CAPITAL STRUCTURE

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1 Problem Statement

Management believes that it would be beneficial to increase its current gearing levels. If this strategy were to be implemented the company would then be financed to a greater extent by cheaper borrowed funds, resulting in the weighted average cost of capital (WACC) to fall.

The discounting of future cash flows at this lower WACC produces a higher present value and so shareholder wealth is enhanced.

I, the Financial Director and shareholder, am considering two long-term loans, one local, and the other from abroad.

The company currently has about 6% financial gearing.

2 Hypothesis

H_0: The introduction of long-term debt into the *Capital Structure* will not lead to a reduction in the weighted average cost of capital.

H_1: The introduction of long-term debt into the *Capital Structure* will lead to a reduction in the weighted average cost of capital.

3 Literature Review

3.1.0 Introduction

Someone has to decide what is the appropriate level of borrowing for a firm given its equity base. To assist this decision it would be useful to know if it is theoretically possible to increase shareholders wealth by changing the gearing (debt - equity ratio) level. That is, if future cash flows generated by the business are assumed to be constant, can managers simply by altering the proportion of debt in the total capital structure increase shareholder value? If this is possible then surely managers have a duty to move the firm towards the optimal debt proportion?

The traditional view was that it would be beneficial to increase gearing from a low (or zero) level because the firm would then be financed to a greater extent by cheaper borrowed funds (tax shield impact), therefore the weighted average cost of capital (WACC) would fall. The discounting of future cash flows at this lower WACC produces a higher present value and so shareholder wealth is enhanced. However, as debt levels rise the firm's earnings attributable to shareholders become increasingly volatile due to the requirement to pay large amounts of interest prior to dividends.

Eventually the burden of a large annual interest bill can lead to become financially distressed and, in extreme circumstances, liquidation. So the traditional answer to the question of whether there was an optimum gearing level was 'yes'. If the gearing level is too low, shareholders value opportunities are forgone by not substituting 'cheap' debt for equity. If it is too high the additional risk leads to a loss in shareholder value through a higher discount rate being applied to the future cash flows attributable to ordinary shareholders. This is because of the higher risk and, at very high gearing, the penalty of complete business failure becomes much more of a possibility.

Then, in the late 1950s a theory was developed by Franco Modigliani and Merton Miller (1958) which said that it did not matter whether the firm had a gearing level of 90% debt or 2% debt - the overall value of the firm is constant and shareholder wealth cannot be enhanced by altering the debt - equity ratio. This conclusion was based on some major assumptions and required the firm to operate in a perfect world of perfect knowledge, a world in which individual shareholders can borrow and lend at the same rate as giant corporations, and in which taxation and cost of financial distress do not exist.

Later Modigliani and Miller modified the no-taxation assumption. This led to a different conclusion: the best gearing level for a firm interested in shareholder wealth maximization is, generally, as high as possible. This was an astonishing result; it means that a company financed by £99m of debt and £1m of equity serves its shareholders better than one funded by £50m of debt and £50m of equity. Within academic circles thousands of hours of thinking and research has been spent over the past four decades building on the Modigliani and Miller foundations, and millions of hours of undergraduates' and postgraduates ' precious time has been spent learning the intricacies of the algebraic proof lying behind Modigliani and Miller conclusions. Going through this process has its virtues: the models provide a systematic framework for evaluating the capital structure question and can lead to some rigorous thought within the confines of the models.

3.1.1 The Modigliani - Miller Propositions

One of the pillars on which the field of finance rests are the Modigliani - Miller proposition on capital structure. Here, the tensions between the micro normative and the macro normative approaches were evident from the outset, as is clear from the very title of the first Modigliani - Miller paper, "The Cost of Capital, Corporate Finance and the Theory of Investment."

The theme of that paper, and indeed of the whole field of corporate finance at the time, is capital budgeting.

The micro normative wing was concerned with finding the "cost of capital" in the sense of the optimal cutoff rate for investment when the firm can finance the project either with debt of equity of some combination of both. The macro normative or economics wing sought to express the aggregate demand for investment by corporations as a function of the cost of capital that firms are actually using as their optimal cutoffs, rather than just the rate of interest on long-term government bonds.

The Modigliani - Miller analysis provided answers, but ones that left both wings of the profession dissatisfied.

