rate of return would be if the levered firm was instead unlevered. With two rates of return, levered and unlevered, the levered and unlevered measures of risk of the stock can be calculated. The difference between them would be due solely to leverage. The major weakness is the assumption of validity of MM theory and its assumptions. However, when the assumption of perfect markets is met, at least partly, the results should be reliable. It is also necessary to note that so far, MM theory has not been shown incorrect except for the moderation of bankruptcy costs. And the other theories of capital structure are not fully synthetised into a clear - cut framework that can be readily used for purposes of a study like the present one. This study then uses the second and last approaches to study the risk implications of leverage.

CHAPTER THREE

3.0 RESEARCH DESIGN

3.1 The Population and Sampling Procedure

This study used a census of the total population which is composed of all the common stocks listed at the Nairobi Stock Exchange - NSE - as at 31st Dec 1990. In addition, for a stock to qualify to be included in the study, it must have been consistently quoted at the NSE for fifteen years covering 1976 to 1990. The period of fifteen years is long enough to provide sufficient number of data points while not eliminating most of the stocks quoted at the NSE.

From the population therefore, were excluded all stocks that have either been intermittently quoted or quoted for less than fifteen years upto and including 1990. Banks and financial institutions were also excluded because by their nature their debt levels do not have much meaning in the present study. They deal in borrowing from and lending to the public. Also excluded were firms which did not have debt in issue for a reasonable number of years under study. Using these criteria, thirty (30) companies qualified to be included in the study representing more than fifty per cent of all the common stocks quoted at the NSE.

3.2 Data Collection

The following data was required for this study:

(i) The stock prices at the beginning and end of each year and the number of shares issued during the year. The year used corresponds to the issuing company's year - end because reliance on some accounting data will be made.

(ii) Total amount of interest earning debt outstanding, including short term loans and bank overdrafts and the total annual interest payment each year.

(iii) Total annual ordinary dividends per share and total gross preferred dividend, if any.

(iv) The annual tax rate for each year.

Most of the data was obtained from the Secretariat of the NSE in form of raw published accounts and stock price lists. However , published accounts of some companies for certain years were not available at the secretariat. The researcher therefore obtained some from Francis Drummond & Co - a firm of stockbrokers that is a member of the NSE. Even then, a few statements could not be obtained and were therefore dispensed with. Complete data for nineteen companies was obtained. Of the remaining, four companies had data missing for only one year while the remaining seven had data missing for five years or less. The data was collected using a Data Collection Form shown in Appendix I and summarised for computer input in a Data Summary Form shown in Appendix II.

3.3 Data Analysis Method

3.3.1 The MM Approach

The first approach used to determine the relationship between capital structure and risk is based on the work of MM. The application of the MM theory allows us to derive the variance of the common stock returns of a firm *if* it was unlevered. The variances of the two sets of returns is calculated and then compared. The hypothesized relationship is that the unlevered variances will on average be less than the levered variances. This would confirm the theoretical position that increased leverage is associated with increased risk.

Because the MM model is used in this study it is necessary to discuss the major assumptions underlying it. These are:

i) The mean value of the stream of income over time or average profit per unit of time is finite and represents a random variable subject to a probability distribution. Further, all the investors are in agreement as to the expected return even though it is uncertain.

ii) It is possible to divide firms into 'equivalent return' classes such that the returns to shares of any firm in a given risk class are proportional and therefore perfectly correlated with returns to shares of any other firm in the same risk class. We can therefore describe a share by the class to which it belongs and its expected return.

iii) There are perfect markets in which shares and bonds are traded 'under conditions of atomistic competition'. In such markets any two commodities that are perfect substitutes for each other sell at the same price.

iv) The income yield of debt is constant per unit of time and is regarded as constant by all traders regardless of who has issued it.

v) Individuals have the ability to borrow at the same rate of interest as the firms.

It is not known in advance whether these assumptions are met by the NSE. Muli[1990]concludes that evidence available on the NSE shows that the market is at least weak - form efficient. This contributes towards the most important assumption - perfect markets - and if it is met, at least partially, the use of MM theory in this study is justified.

The analytical procedures of this method are now described: The shilling return to the common shareholders from period t-1 to t is given by:

$$C_t = (X - I)_t(1 - T)_t - P_t + sG_t = d_t + cg_t \text{ ----------(1)}$$

Where,

C_t = the total shilling return to the common stockholders from period t-1 to t

X_t = the earnings before interest, taxes and preferred dividends.

I_t = Interest Expense

T = the tax rate

P_t = Preferred dividends paid

sG_t = the change in capitalized growth over time.

d_t = Common stock dividends

cg_t = Common stock capital gains

NB: There is need to add the change in capitalized growth opportunities. These are in form of future earnings in excess of the firm's cost of capital obtained from new assets. Their value (i.e. present value) rises the more closer their maturity. The annual increase in their value is included in the common shareholder return.

Using the market model, the return to the common stock if the firm had no debt or preferred stock would be:

$$R_{ut} = [X_t(1 - T)_t + sG_t]/S_{ut-1} \quad \text{------------------------(2)}$$

Where,

R_{ut} = the rate of return to common stock if the firm had no debt or preferred stock.

S_{ut-1} = the market value of the common stock if the firm had no debt or preferred stock.

We can rearrange (2) in terms of (1) as follows:

$$R_{ut} = [(X - I)_t(1 - T)_t - P_t + sG_t] + P_t + I_t(1 - T)_t]/S_{ut-1} \quad \text{-------------(3)}$$

Substituting the RHS of (1) in the numerator of (3) gives,

$$R_{ut-1} = [d_t + cg_t + P_t + I_t(1 - T)_t]/S_{ut-1} \quad \text{-------------(4)}$$

The major problem so far is determining the value of S_{ut-1} - the market value of the unlevered stocks. The problem is that it is not observable because the firm's under study are levered. However the solution can be found in MM theory.

The value of the firm if unlevered, according to MM is approximated by,

$$(V_1 - TD)_t \quad \text{-------------(5)}$$

Where,

V_l = Total actual value of the levered firm

T = the tax rate

D = the total market value of debt

Therefore,

$$S_{ut-1} \cong (V_l - TD)_{t-1} \text{--(6)}$$

Then,

$$R_{ut} = [d_t + cg_t + P_t + I_t(1 - T)_t]/(V_l - TD)_{t-1} \text{------------(7)}$$

On the other hand the observed actual rate of return on the common stock is,

$$R_{lt} = (X - I)_t(1 - T)_t - P_t + sG_t/S_{lt-1} \cong d_t + cg_t/S_{lt-1} \text{--(8)}$$

Note that now we can calculate two common stock returns, R_{ut} which is the rate of return on the common stock assuming the firm was unlevered and R_{lt} which is the actual rate of return for the common stock that is levered. A computer program in dBase III Plus package, available in the Campus PC's was written to calculate these returns. The sets of levered and unlevered returns for each common stock selected are presented in Appendix III.

The variance of each of the two sets of returns, levered and unlevered for each common stock , was then calculated. We therefore have two sets of measures of risk. The first is composed of the variance of the levered returns for all the stocks under study and the second is composed of the corresponding variances of the unlevered returns of each stock. Then, the mean variance of each set was computed and the two means obtained compared. The mean of the unlevered variances, according to the hypothesized relationship, was expected to be smaller than that of the levered variances.

A second test was a Mann Whitney U-test of the difference between the two sets of variances. If leverage had no effect on risk, then we would ordinarily expect as many unlevered variances to be greater than levered variances as there would be levered variances greater than unlevered variances. If most unlevered variances are found to be smaller than their corresponding levered variances, the conclusion to be drawn is that the higher the leverage the higher the risk of common stock returns.