At the macro normative level, the Modigliani and Miller measure of the cost of capital for aggregate investment functions never really caught on, and, indeed, the very notion of estimating aggregate demand functions for investment has long since been abandoned by macro economists. At the micro level, the Modigliani and Miller propositions imply that the choice of financing instrument is irrelevant for the optimal cutoff.

Such a cutoff s seen to depend solely on the risk (or "risk class") of the investment, regardless of how it is financed, hardly a happy position for professors of finance to explain to their students being trained, presumably, in the art of selecting optimal capital structures.

Faced with the unpleasant action consequences of the Modigliani and Miller model at the micro level, the tendency of many at first was to dismiss the assumption underlying Modigliani and Miller's then novel arbitrage proof as unrealistic. The assumption underlying the CAPM, of course, are equally or even more implausible, as noted earlier, but the profession seemed far more willing to accept Friedman's:

"the assumption don't matter"

position for the CAPM the for the Modigliani and Miller propositions.

The likely reasons is that the second blade of the Friedman positivism slogan:

"what does count is the descriptive power of the model itself,"

was not followed up.

Tests by the hundreds of the CAPM fill the literature. But direct calibration tests of the Modigliani and Miller proposition and their implications do not.

One fundamental difficulty of testing the Modigliani and Miller proposition shows up in the initial Modigliani and Miller paper itself. The capital structure proposition says that if you could find two firms whose underlying earnings are identical, then so would their market value, regardless of how much of the capital structure takes the form of equity as opposed to debt.

But how do you find two companies whose earnings are identical? Modigliani and Miller tried using industry as a way of holding earnings constant, but this sort of filter is far too crude. Attempts to exploit the power of the CAPM for testing Modigliani and Miller were no more successful. How do you compute a beta for the underlying real assets?

One way to avoid the difficulty of not having two identical firms, is to see what happens when the same firm changes capital structure. If a firm borrows and uses the proceeds to pay its shareholders a huge dividend or to buy back share, does the value of the firm increase? Many studies have suggested that it does. But the interpretation of such results faces a hopeless identification problem.

The firm, after all, never issues a press release saying "we are just conducting a purely scientific investigation of the Modigliani and Miller proposition." The market, which is forward-looking, has every reason to believe that the capital structure decisions are conveying management's views about changes in the firm's prospects for the future. These confounding "information effects," present in every dividend and capital structure decision, render indecisive all tests based on specific corporate actions.

Nor can we hope to refute the Modigliani and Miller propositions indirectly by calling attention to the multitude of new securities and of variations on old securities that are introduced year after year. The Modigliani and Miller propositions say only that no gains could be earned from such innovations if the market were in fact "complete."

But the new securities in question may well be serving to complete the market, earning a first mover's profit to the particular innovation. Only those on Wall Street know how hard it is these days to come by those innovator's profits.

If all this reminiscent of the efficient markets hypothesis, that is no accident. The Modigliani and Miller propositions are also ways of saying that there is no free lunch. Firms cannot hope to gain by issuing what looks like low-cost debt rather than high-cost debt. They just make the cost of higher-cost equity even higher. And if any substantial number of firms, at the same time, seek to replace what they think is their high-cost equity with low-cost debt (even tax-advantaged debt), then the interest costs of debt will rise, and the required yields on equity will fall until the perceived incentives to change capital structures (or dividend policies for that matter) are eliminated.

The Modigliani and Miller propositions, in short, like the efficient markets hypothesis, are about equilibrium in the capital markets, what equilibrium looks like, and what forces are set in motion once it is disturbed. And this is why neither the efficient markets hypothesis nor the Modigliani and Miller propositions have ever set well with those in the profession who see finance as essentially a branch of management science.

The following is stated in their proposition:

> "The market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate p appropriate to its risk class."

> "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."

Copeland and Weston offer their opinion of the importance of the Modigliani and Miller Proposition 1.

> "This is perhaps the single most important result in the theory of corporate finance obtained in the last 25 years. It says that in the absence of any market imperfections including corporate taxes, the value of the firm is completely independent of the type of financing used for its projects. In other words, the method of financing is irrelevant."

Of course, there is no such thing as a perfect market. However, Modigliani and Miller's theory is generally believed to apply on a pre-financed pre-tax basis because income taxes are considered to be the primary market imperfection. On an after-tax basis, there is an unsettled academic debate with regards to the cost of capital and capital structure.

3.1.2 Debt is Good for you

Ever since Franco Modigliani and Merton Miller published their famous papers on the relative merits of debt and equity financing, the central question in corporate finance has been about the optimal balance between the two.

Modigliani and Miller argued that, given certain assumptions, the proportions of debt and equity capital were irrelevant to the value of a firm; the only difference they made was to the distribution of the spoils between creditors and shareholders. This was because the more debt a firm issued for a given level of equity, the riskier that firm became. Leverage increases the expected return to shareholders, but it also increases their risks. In an efficient stock market, the two should cancel each other out.

But a later, modified version of the Modigliani and Miller theory said something rather different. It allowed for the fact that the original assumptions, particularly on taxation, might not apply. In America, dividends are paid out of companies' net-of-tax income, and are then taxed again in the hands of the recipients. Interest payments on debt, on the other hand, are tax-deductible.

This means that a firm's overall value should increase as it substitutes debt for equity, and suggests that many firms in the 1950s and 1960s had too much equity and not enough debt.

However, it is clear that over the past couple of decades they have been trying to rectify that. But not, perhaps, as vigorously as might be expected. As Modigliani and Miller proposition implied that firms should be financed almost entirely with debt. Yet many big companies still think that their weighted average cost of capital, the total mix of debt and equity, would be cheaper in the long term if they maintained a solid credit rating. Clearly, piling up more debt benefits shareholders only up to a point. That point, roughly speaking, is reached when bondholders are so worried about the company defaulting that the cost of its debt rises to unsustainable levels. To go on borrowing beyond that point may even lead to bankruptcy.

Note that bankruptcy in America is rather less onerous to shareholders than it is in many other big economies.

Moreover, inflation, both in America and elsewhere, is much less of a problem than it was in the 1970s and early 1980s, so interest rates are lower and companies can afford to borrow more. Some commentators, notably Stern Stewart, a consultant, that does a lot of work in this area, maintains that many firms still have too little debt.

Mature, profitable firms, with the least need to borrow, probably benefit most from doing so.

Consider three different capital structures which will all result in £10m of capital being raised.

1. All equity - 10 million shares sold at a nominal value of £1.
2. £3m debt (carrying 10% interest) and £7m equity.
3. £5m debt (carrying 10% interest) and £5m equity.

Probabilities of performance levels

Customer response to firm's products	Income before Interest *	Probability %
Modest success	0.5m	20
Good response	3m	60
Run-away success	4m	20

* Taxes to be ignored

We can now examine what will happen to shareholder returns for each of the gearing levels.

The effect of gearing (taxes to be ignored)

Customer response	Modest	Good	Run-away
Earnings before interest	0.5m	3m	4m
All-equity structure			
Debt interest at 10%	0	0	0
Earnings available for shareholders	0.5	3	4
Return on shares	**5%**	**30%**	**40%**
30% Gearing (3m debt, 7m equity)			
Debt interest at 10%	0.3	0.3	0.3
Earnings available for shareholders	0.2	2.7	3.7
Return on shares	**3%**	**39%**	**53%**
50% Gearing (5m debt, 5m equity)			
Debt interest at 10%	0.5	0.5	0.5
Earnings available for shareholders	0	2.5	3.5
Return on shares	**0%**	**50%**	**70%**

3.1.3 A Matter of Degree

Two other theories try to explain why firms are still reluctant to incur debt, or at least do not borrow as much as implied by the Modigliani and Miller theory. The first, called the trade-off theory, says that the amount of debt a firm is willing to take on depends, among other things, on the business it is in. Profitable companies with stable cash flows and safe, tangible assets can afford more debt; unprofitable, risky ones with intangible assets, rather less.

So dot.com companies, to take a formerly fashionable sector, would be ill advised to shoulder any debt at all. Firms in highly cyclical industries, such as car making, should probably be wary of taking on too much.

By contrast, utilities, whose business tends to be more predictable, can afford much greater leverage.

Managers prefer this kind of theory to the Modigliani and Miller one because it does not imply categorically that they are doing the wrong thing. But does it give them much guidance on what, in fact, they should be doing? Some would argue that in a way it does; that firms "target" a credit rating they are happy with, according to the business they are in, and stick to it.

Rick Escherich, an analyst at J.P. Morgan, has looked at a sample of 50 companies taken from Fortune magazine's list of "most admired companies," and found that only four of them have been downgraded by more than one notch over the past ten years. Most of them have the same rating now as they did a decade ago.