3.3.2 Regression of Risk Measures on Leverage Measures

The second data analysis approach is a simple regression of three leverage ratios, Total Debt/Equity, Total Debt/Value and Long Term Debt/Value, on the calculated levered variances of the securities under study. The regression equations were:

$$ {}_{1}\beta = a_1 + B_1 D/E + E_1 $$

$$ {}_{1}\beta = a_2 + B_2 D/V + E_2 $$

$$ {}_{1}\beta = a_3 + B_3 LTD/V + E_3 $$

Where,

a_i's = the intercept of the regression equations

B_i's = the slopes of the regressions

E_i's = the disturbance terms

D/E = Debt/Equity ratio

D/V = Total Debt/Value ratio

LTD/V = Long Term Debt/Value ratio

It is expected that if the hypothesized relationship between leverage and risk of common stocks holds, the slopes, B_i's, of the regression equations should be positive.

CHAPTER FOUR

4.0 DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 Introduction

This study's objective is to determine the effects of capital structure on common stock risk. In order to achieve this objective two approaches, as detailed out in the previous chapter, are used. The first is based on the MM capital structure theory and the second on a regression of risk measures on leverage ratios. It is expected that the higher the level of debt ratio of a firm the higher the risk of the returns to the firm's common stocks. In this chapter therefore, the results of the data analysis are presented and briefly discussed.

The data collected was analysed in several stages. First, the raw data collected was summarised into a table as presented in Appendix IV. This table contains separate data for fifteen years(1976 - 1990) for each company issuing a qualifying stock on:

(i) the dividends per share.

(ii) the number of ordinary shares outstanding at the beginning and end each year.

(iii) the share price at the beginning and end of each year.

(iv) the total interest paid on debt.

(v) the corporate tax rate on current and previous year's income.

(vi) the total interest earning debt and the respective division into short and long term components.

At the first stage of data analysis, this raw data was input into a dBase III Plus database file. Then a program in the same package was written to compute the annual returns, both the levered and unlevered, the respective mean returns for each stock and the corresponding variance. The results of this computation are presented in Appendix V. Two mean variances, levered and unlevered were computed and then compared. In addition, a Mann - Whitney U - test was carried out on the differences between the two sets of variances - levered and unlevered.

The second stage data analysis involved the computation of three leverage ratios - the total debt/equity, the total debt/value and the long term debt/value and their mean values over the thirty companies. These were computed by running another dBase III Plus program on the original database file. The results are presented in Appendix VI.

Finally, the aggregate company mean levered variances calculated in the first stage and the mean company debt ratios calculated in stage two were input into a statistical computer package - Statgraphics. This was used to regress the levered variances of each company against the corresponding company's debt ratios.

4.2 General Findings

The computation of levered and unlevered returns as shown in Table 1 shows that, generally, the levered returns are higher than their corresponding unlevered returns. Only in very few and very scattered cases does the reverse occur. The differences between these returns are variable with some being relatively larger than others. Similarly, Table 3 shows that the levered variances are also considerably larger than the unlevered variances.

Table 1

Mean Returns of Selected Common Stocks Quoted at The NSE

Company Code	Levered Return	Unlevered Return
01	0.02	0.09
02	0.12	0.058
03	0.27	0.126
04	0.26	0.176
05	0.25	0.128
06	0.22	0.139
07	0.16	0.100
08	0.21	0.109
09	0.22	0.189
10	0.40	0.333
11	0.13	0.053
12	0.34	0.214
13	0.39	0.196
14	0.41	0.313
15	0.32	0.203
16	0.18	0.167
17	0.50	0.446
18	0.19	0.147
19	0.38	0.268
20	0.10	0.077
21	0.19	0.099
22	0.16	0.057
23	0.25	0.210
24	0.36	0.261
25	0.19	0.132
26	0.13	0.084
27	0.18	0.173
28	0.18	0.152
29	0.11	0.109
30	0.22	0.109

The computation of mean debt ratios shows, inter alia, that the debt ratios vary widely across companies quoted at the NSE. This is shown in Table 2 below which shows that the Debt/Value ratio among the companies studied varies from 8.12 to 0.08. The mean Debt/Equity ratio is 1.92 with a standard deviation of 1.85.

Table 2

Mean Debt Ratios of Selected Companies Quoted at The NSE

Company Code	Debt/Equity	Debt/Value	Long Term Debt/Value
01	5.26	0.71	0.25
02	1.39	0.56	0.31
03	0.08	0.06	0.01
04	0.88	0.42	0.03
05	2.02	0.64	0.64
06	1.51	0.54	0.02
07	1.24	0.52	0.01
08	3.06	0.65	0.12
09	0.28	0.17	0.10
10	0.36	0.22	0.02
11	4.94	0.74	0.57
12	1.13	0.39	0.23
13	2.43	0.65	0.30
14	0.29	0.20	0.06
15	2.96	0.60	0.26
16	0.20	0.15	0.13
17	0.21	0.15	0.00
18	0.60	0.36	0.23
19	0.89	0.42	0.23
20	8.12	0.65	0.15
21	2.08	0.63	0.00
22	4.55	0.71	0.66
23	2.62	0.38	0.06
24	0.63	0.32	0.01
25	0.74	0.38	0.20
26	1.31	0.43	0.00
27	0.17	0.14	0.02
28	2.59	0.42	0.00
29	2.49	0.51	0.32
30	2.68	0.47	0.24
Mean	1.92	0.44	0.17
Std Deviation	1.85	0.20	0.19
Variance	3.42	0.04	0.36

The Debt/Value ratio varies from 0.74 to 0.06. Its mean is 0.44 with a standard deviation of 0.20. The long Term Debt/Value ratio ranges from 0.66 to 0.00 with a mean of 0.17 and a standard deviation of 0.19. These figures show that the variation of debt ratios among the companies is quite high. In fact they are more or almost as much as their means.

A further finding is that a lot of borrowing done by the companies is on short term in form of short term loans and bank overdrafts. The ratio of long term debt to value is substantially lower than half the Total Debt/Value ratio. The absolute debt ratios are not extremely high. Equity forms more than fifty per cent of the total financing of most firms. The mean Debt/Value ratio is 44%. This means that on average firms are financed 44% by debt and 56% by equity.

4.3 Comparison of Levered and Unlevered Variances

The main thrust of this study is the comparison of the levered and unlevered variables. The former is calculated from the actual returns of a leveraged firm while the latter is calculated from the returns derived assuming the firm was unleveraged. The results are tabulated in Table 3 below.

Table 3

Mean Levered and Unlevered Variances of Selected Companies Quoted at The NSE

Company Code	Levered Variance	Unlevered Variance
01	0.130 (0.36)	0.031 (0.176)
02	0.170 (0.41)	0.058 (0.241)
03	0.130 (0.36)	0.126 (0.355)
04	0.200 (0.45)	0.094 (0.307)
05	0.018 (0.13)	0.018 (0.134)
06	0.080 (0.28)	0.030 (0.173)
07	0.120 (0.35)	0.043 (0.207)
08	0.170 (0.41)	0.052 (0.228)
09	0.060 (0.24)	0.054 (0.232)
10	0.160 (0.40)	0.095 (0.308)
11	0.038 (0.19)	0.038 (0.195)
12	0.550 (0.74)	0.114 (0.338)
13	0.160 (0.40)	0.046 (0.214)
14	0.860 (0.93)	0.419 (0.647)
15	0.390 (0.62)	0.130 (0.361)
16	0.050 (0.22)	0.040 (0.200)
17	0.900 (0.95)	0.733 (0.856)
18	0.060 (0.24)	0.037 (0.192)
19	0.230 (0.48)	0.127 (0.356)
20	0.160 (0.40)	0.050 (0.224)
21	0.090 (0.30)	0.016 (0.126)
22	0.015 (0.12)	0.015 (0.122)
23	0.470 (0.69)	0.454 (0.674)
24	0.340 (0.58)	0.222 (0.471)
25	0.070 (0.26)	0.031 (0.176)
26	0.060 (0.24)	0.029 (0.170)
27	0.070 (0.26)	0.066 (0.257)
28	0.040 (0.20)	0.020 (0.141)
29	0.050 (0.22)	0.021 (0.145)
30	0.090 (0.30)	0.075 (0.274)
Mean	0.198 (0.39)	0.109 (0.283)

Note: **Figures in parentheses is the corresponding standard deviation.**

4.3.1 Mean Variances

As expected, the mean levered variance is larger than the mean unlevered variance. The mean levered variance is about 20%

while the mean unlevered variance is about 11% per cent. The difference of 9% may be attributed to leverage. Hence because of using leverage the variance of the returns to common stocks is magnified by about 100%.

4.3.2 Mann - Whitney U - Test

This test was used to test if there was a difference between the distributions of the two sets of variances. If the two distributions are found to be drawn from different populations, then, we can attribute the significant differences between them to leverage. We would therefore conclude that leverage has an effect on the risk of common stocks.

The Mann - Whitney U - test was selected because it makes no a priori assumptions about the distribution of the population from which the samples are drawn. When the sample size is more than ten, the distribution of the test statistic, U, approximates a normal distribution. The calculated values were:

U = 266,   Var(U) = 4575,   E(U) = 450,

Where,

U = test statistic

Var(U) = Variance of U

E(U) = Expected value of U

The hypothesis tested was:

Ho: Var(Levered Returns) = Var(Unlevered Returns)

HA: Var(Levered Returns) <> Var(Unlevered Returns)

The test statistic Z calculated was:

Z = U - E(U)/ Var(U)

Z = 266 - 450/ 4575

= -2.72

The calculated Z value is very close to -3 and we can therefore reject the null hypothesis and therefore conclude that the two populations are totally different. The distributions of levered and unlevered variances are drawn from different populations. They are therefore different with levered variances being larger than unlevered variances.

4.4 Regression of Levered Variances on Selected Leverage Ratios

To confirm the above findings, it was decided to regress the calculated levered variances on some selected leverage ratios. The leverage ratios selected were: the total debt/equity, the total debt/value and the long term debt/value. What needs to be pointed out here is that the results of the regression should show only the relationship between leverage and risk and not the effects of leverage on risk. There are other factors that probably affect the risk of common stocks which are not taken into account in this study. Nevertheless, the relationship between leverage ratios and leveraged variances is expected to be positive.

The results of the regression are presented in table 4 below. Table 4(a) shows the regression of levered variances on the debt equity ratio. To arrive at these results four outliers were eliminated. The results show a positive relationship between the debt/equity ratio and the variance of common stock returns. The regression equation is given by:

Var = 0.112 + 0.016de

where,

Var = Variance of the levered returns

de = debt/equity ratio.

The slope of the regression is 0.016 and it is significant at a 71 per cent confidence level. The calculated correlation is 20 per cent showing that the debt/equity ratio explains 20 per cent of the variations in levered variances.

A second regression was that of the levered variances on Debt/Value ratio. Table 4(b) shows that theres a positive relationship between the two. The regression line is given as:

Var = 0.07 + 0.18dv

where,

Var = Variance of levered returns

dv = total debt/value ratio.

The slope of the regression is 0.18 and is significant at 88 per cent. The function shows that only about 29% of variations in variance is explained by variations in total debt/value ratio.

Finally, the results of the regression of the levered variances on long term debt/value is presented in table 4(c). This shows a negative relationship between variance and the leverage measure of total debt/value. The actual relationship is given as:

Var = 0.13 - 0.091tdv

where,

Var = Variance of common stock returns

ltdv = long term debt.

The negative slope is significant at only 40% confidence level. The correlation coefficient is also extremely low at only 10% which means that variations in long term debt explains only 10% of variations in the variance of common stock returns.

Table 4(a)

Simple Regression of levret on de

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	0.11196	0.0341654	3.277	2.80911E-3
Slope	0.0159095	0.014573	1.09171	0.284265

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio
Model	.0225230	1	.0225230	1.1918329
Error	.529137	28	.018898	
Total (Corr.)	.551660	29		

Correlation Coefficient = 0.202058
Stnd. Error of Est. = 0.137469

Table ~~4(a)~~ 4(b)

Simple Regression of levret on dv

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	0.070081	0.0485683	1.44294	0.160135
Slope	0.17696	0.110414	1.60269	0.120225

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio
Model	.0463550	1	.0463550	2.5686295
Error	.505305	28	.018047	
Total (Corr.)	.551660	29		

Correlation Coefficient = 0.289876

Stnd. Error of Est. = 0.134338

Do you want to plot the fitted line? (Y/N):

Table 4(c)

Simple Regression of levret on ltdv

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	0.125265	0.0339806	3.68637	9.67697E-4
Slope	0.0925573	0.173233	0.534292	0.597357

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio
Model	.0055676	1	.0055676	.2854680
Error	.546092	28	.019503	
Total (Corr.)	.551660	29		

Correlation Coefficient = 0.100461
Stnd. Error of Est. = 0.139654

4.5 Discussion

Data analysis carried out in this chapter seems to confirm the expected relationship between leverage and common stock risk. The comparison of the levered and unlevered variances shows that the former are larger than the latter. The mean levered variance of 20% is almost twice the mean unlevered variance of 11%. The 9% difference between the two can be attributed wholly to leverage. The difference between levered and unlevered returns is found to be statistically significant. This shows that when a company issues more debt the total risk of the returns of the common stocks as measured by variance increases.

Attempts to confirm this relationship by running regressions of levered variances against measures of debt utilization in form of three debt ratios showed insignificant results. In all cases, the results conformed to the expectations but two were slightly more significant at 71 and 88 per cent for debt/equity and total debt/equity ratios respectively. However, in the case of long term debt/value ratio, the result was substantially insignificant with a significance level of only 40 per cent and correlation coefficient of only 10 per cent.

This result can be attributed to the fact that other factors may affect the risk of common stocks apart from the debt level. Examples here include the economic performance of the country, the weather conditions, Union activity and even political activity in the country. Some of these and other factors may affect the risk of common stocks in opposite directions hence the insignificant results obtained by regression analysis. A further problem is the averaging effects on debt and risk measures.

Using the results obtained above, we can argue that increased leverage is associated with increased variances of common stock returns. This shows that when a company issues more debt, the total risk of the returns to common stocks as measured by variance increases. The implication of this to the investor is that increased leverage calls for increased required rate of return. This may seem to be the case because most of the levered returns are larger than the unlevered returns for the stocks studied. The investors should ask for a premium to compensate them for the increased risk they assume.

CHAPTER FIVE

5.0 SUMMARY AND CONCLUSIONS

5.1 Introduction:

The security risk is an important factor in the assessment of security performance. A rational investor should ordinarily require a higher return for a security similar in all other respects to another except that it carries a higher risk. Any attempt to study factors that affect the risk of a security is an important input to the determination of an optimal investment analysis. This study was based on the presupposition that one such factor is the capital structure of the firm issuing the security.

The objective of the study therefore, as outlined earlier, was to determine the effects of a firm's capital structure on the risk of common stocks.

In order to achieve the stated objective, a research design was developed as outlined in Chapter three based on the literature reviewed in Chapter two. Data analysis and findings were presented in the previous Chapter. In this Chapter, the conclusions made from the results of data analysis are presented. In addition, the limitations of the study are given and recommendations for future research made.

5.2 Conclusions:

Data analysed in this study confirmed the presupposed effects of capital structure on the risk of common stocks quoted at the Nairobi Stock Exchange. The variance of the returns of these common stocks when actually levered were larger than the calculated variances assuming the firms were not leveraged in the first case. A non-parametric test, the Mann-Whitney U-test, showed that the difference between individual levered variances from unlevered variances was statistically significant. This result was partially supported by two of three regressions of the risk measure- variance - on the three measures of capital structure.