But Stephen Kealhofer of KMV says that, according to his firm's research, firms do not target credit ratings, indeed quite the opposite:

"We find that firms engage in anti-targeting behavior."

Generally, they are more interested in their business plans than in what the rating agencies say. If they get into trouble, they increase their liabilities to enable them to carry out these plans, as the telecoms firms done.

"Only when they get close to default do they reduce them," he points out.

3.1.4 Agency Costs

Another restraining influence on the decision to take on high debt is the agency cost of doing so. Agency costs arise out of what is known as the "principal-agent" problem. In most large firms the finance providers (principles) are not able to actively manage the firm. They employ "agents" (managers) and it is possible for these agents to act in ways which are not always in the best interest of the equity or debt holders.

If we focus on the debt issue and assume that there is no potential conflict of interest between shareholders and management, we can assume that management are acting for the maximization of shareholder wealth. But debt holders may have reason to fear agency problems, because there may be actions which potentially benefit the owners at the expenses of lenders. It is possible for lenders to be fooled or mislead by managers.

For example, management might raise money from bond holders saying that this is low-risk (and therefore paying a low interest rate) because the firm has low gearing and the funds will be used for low-risk project. In the event the managers invest in high-risk venture, and the firm becomes highly geared by borrowing more.

As a result the original lenders do not receive a return sufficient for the level of risk and the firm has the benefit of low-interest financing. Alternatively, consider a firm already in financial distress.

From the shareholders' point of view there is little to lose taking an enormous gamble by accepting very high risk projects. If the gamble pays off the shareholders will win but the debt holders will gain no more then the obligated fixed interest. If it fails, the shareholders are no worse off but the lenders experience default on their securities.

The problem boils down to one of information asymmetry - that is, the managers are in possession of knowledge unavailable to the debt providers. One of the solutions is to spend money on monitoring. The lenders will require a premium on the debt interest to compensate for this additional cost. Also restrictions (covenants) are usually built into a lending agreement. For example, there may be limits on the level of dividends so that shareholders do not strip the company of cash.

There may be limits placed on the overall level of indebtedness, with precise capital and income-gearing ratios. Mangers may be restricted in the disposal of major assets or constrained in the type of activity they may engage in.

Extensive covenants imposed by lenders can be costly for shareholders because they reduce the firm's operating freedom and investment flexibility. Projects with a high NPV may be forgone because of the cautiousness of lenders.

The opportunity costs can be especially frustrating for firms with high growth potential. Thus agency costs include monitoring costs passed on as higher interest rates and the loss of value caused by the inhibition of managerial freedom to act. These increase with gearing, raising the implicit cost of debt and lowering the firm's value.

There may also be a psychological element related to agency costs; managers generally do not like restrictions placed on their freedom of action. They try to limit constraints by not raising a large proportion of capital from lenders. This may help to explain why, in practice, we find companies generally have modest gearing levels.

Borrowing capacity has a close connection with agency costs. Lenders prefer secured lending, and this often sets an upper limit on gearing.

They like to have the assurance that if the worst happened and the firm was unable to meet its interest obligations they could seize assets to sell off in order that loans could be repaid.

Thus, high levels of gearing are unusual because companies run out of suitable assets to offer as security against loans. So, the gearing level may not be determined by a theoretical, informed and considered manager decision, but by the limits to total borrowing imposed by lenders.

Firms with assets which have an active secondhand market, and which do not tend to depreciate, such as property, are likely to have higher borrowing capacity than firms that invest in assets with few alternative uses.

Liquidity affects not only shareholder, but managers and other employees. Indeed, the impact on these people can be far greater than the impact on well-diversified investors. It may be argued that managers have a natural tendency to be cautious are borrowing.

Mr. Kealhofer prefers a third explanation of firms' behavior, dubbed "the pecking-order theory." The central plank of this theory, first propounded by Stewart Meyers in 1984, is that outside investors in a firm know less about the health of a firm than its managers do.

That can be a problem when the company wants to issue equity: investors may believe, rightly or wrongly, that the company is doing this because it thinks its shares are overpriced, and may respond by selling them.

Issuing debt generally has a much less dramatic effect, but external finance is still costly. That is why the vast majority of new capital raised by firms comes from retained profits.

The pecking-order theory might help to explain why many big firms hold large reserves. If they find that these are insufficient, they often take another route: to delay paying their bills.