This study concludes therefore that there are positive effects of capital structure on the total risk of common stocks at the NSE. Since investors should be expected to b guided by a rational instinct, the same results can be inferred on ant other security market in the World. Thus, as the capital structure of a firm changes by the rise in the debt ratio, the total risk of common stocks increases. The reverse should also be expected. If the debt ratio falls the total risk of the common stocks declines as well.

The implications of this conclusion is based on the risk-return tradeoff. As the risk of a security rises the required return of the security rises also. The two are positively related. Anything that causes the risk of a security to rise or fall affects the security's required return by implication. Since we have found that changes in capital structure of a firm affects the total risk of the firm's common stocks returns then such changes affect the required returns that investors require from these stocks. This means therefore that:

i) Investors in common stocks should ask for a risk premium whenever the company issuing the stocks borrows more relative to the total value of the firm.

ii) Managers of firms should not borrow to finance assets whose returns are not going to be more than the returns to existing assets.

In both cases no clear-cut framework is suggested by this study as to how much risk premium is required for specified changes in capital structure.

5.3 Limitations of the study:

Every study is expected to have certain limitations and weaknesses. Such limitations and weaknesses may be due to difficulties in designing the study or in collection and availability of data. This study is therefore no exception. The major limitations and weaknesses inherent in the study are:

i) The assumption underlying the reliance on MM capital structure theory

The main assumption of concern here is that of the presence of a perfect capital market. Such a market does not probably exist in reality and we have to rely on approximations to it. The results would also be approximations. The only thing known for sure about the NSE is that it is efficient in the weak form. While this is a boost towards meeting the condition of perfect markets it results in this study are qualified to the extent of this assumption.

ii) Insufficient data

The life of the NSE is relatively short. This study would have benefited from more data than what was used. However, it was extremely difficult to obtain organised data beyond the study period. Besides that, the sample size would have shrunk because some of the companies would have been eliminated because they obtained a listing only a few years before the study period.

iii) Lack of market values for debt

As mentioned earlier, most of the borrowings by Kenya companies are private. They usually borrow from banks, and other conventional lenders of funds. There is very little reliance on public debt through sale of debentures. And in the few cases where debentures are issued they are normally not traded at the stock exchange. In fact there are only about five loan stocks apart from government bills and bonds quoted at the NSE.

The unavailability of market prices for debt necessitated the use of book values for debt as approximations for market values. Assuming that interest rates on these debts were close to the market rates, the book value proxies are almost perfect substitutes of market values. But the rates of interest on debt were not available and it is assumed here that they were close enough to the market rates that book debt values were close enough to market debt values.

iv) Inability to control for other factors that affect risk

The regression of the risk measure on debt measures did not control for other factors that affect risk. Such factors could have made the relationship obtained almost meaningless. However, there was no way to control these factors because all these factors were not known.

5.4 Suggestions for Further Research

Studies on capital structure are generally few. Most of them are theoretical and empirical studies are even fewer. In Kenya there has been very little done in this field. Therefore, the capital structure area is a fertile ground for future research. This study was only exploratory and more on this issue should be done. From the results of this study the suggested future research direction should be:

i) Attempt to determine the clear cut framework that would show an investor or a finance Manager how much risk premium on common stocks is expected from specified changes in capital structure.

ii) This study has relied on two approaches to study the leverage-risk issue. In the second approach that relied on regression, other factors that affect the risk of common stocks were not controlled for. Future research should attempt to determine these and control for them in similar studies.

iii) In this study capital structure was related to the total risk of common stocks. An improvement on this would be to relate capital structure to specific types of common stock risks like systematic and unsystematic risk.

When these are done the accumulated knowledge will probably be more convincing to investors and finance Managers. For this study it is satisfying enough to conclude that more debt means more risk and therefore more required return - but not how much more.

APPENDIX I
SAMPLE DATA COLLECTION FORM

NAME OF COMPANY--

Year	Stock Price		Cum	Cum	Rights	Stock	No of Shares		S T	L T	Total	Tax	Total
	Beg	Ending	Div	Bonus	Issue	Split	Beg	Ending	Debt	Debt	Div	Rate	Interest
1976													
1977													
1978													
1979													
1980													
1981													
1982													
1983													
1984													
1985													
1986													
1987													
1988													
1989													
1990													

Key
Div - Dividend   Beg - Beginning
S T - Short Term
L T - Long Term

APPENDIX II

DATA SUMMARY FORM

NAME OF COMPANY--

Year	Year Code	d_t	N_{t-1}	N_t	P_{t-1}	P_t	P_{ft}	I_t	T_t	T_{t-1}	D_{t-1}	L Dt-1	S Dt-1
1976	01												
1977	02												
1978	03												
1979	04												
1980	05												
1981	06												
1982	07												
1983	08												
1984	09												
1985	10												
1986	11												
1987	12												
1988	13												
1989	14												
1990	15												

Key

d_t Ordinary Dividends per share this year

N_t Number of ordinary shares at the end of this year

N_{t-1} Number of ordinary shares at the beg of this year

P_t Price of ordinary shares at the end of this year

P_{t-1} Price of ordinary shares at the beg of this year

L Dt-1 Long Term Debt at the end of last year

P_{ft} Total Preference dividends this year

I_t Total debt interest paid this year

T_t Tax rate on income this year

T_{t-1} Tax rate on last year's income

D_{t-1} Total interest earning debt at the end of last year

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
1	1	0.32	0.198
1	6	-0.07	-0.031
1	7	0.00	0.007
1	8	-0.37	-0.198
1	9	0.00	0.010
1	10	-0.61	-0.304
1	11	0.37	0.312
1	12	-0.14	-0.010
1	13	0.08	0.021
1	14	0.62	0.089
MEAN RETURN		0.02	0.009
VARIANCE OF RETURNS		0.13	0.031

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
2	1	-0.06	-0.039
2	2	0.62	0.367
2	3	-0.24	-0.162
2	4	0.90	0.583
2	5	0.20	0.158
2	6	0.33	0.182
2	7	0.06	0.043
2	8	-0.31	-0.167
2	9	-0.19	-0.080
2	10	0.08	0.037
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
2	13	-0.21	-0.127

5	5	0.24	0.191
5	6	0.44	0.361
5	7	-0.08	-0.069
5	8	-0.14	-0.114
5	9	0.17	0.137
5	10	0.00	0.006
5	11	-0.13	-0.066
5	12	0.96	0.417
5	13	0.38	0.236
5	14	0.49	0.294
5	15	-0.28	-0.187
MEAN RETURN		0.26	0.176
VARIANCE OF RETURNS		0.20	0.094

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
6	7	0.06	0.028
6	8	0.00	0.004
6	9	0.23	0.090
6	10	0.06	0.030
6	11	0.18	0.085
6	12	0.47	0.210
6	13	0.09	0.061
6	14	0.40	0.213
6	15	0.73	0.426
MEAN RETURN		0.25	0.128
VARIANCE OF RETURNS		0.06	0.018

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
7	1	0.56	0.273

7	4	0.02	0.015
7	5	-0.04	-0.029
7	6	-0.08	-0.062
7	7	-0.01	-0.006
7	8	-0.15	-0.058
7	9	0.20	0.071
7	10	0.21	0.176
7	11	0.18	0.143
7	12	0.62	0.288
7	13	0.36	0.341
7	14	0.06	0.040
7	15	0.04	0.022
MEAN RETURN		0.22	0.138
VARIANCE OF RETURNS		0.08	0.030

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
8	1	-0.14	-0.111
8	7	-0.42	-0.217
8	8	0.00	0.001
8	9	0.54	0.247
8	10	0.42	0.259
8	11	0.46	0.285
8	12	0.60	0.439
8	13	-0.06	-0.040
8	14	0.22	0.153
8	15	-0.03	-0.016
MEAN RETURN		0.16	0.103
VARIANCE OF RETURNS		0.12	0.042