In effect, when they need to borrow, the first place they look to is their trade creditors. Only when that route becomes difficult do they turn to external lenders, banks or bond market, and only as a last resort to the equity markets. That might help to explain why companies with stable profits often borrow a lot less than unprofitable ones. The pecking order of finance is in sharp contrast to the Modigliani and Miller theory plus financial distress analysis, in which an optimal capital structure is targeted.

Myers (1984, p.581) puts it in this way:

> "In this story, there is no well-defined target debt-equity mix, because there are two kinds of equity, internal and external, one at the top of the pecking order and the one at the bottom."

One reason for placing new issues of equity at the bottom is supposedly that the stock markets perceive an equity issue as a sign of problems - an act of desperation. Myers and Majluf (1984) provide a theoretical explanation of why an equity issue might be bad news - managers will only issue shares when they believe the firm's shares are overpriced.

Bennett Stewart (1990, p.391) puts it differently:

> "Raising equity conveys doubt. Investors suspect that management is attempting to shore up the firm's financial resources for rough times ahead by selling over-valued shares."

The pecking order idea helps to explain why the most profitable companies often borrow very little. It is not that they have a low target debt ratio, but because they do not need outside finance. If they are highly profitable they will use these profits for growth opportunities and so end up with very little debt and no need to issue shares.

Less profitable firms issue debt because they do not have internal funds sufficient for their capital investment program and because debt is first in the pecking order of externally raised finance. There is an argument that firms do not try to reach the "correct" capital structure as dictated by theory, because managers are following a line of least resistance.

Internal funds are the first choice because using retained earnings does not involve contact with outside investors. This avoids the discipline involved in trying to extract investors' money.

For example, the communication process required to raise equity finance is usually time-consuming and onerous, with formal prospectus, etc., and investors will scrutinize the detailed justifications advanced for the need to raise additional finance. It seems reasonable to suppose that managers will feel more comfortable using funds they have in their hands. However, if they do have to obtain external financing then debt is the least line of resistance. This is because the degree of questioning and publicity associated with a bank loan or bond issue is usually significantly less than that associated with a share issue.

Another reason for a pecking order is that ordinary shares are more expensive to issue than debt capital, which in turn is more expensive than simply applying previously generated profits. The cost of new issues and rights issues of shares can be very expensive, whereas retained earnings are available without transaction costs.

Yet none of these theories gives much of a clue to whether, at any particular point, firms' debts are too high or too low.

To put it another way, they do not tell you what the market thinks of a firm's default risk. For that, turn to another theory, which despite its less-than-snappy title has lately proven remarkably powerful: contingent claims analysis.

This was first developed by Robert Merton, an economist who in 1997 won a Nobel prize with Myron Scholes for his work on developing mathematical models to price options. It uses option theory to analyze the differing claims that debt-holders and shareholders have on a firm.

3.1.5 **Making Money by Default**

The theory says that shareholders essentially own a call option on the firm. (the right but not the obligation to buy) Shareholders get all the upside; their downside, thanks to limited liability, is restricted to the firm going bankrupt. The position of bondholders, by contrast, is that of someone having sold a put option (the right to sell) to shareholders, conferring on them the right to bankrupt the firm.

The bondholders' main upside is the fee they receive for that option, for example, the interest on the loans they make to the firm. The theory is helpful in analyzing the market's view of a company's creditworthiness: the more likely it thinks a firm is to default, the greater the fee, it will charge. KMV has built a business applying this theory to estimate the likelihood of a firm defaulting. Some investment banks are increasingly turning to it. Even Moody's has developed its own version.

KMV's model has three main elements: how much a firm owes; how valuable the business is (using the equity price as an indicator); and the volatility of that business (which can also be deducted from the equity price.) Surprisingly, although the equity market did splendidly in 1999 and early last year, its median estimates default frequencies (EDFs, a measure of the likelihood of default) for the 10,000 North American companies tracked by the consultant carried on rising. In recent months, they have risen still further, and some firms have done worse than others.

If that seems odd, consider a slightly more refined way of looking at the put option that debt holders have sold to shareholders. It is, in fact, a put option whose strike price is a long way below the current price of a firm's equity.

As a firm's share fall to a level where the equity price, and by extension the net assets of the firm, get close to a firm's liabilities, the firm is in increasing danger of becoming insolvent. That makes the put option worth a lot more, so the yield on the company's debts rises.