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN

9	1	-0.24	-0.195
9	2	0.17	0.044
9	3	0.12	0.107
9	4	0.14	0.119
9	5	-0.29	-0.121
9	6	0.41	0.128
9	7	0.09	0.044
9	8	-0.24	-0.071
9	9	0.00	0.006
9	10	0.15	0.048
9	11	0.00	0.005
9	12	0.38	0.089
9	13	0.25	0.091
9	14	1.18	0.525
9	15	0.97	0.693
MEAN RETURN		0.21	0.101
VARIANCE OF RETURNS		0.17	0.052

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
10	1	0.62	0.609
10	2	0.14	0.136
10	3	0.45	0.448
10	4	0.08	0.076
10	5	0.09	0.083
10	6	-0.15	-0.140
10	7	-0.32	-0.316
10	8	0.50	0.440
10	9	0.17	0.129
[illegible]	[illegible]	[illegible]	[illegible]
10	11	0.17	0.136

10	12	0.30	0.214
10	13	0.35	0.304
10	14	0.39	0.373
10	15	0.10	0.103
MEAN RETURN		0.22	0.189
VARIANCE OF RETURNS		0.06	0.054

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
11	1	-0.32	-0.253
11	2	-0.16	-0.107
11	3	0.98	0.586
11	7	0.28	0.227
11	8	0.15	0.121
11	9	0.96	0.713
11	10	0.45	0.414
11	11	0.54	0.507
11	12	0.24	0.212
11	13	0.78	0.765
11	14	0.41	0.386
11	15	0.44	0.421
MEAN RETURN		0.40	0.333
VARIANCE OF RETURNS		0.16	0.095

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
12	1	-0.31	-0.171
12	2	0.92	0.637
12	[illegible]	0.2[illegible]	0.20[illegible]
12	[illegible]	-0.0[illegible]	-0.0[illegible]
12	5	-0.11	-0.046

12	6	-0.18	-0.063
12	7	-0.31	-0.079
12	8	-0.34	-0.062
12	9	0.14	0.022
12	10	0.13	0.023
12	11	0.59	0.096
12	12	0.74	0.172
12	13	0.22	0.080
12	14	-0.36	-0.133
12	15	0.40	0.114
MEAN RETURN		0.13	0.053
VARIANCE OF RETURNS		0.16	0.038

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
13	1	-0.03	-0.023
13	2	0.57	0.512
13	3	-0.45	-0.397
13	4	0.05	0.038
13	5	0.53	0.457
13	6	0.72	0.663
13	7	0.64	0.621
13	8	0.68	0.505
13	9	0.27	0.210
13	10	0.14	0.121
13	11	0.34	0.296
13	12	0.01	0.014
13	13	-0.36	-0.166
13	14	-0.61	-0.223
13	15	2.55	0.589
MEAN RETURN		0.34	0.214
VARIANCE OF RETURNS		0.55	0.114

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
14	1	0.05	0.024
14	2	0.72	0.236
14	3	1.31	0.763
14	4	0.23	0.124
14	5	0.09	0.079
14	6	0.53	0.260
14	7	0.17	0.110
14	8	-0.28	-0.129
14	9	0.03	0.017
14	10	0.06	0.029
14	11	0.80	0.280
14	12	0.26	0.176
14	13	0.74	0.483
14	14	0.63	0.248
14	15	0.42	0.243
MEAN RETURN		0.39	0.196
VARIANCE OF RETURNS		0.16	0.046

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
15	1	0.02	0.016
15	2	3.55	2.428
15	3	0.00	0.001
15	4	-0.21	-0.196
15	5	0.20	0.179
[illegible]	[illegible]	-0.0[illegible]	-0.0[illegible]
[illegible]	[illegible]	0.0[illegible]	0.0[illegible]
15	8	0.41	0.322

15	9	1.03	0.897
15	10	0.45	0.432
15	11	0.13	0.130
15	12	0.10	0.088
15	13	0.35	0.325
15	14	-0.27	-0.245
15	15	0.31	0.269
MEAN RETURN		0.41	0.312
VARIANCE OF RETURNS		0.86	0.419

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
16	1	0.16	0.175
16	2	0.59	0.555
16	3	-0.32	-0.304
16	4	0.71	0.530
16	5	0.38	0.255
16	6	0.00	0.026
16	7	1.76	1.154
16	8	0.00	0.020
16	9	0.69	0.262
16	10	0.00	0.014
16	11	-0.26	-0.058
16	12	-0.22	-0.038
16	13	-0.28	-0.042
16	14	1.24	0.293
MEAN RETURN		0.32	0.203
VARIANCE OF RETURNS		0.39	0.130

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN

17	1	0.03	0.026
17	2	0.45	0.323
17	3	0.07	0.070
17	4	-0.22	-0.214
17	5	0.19	0.168
17	6	0.12	0.110
17	7	0.08	0.072
17	8	-0.07	-0.067
17	10	0.36	0.349
17	11	0.34	0.333
17	12	0.39	0.381
17	13	0.50	0.498
17	14	0.02	0.017
17	15	0.29	0.269
MEAN RETURN		0.18	0.167
VARIANCE OF RETURNS		0.05	0.040

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
18	1	-0.07	-0.069
18	2	2.89	2.889
18	3	0.12	0.118
18	4	-0.13	-0.132
18	5	-0.07	-0.063
18	6	-0.53	-0.443
18	7	0.44	0.301
18	8	2.44	1.827
18	9	0.72	0.633
18	10	0.70	0.662
18	11	0.40	0.400
18	12	0.44	0.419
18	13	0.27	0.255

18	14	0.03	0.034
18	15	-0.14	-0.127
MEAN RETURN		0.50	0.446
VARIANCE OF RETURNS		0.90	0.733

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS.

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
19	1	-0.20	-0.162
19	2	0.60	0.473
19	3	0.51	0.457
19	4	-0.06	-0.050
19	5	0.25	0.201
19	7	0.03	0.020
19	8	0.08	0.057
19	9	0.16	0.108
19	10	0.22	0.158
19	11	0.45	0.337
19	12	0.38	0.320
19	13	0.23	0.168
19	14	0.01	0.011
19	15	-0.05	-0.037
MEAN RETURN		0.19	0.147
VARIANCE OF RETURNS		0.06	0.037

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
20	1	-0.06	-0.036
20	2	1.16	0.703
20	3	0.35	0.266
20	[illegible]	[illegible]	[illegible]
20	5	0.58	0.375

20	6	0.30	0.270
20	7	-0.11	-0.075
20	8	-0.14	-0.109
20	9	0.17	0.103
20	10	0.98	0.709
20	11	0.58	0.366
20	12	1.37	1.130
20	13	0.50	0.287
20	14	0.02	0.016
20	15	0.27	0.137
MEAN RETURN		0.38	0.268
VARIANCE OF RETURNS		0.23	0.125

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
21	1	-0.02	-0.019
21	2	0.14	0.135
21	3	0.82	0.824
21	4	0.04	0.035
21	5	0.15	0.160
21	6	-0.71	-0.158
21	7	0.00	0.009
21	8	0.16	0.051
21	9	0.04	0.029
21	10	0.32	0.050
21	11	0.30	0.021
21	12	0.89	0.152
21	13	-0.25	-0.069
21	14	-0.30	-0.054
21	15	-0.08	-0.014
MEAN RETURN		0.10	0.077
VARIANCE OF RETURNS		0.16	0.050

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
22	4	0.22	0.097
22	5	0.07	0.050
22	6	0.09	0.071
22	7	0.53	0.216
22	8	0.08	0.058
22	9	-0.23	-0.084
22	10	0.80	0.355
22	11	0.16	0.090
22	12	-0.18	-0.080
22	13	0.19	0.113
22	14	0.53	0.259
22	15	0.07	0.046
MEAN RETURN		0.19	0.099
VARIANCE OF RETURNS		0.09	0.016

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
23	1	-0.23	-0.134
23	2	0.69	0.399
23	3	0.22	0.168
23	4	0.09	0.075
23	5	-0.18	-0.126
23	6	0.12	0.095
23	7	-0.07	-0.023
23	8	0.02	0.006
23	9	0.28	0.050
23	[illegible]	0.2[illegible]	0.05[illegible]
23	11	0.23	0.049

23	12	0.46	0.100
23	13	0.19	0.048
23	14	0.25	0.064
23	15	0.11	0.035
MEAN RETURN		0.16	0.057
VARIANCE OF RETURNS		0.05	0.015

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
24	1	0.15	0.146
24	2	-0.13	-0.126
24	3	0.35	0.354
24	4	0.10	0.105
24	5	0.27	0.271
24	6	-0.23	-0.230
24	7	-0.22	-0.214
24	8	0.09	0.089
24	9	2.57	2.572
24	10	0.03	0.026
24	11	-0.45	-0.141
24	12	0.35	0.079
24	13	0.22	0.055
24	14	0.46	0.115
24	15	0.15	0.042
MEAN RETURN		0.25	0.210
VARIANCE OF RETURNS		0.47	0.454

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
25	1	0.24	0.169
25	2	0.60	0.429

25	3	0.57	0.553
25	4	-0.16	-0.147
25	5	-0.41	-0.375
25	6	-0.32	-0.280
25	7	-0.31	-0.247
25	8	0.13	0.097
25	9	0.20	0.108
25	10	1.09	0.569
25	11	0.59	0.334
25	12	0.45	0.375
25	13	1.84	1.539
25	14	0.53	0.509
25	15	0.31	0.286
MEAN RETURN		0.36	0.261
VARIANCE OF RETURNS		0.34	0.222

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
26	1	0.10	0.074
26	2	0.42	0.324
26	3	0.08	0.068
26	4	-0.09	-0.077
26	5	0.20	0.181
26	6	-0.12	-0.105
26	7	0.05	0.041
26	8	-0.10	-0.057
26	9	0.36	0.160
26	10	0.37	0.292
26	11	0.52	0.361
26	12	0.78	0.468
26	14	[illegible]	0.125
26	15	0.00	0.003

MEAN RETURN		0.19	0.132
VARIANCE OF RETURNS		0.07	0.031

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
27	1	-0.07	-0.062
27	7	0.00	0.002
27	8	0.15	0.111
27	9	0.05	0.041
27	10	0.05	0.044
27	12	-0.16	-0.118
27	13	0.63	0.474
27	14	0.15	0.098
27	15	0.38	0.162
MEAN RETURN		0.13	0.084
VARIANCE OF RETURNS		0.06	0.029

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
28	1	-0.02	-0.017
28	2	0.55	0.557
28	3	-0.04	-0.035
28	4	0.27	0.246
28	5	0.59	0.526
28	6	0.00	0.002
28	7	-0.14	-0.120
28	8	0.36	0.306
28	9	0.20	0.179
28	10	-0.03	-0.020
28	11	0.15	0.140
28	12	0.41	0.396

28	13	0.64	0.625
28	14	-0.08	-0.072
28	15	-0.13	-0.114
MEAN RETURN		0.18	0.173
VARIANCE OF RETURNS		0.07	0.066

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
29	1	0.51	0.466
29	2	0.00	0.002
29	3	0.23	0.207
29	4	0.58	0.399
29	5	0.19	0.153
29	6	0.04	0.029
29	7	0.00	0.002
29	8	0.22	0.179
29	9	0.18	0.153
29	10	0.21	0.129
29	11	0.07	0.050
29	12	0.38	0.282
29	13	0.23	0.173
29	14	0.14	0.071
29	15	-0.22	-0.015
MEAN RETURN		0.18	0.152
VARIANCE OF RETURNS		0.04	0.020

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
30	1	-0.03	-0.028
30	2	0.39	0.371
30	3	0.15	0.129

30	4	-0.07	-0.047
30	5	0.15	0.125
30	6	0.29	0.258
30	7	0.40	0.363
30	8	0.15	0.067
30	9	0.33	0.158
30	10	0.23	0.142
30	11	0.14	0.092
30	12	0.00	0.007
30	13	-0.28	-0.056
30	14	-0.28	-0.046
MEAN RETURN		0.11	0.109
VARIANCE OF RETURNS		0.05	0.021

APPENDIX III CONT'D

COMPUTATION OF LEVERED AND UNLEVERED RETURNS

CO. CODE	YR CODE	LEV RETURN	UNLEV RETURN
31	1	0.29	0.239
31	2	1.22	1.100
31	3	0.34	0.316
31	4	-0.01	-0.013
31	5	0.10	0.100
31	6	0.19	0.194
31	7	0.12	0.095
31	8	0.17	0.134
31	9	0.16	0.062
31	10	-0.02	-0.008
31	11	0.16	0.067
31	12	0.31	0.150
31	13	0.20	0.048
31	14	0.11	0.030
31	15	-0.06	-0.006

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
1	1	0.99	0.50	0.21
1	6	1.56	0.61	0.00
1	7	1.43	0.59	0.00
1	8	2.43	0.71	0.00
1	9	1.70	0.63	0.00
1	10	0.84	0.46	0.00
1	11	11.87	0.92	0.58
1	12	11.42	0.92	0.66
1	13	11.39	0.92	0.61
1	14	9.03	0.90	0.42
MEAN DEBT RATIOS		5.26	0.71	0.25

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
2	1	1.45	0.59	0.28
2	2	0.82	0.45	0.25
2	3	1.01	0.50	0.20
2	4	0.70	0.41	0.28
2	5	0.83	0.45	0.25
2	6	1.10	0.52	0.23
2	7	1.22	0.55	0.35
2	8	2.42	0.71	0.34
2	9	2.36	0.70	0.34
2	10	2.25	0.69	0.32
2	11	2.09	0.68	0.50
2	12	1.11	0.53	0.38
2	13	1.15	0.54	0.34
2	14	1.39	0.58	0.36
2	15	1.01	0.50	0.17
MEAN DEBT RATIOS		1.39	0.56	0.31

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
4	1	0.00	0.00	0.00
4	2	0.00	0.00	0.00
4	3	0.08	0.07	0.00
4	4	0.16	0.13	0.00
4	5	0.22	0.18	0.00
4	6	0.34	0.25	0.05
4	7	0.23	0.18	0.04
4	8	0.00	0.00	0.00
4	9	0.00	0.00	0.00
4	10	0.06	0.05	0.00
4	11	0.00	0.00	0.00
4	12	0.00	0.00	0.00
4	13	0.00	0.00	0.00
4	14	0.08	0.07	0.00
4	15	0.00	0.00	0.00
MEAN DEBT RATIOS		0.08	0.06	0.01

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
5	1	0.59	0.37	0.02
5	2	0.10	0.09	0.03
5	3	0.31	0.23	0.05

5	4	0.49	0.33	0.12
5	5	0.73	0.42	0.12
5	6	0.18	0.16	0.02
5	7	0.38	0.28	0.02
5	8	0.54	0.35	0.00
5	9	1.55	0.61	0.00
5	10	1.64	0.62	0.00
5	11	2.09	0.68	0.03
5	12	1.13	0.53	0.02
5	13	1.25	0.56	0.00
5	14	1.08	0.52	0.00
5	15	1.11	0.53	0.00
MEAN DEBT RATIOS		0.88	0.42	0.03

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
6	7	2.90	0.74	0.74
6	8	3.59	0.78	0.78
6	9	2.47	0.71	0.71
6	10	2.32	0.70	0.70
6	11	2.24	0.69	0.69
6	12	1.72	0.63	0.63
6	13	0.82	0.45	0.45
6	14	1.32	0.57	0.57
6	15	0.82	0.45	0.45
MEAN DEBT RATIOS		2.02	0.64	0.64

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
7	1	1.21	0.55	0.02
7	2	1.26	0.56	0.01
7	3	1.02	0.50	0.00
7	4	0.61	0.38	0.00
7	5	0.52	0.34	0.00
7	6	0.78	0.44	0.00
7	7	2.83	0.74	0.08
7	8	3.45	0.78	0.00
7	9	1.97	0.66	0.14
7	10	2.27	0.69	0.04
7	11	2.37	0.70	0.00
7	12	0.11	0.10	0.00
7	13	0.86	0.46	0.00
7	14	1.74	0.63	0.00
7	15	1.71	0.63	0.00
MEAN DEBT RATIOS		1.51	0.54	0.02

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
8	[illegible]	0.74	0.42	0.00
8	[illegible]	2.86	0.74	0.05
8	8	2.23	0.69	0.02
8	9	1.18	0.54	0.00
8	10	1.17	0.54	0.00
8	11	0.58	0.37	0.00
8	12	0.52	0.34	0.00
8	13	0.90	0.47	0.00
8	14	0.96	0.49	0.00
8	15	1.24	0.55	0.00
MEAN DEBT RATIOS		1.24	0.52	0.01

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
9	1	5.20	0.84	0.00
9	2	0.32	0.24	0.00
9	3	0.43	0.30	0.00
9	4	2.31	0.70	0.49
9	5	4.13	0.81	0.53
9	6	2.62	0.72	0.49
9	7	3.94	0.80	0.17
9	8	5.82	0.85	0.00
9	9	4.85	0.83	0.00
9	10	5.40	0.84	0.00
9	11	4.72	0.83	0.00
9	12	3.04	0.75	0.00
9	13	2.29	0.70	0.00
9	14	0.79	0.44	0.02
9	15	0.04	0.04	0.04
MEAN DEBT RATIOS		3.06	0.65	0.12

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
10	1	0.04	0.04	0.00
10	2	0.02	0.02	0.00
10	3	0.00	0.00	0.00
10	4	0.04	0.04	0.00
10	5	0.08	0.07	0.00
10	6	0.00	0.00	0.00
10	7	0.24	0.19	0.00
10	8	0.64	0.39	0.32
10	9	0.99	0.50	0.39
10	10	1.14	0.53	0.36
10	11	0.72	0.42	0.25
10	12	0.27	0.21	0.07
10	13	0.06	0.06	0.06
10	14	0.00	0.00	0.00
10	15	0.00	0.00	0.00
MEAN DEBT RATIOS		0.28	0.17	0.10

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
11	1	0.84	0.46	0.00
11	2	1.28	0.56	0.16
11	3	0.32	0.25	0.05
11	7	0.38	0.28	0.00
11	8	0.64	0.39	0.00
11	9	0.14	0.13	0.00
11	10	0.13	0.12	0.00
11	11	0.25	0.20	0.00
11	12	0.03	0.03	0.00
11	13	0.09	0.09	0.00
11	14	0.06	0.06	0.00
11	15	0.18	0.15	0.00
MEAN DEBT RATIOS		0.36	0.22	0.02

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
12	1	0.82	0.45	0.36
12	2	0.42	0.30	0.26

12	3	0.63	0.39	[illegible]
12	4	2.05	0.67	0.59
12	5	3.21	0.76	0.55
12	6	4.96	0.83	0.66
12	7	7.41	0.88	0.79
12	8	12.88	0.93	0.74
12	9	10.29	0.91	0.71
12	10	10.00	0.91	0.65
12	11	5.94	0.86	0.61
12	12	3.37	0.77	0.56
12	13	3.00	0.75	0.51
12	14	4.60	0.82	0.67
12	15	4.51	0.82	0.52
MEAN DEBT RATIOS		4.94	0.74	0.57

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
13	1	0.23	0.19	0.13
13	2	0.22	0.18	0.08
13	3	0.72	0.42	0.17
13	4	0.31	0.23	0.23
13	5	0.20	0.17	0.17
13	6	0.10	0.09	0.09
13	7	0.84	0.46	0.36
13	8	0.39	0.28	0.21
13	9	0.36	0.27	0.17
13	10	0.27	0.21	0.11
13	11	0.85	0.46	0.30
13	12	2.02	0.67	0.46
13	13	3.04	0.75	0.45
13	14	6.11	0.86	0.42
13	15	1.25	0.56	0.16
MEAN DEBT RATIOS		1.13	0.39	0.23

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
14	1	3.85	0.79	0.43
14	2	4.52	0.82	0.61
14	3	0.77	0.44	0.29
14	4	0.41	0.29	0.21
14	5	1.60	0.61	0.10
14	6	1.16	0.54	0.14
14	7	1.67	0.63	0.35
14	8	3.44	0.77	0.24
14	9	3.28	0.77	0.22
14	10	3.51	0.78	0.18
14	11	1.22	0.55	0.23
14	12	0.99	0.50	0.17
14	13	2.94	0.75	0.32
14	14	5.45	0.84	0.65
14	15	1.60	0.62	0.40
MEAN DEBT RATIOS		2.43	0.65	0.30

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
15	1	0.87	0.46	0.20
15	2	0.02	0.02	0.02
15	3	0.13	0.11	0.05
15	4	0.24	0.19	0.14
	[illegible]	0.39	0.28	0.10

15	6	0.45	0.31	0.10
15	7	0.49	0.33	0.04
15	8	0.25	0.20	0.01
15	9	0.12	0.10	0.00
15	10	0.04	0.04	0.00
15	11	0.14	0.13	0.00
15	12	0.15	0.13	0.00
15	13	0.18	0.15	0.02
15	14	0.31	0.24	0.01
15	15	0.54	0.35	0.15
MEAN DEBT RATIOS		0.29	0.20	0.06

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
16	1	0.21	0.18	0.00
16	2	0.00	0.00	0.00
16	3	0.77	0.43	0.00
16	4	1.18	0.54	0.00
16	5	1.01	0.50	0.00
16	6	0.96	0.49	0.00
16	7	1.25	0.55	0.00
16	8	3.15	0.76	0.57
16	9	1.68	0.63	0.47
16	10	5.11	0.84	0.58
16	11	6.30	0.86	0.51
16	12	7.44	0.88	0.54
16	13	7.46	0.88	0.50
16	14	4.92	0.83	0.49
MEAN DEBT RATIOS		2.96	0.60	0.26

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
17	1	0.72	0.42	0.42
17	2	0.44	0.30	0.30
17	3	0.07	0.06	0.06
17	4	0.28	0.22	0.22
17	5	0.24	0.19	0.16
17	6	0.23	0.18	0.16
17	7	0.10	0.09	0.09
17	8	0.16	0.14	0.14
17	10	0.08	0.07	0.05
17	11	0.03	0.02	0.02
17	12	0.01	0.01	0.01
17	13	0.10	0.09	0.04
17	14	0.28	0.22	0.11
17	15	0.05	0.05	0.03
MEAN DEBT RATIOS		0.20	0.15	0.13

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
18	1	0.00	0.00	0.00
18	2	0.00	0.00	0.00
18	3	0.00	0.00	0.00
18	4	0.27	0.21	0.00
18	5	0.41	0.29	0.00
18	6	0.72	0.42	0.00
18	7	0.61	0.38	0.00
18	8	0.28	0.22	0.00
18	9	0.10	0.09	0.00
18	10	0.00	0.00	0.00

18	11	0.08	0.08	0.00
18	12	0.14	0.13	0.00
18	13	0.01	0.01	0.00
18	14	0.16	0.14	0.00
18	15	0.41	0.29	0.00
MEAN DEBT RATIOS		0.21	0.15	0.00

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
19	1	0.59	0.37	0.30
19	2	0.25	0.20	0.20
19	3	0.30	0.23	0.20
19	4	0.47	0.32	0.27
19	5	0.37	0.27	0.25
19	7	0.78	0.44	0.31
19	8	0.88	0.47	0.28
19	9	0.76	0.43	0.29
19	10	0.63	0.38	0.22
19	11	0.42	0.30	0.16
19	12	0.69	0.41	0.24
19	13	0.52	0.34	0.14
19	14	0.65	0.39	0.21
19	15	1.09	0.52	0.22
MEAN DEBT RATIOS		0.60	0.36	0.23

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
20	1	1.12	0.53	0.49
20	2	0.56	0.36	0.36
20	3	0.71	0.41	0.27
20	4	0.61	0.38	0.38
20	5	0.25	0.20	0.08
20	6	0.00	0.00	0.00
20	7	0.51	0.34	0.22
20	8	1.44	0.59	0.23
20	9	0.55	0.36	0.18
20	10	0.93	0.48	0.10
20	11	0.35	0.26	0.07
20	12	1.37	0.58	0.44
20	13	1.35	0.57	0.26
20	14	1.87	0.65	0.25
20	15	1.71	0.63	0.15
MEAN DEBT RATIOS		0.89	0.42	0.23

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
21	1	0.01	0.01	0.00
21	2	0.00	0.00	0.00
21	3	0.03	0.03	0.00
21	4	0.07	0.06	0.00
21	5	6.69	0.87	0.00
21	6	7.35	0.88	0.00
21	7	11.14	0.92	0.90
21	8	4.16	0.81	0.73
21	9	12.07	0.92	0.30
21	10	32.69	0.97	0.10
21	11	21.08	0.95	0.14
21	12	4.44	0.82	0.03
21	13	7.49	0.88	0.01
21	14	5.17	0.84	0.01

21	15	4.56	0.82	0.00
MEAN DEBT RATIOS		8.12	0.65	0.15

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
22	4	0.00	0.00	0.00
22	5	2.22	0.69	0.00
22	6	3.28	0.77	0.00
22	7	2.30	0.70	0.00
22	8	2.06	0.67	0.00
22	9	2.66	0.73	0.00
22	10	2.30	0.70	0.00
22	11	1.69	0.63	0.00
22	12	1.97	0.66	0.00
22	13	2.24	0.69	0.00
22	14	1.99	0.67	0.00
22	15	2.27	0.69	0.00
MEAN DEBT RATIOS		2.08	0.63	0.00

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
23	1	1.44	0.59	0.44
23	2	0.73	0.42	0.39
23	3	0.54	0.35	0.35
23	4	0.56	0.36	0.36
23	5	0.81	0.45	0.45
23	6	2.30	0.70	0.70
23	7	5.64	0.85	0.84
23	8	9.34	0.90	0.88
23	9	8.83	0.90	0.88
23	10	7.69	0.88	0.86
23	11	6.81	0.87	0.82
23	12	5.91	0.86	0.79
23	13	5.68	0.85	0.74
23	14	4.75	0.83	0.75
23	15	7.18	0.88	0.62
MEAN DEBT RATIOS		4.55	0.71	0.66

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
24	1	0.02	0.02	0.02
24	2	0.02	0.02	0.02
24	3	0.01	0.01	0.01
24	4	0.00	0.00	0.00
24	5	0.00	0.00	0.00
24	6	0.01	0.01	0.00
24	7	0.00	0.00	0.00
24	8	0.00	0.00	0.00
24	9	0.81	0.45	0.00
24	10	3.69	0.79	0.40
24	11	8.51	0.89	0.25
24	12	6.60	0.87	0.11
24	13	5.95	0.86	0.04
24	14	6.48	0.87	0.00
24	15	7.27	0.88	0.00
MEAN DEBT RATIOS		2.62	0.38	0.06

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE

25	1	0.77	0.44	0.02
25	2	0.08	0.07	0.02
25	3	0.09	0.09	0.01
25	4	0.17	0.15	0.01
25	5	0.24	0.19	0.00
25	6	0.37	0.27	0.00
25	7	1.30	0.57	0.00
25	8	1.70	0.63	0.00
25	9	1.87	0.65	0.00
25	10	1.27	0.56	0.00
25	11	0.37	0.27	0.00
25	12	0.36	0.26	0.03
25	13	0.08	0.07	0.01
25	14	0.15	0.13	0.01
25	15	0.64	0.39	0.00
MEAN DEBT RATIOS		0.63	0.32	0.01

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
26	1	0.55	0.36	0.34
26	2	0.40	0.29	0.24
26	3	0.38	0.28	0.15
26	4	0.17	0.14	0.12
26	5	0.38	0.27	0.01
26	6	0.69	0.41	0.09
26	7	1.12	0.53	0.45
26	8	2.37	0.70	0.37
26	9	0.62	0.38	0.38
26	10	0.99	0.50	0.15
26	11	1.13	0.53	0.17
26	12	0.69	0.41	0.15
26	14	0.25	0.20	0.03
26	15	0.64	0.39	0.09
MEAN DEBT RATIOS		0.74	0.38	0.20

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
27	1	0.06	0.05	0.00
27	7	0.65	0.39	0.00
27	8	0.44	0.31	0.00
27	9	0.35	0.26	0.00
27	10	0.64	0.39	0.00
27	12	0.62	0.38	0.00
27	13	0.89	0.47	0.00
27	14	2.82	0.74	0.00
27	15	5.36	0.84	0.00
MEAN DEBT RATIOS		1.31	0.43	0.00

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
28	1	0.00	[illegible]	0.00
28	2	0.12	[illegible]	0.00
28	3	0.15	[illegible]	0.00
28	4	0.27	[illegible]	0.00
28	5	[illegible]	[illegible]	0.00
28	6	[illegible]	0.24	0.11
28	7	0.30	0.23	0.12
28	8	0.26	0.21	0.00
28	9	0.18	0.15	0.00

28	10	0.15	0.13	0.00
28	11	0.09	0.08	0.00
28	12	0.06	0.06	0.00
28	13	0.09	0.08	0.00
28	14	0.22	0.18	0.00
28	15	0.21	0.18	0.00
MEAN DEBT RATIOS		0.17	0.14	0.02

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
29	1	0.40	0.29	0.00
29	2	0.17	0.14	0.00
29	3	0.57	0.36	0.00
29	4	0.42	0.30	0.00
29	5	0.75	0.43	0.00
29	6	0.19	0.16	0.00
29	7	0.39	0.28	0.00
29	8	0.03	0.03	0.00
29	9	1.07	0.52	0.00
29	10	0.55	0.35	0.00
29	11	0.65	0.39	0.00
29	12	0.60	0.37	0.00
29	13	2.81	0.74	0.00
29	14	16.31	0.94	0.00
29	15	13.95	0.93	0.01
MEAN DEBT RATIOS		2.59	0.42	0.00

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE
30	1	0.12	0.11	0.00
30	2	0.27	0.21	0.00
30	3	0.88	0.47	0.19
30	4	0.36	0.27	0.27
30	5	0.28	0.22	0.22
30	6	0.17	0.14	0.14
30	7	2.31	0.70	0.55
30	8	2.00	0.67	0.49
30	9	1.13	0.53	0.35
30	10	0.92	0.48	0.24
30	11	2.75	0.73	0.48
30	12	6.69	0.87	0.59
30	13	7.82	0.89	0.55
30	14	9.21	0.90	0.45
MEAN DEBT RATIOS		2.49	0.51	0.32

APPENDIX IV CONT'D

COMPUTATION OF MEAN DEBT RATIOS

CO CODE	YR CODE	DEBT/EQUITY	DEBT/VALUE	L-TERM DEBT/VALUE

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