The share prices of most firms, particularly those with an investment grade, are nowhere near this level. But this is where a key feature of option pricing comes in. Option markets do not guess the direction that as asset's price is heading in; instead, they look at its volatility.

The more volatile an asset, the greater the chance that an option written on it will be exercised. Put another way, the more volatile a share, the less happy bond investors will be to lend to it. If the firm's shares become so volatile that insolvency is at least possible, the yield demanded by debt holders will rise, perhaps dramatically.

There is a further wrinkle. When the bondholder sells the put option to a firm's shareholders, the strike price (at which the option can be exercised) is not set in stone; it is variable. That is, the managers of the firm could reduce debt (which is helpful for bondholders because, in effect, it reduces the strike price at which a company becomes insolvent); it could increase debt (the opposite); it could sell shares (good); or it could buy them back (bad).

The point to note is that bondholders sell managers not only the right to bankrupt the firm, but also the right to alter the firm's capital structure. Arcane as all this might sound, it helps in understanding what has been happening in the corporate bond market this past year or so.

3.1.6 Modigliani and Miller on Capital Structure

"Our distinction between the real value of the firm and its financial packaging raised many issues long familiar to economists in discussions of the 'money illusion' and money neutrality."

So wrote Merton Miller (1988, p.100) in his contribution marking the thirtieth anniversary of the publication of the celebrated Modigliani and Miller propositions on capital structure (Modigliani and Miller, 1958).

The institution that gave rise to this paper was that so open an avowal of the neutral-money doctrine must be vulnerable to challenge on the grounds on which Post Keynesian's have disputed it in the general macroeconomic case. These are that, in a monetary production economy operating under conditions of intractable uncertainty and in which firms and households constitute categorically different functional entities, money contracts have a unique and positive influence and that this is true whether markets are perfect or imperfect.

Miller (1988, p.101) tells how the Modigliani and Miller:

"approach of looking through the momentary capital structure to the underlying real flows"

was inspired by the way financial assets and liabilities, and with them the debt / equity ratio, disappeared entirely from the reckoning when sectoral balance sheets are consolidated into national accounts. The present discussion focuses specifically on what, inter-alia, is lost in this aggregation, namely, the essentially financial role of lenders and their crucial influence, as a matter both of analysis and historical record, on the gearing decision.

The broad argument is that lenders' preferences set upper and lower bounds to the gearing levels at which firms will operate. The upper limit is directly imposed by lenders. The lower bound emerges because the nature of the firm makes lenders willing to provide it with finance on more favorable terms than they would offer to an individual borrower. Firms are therefore encouraged to take on debt and in fact set target debt ratios within the bounds determined by lenders' behavior.

The following is devoted to establishing the theoretical case for the existence of the postulated upper bound to the gearing ratio. The starting point, in the next section, is an analysis of the Modigliani and Miller vision of bankruptcy.

This is shown to be more than a parody of reality in which the economy is populated solely by "sound concerns," but, equally, it proves to be an essential element in the Modigliani and Miller extension of the neutral money thesis to encompass corporate capital structures. The paper then proceeds to trace the origins of this conception of bankruptcy to the Modigliani and Miller application of the stochastic paradigm that dominates financial theory and the way it enables them to portray risk as a phenomenon stemming from imperfections that may contingently arise within the economic world the firms inhabits, rather than from the uncertain nature of that world itself.

Via reference to work by Davidson (1982-1983), Vickers (1992), and Crotty (1992), familiar Keynesian criticism of the stochastic paradigm are reviewed and shown to apply specifically to the Modigliani and Miller treatment of uncertainty. The discussion takes this critique further by suggesting that no satisfactory understanding of risk, quite apart from uncertainty, can be derived from the stochastic world-view, which depicts events as merely ephemeral accidents.

It argues that an alternative analysis emphasizing causation and its corollary, change within historic time, is required.

The logic of this approach is then applied to explore the concept of risk (or fear) of irrecoverable loss, which, it is suggested, offers the key to understanding the determination of maximum gearing levels as well as the causes of bankruptcy. Both become explicable as liquidity preference behavior on the part of creditors.

The penultimate section makes the case for the existence of a lower bound to the gearing level at which the firm will operate. While recognizing that excessive gearing implies risks to firms themselves that they will wish to avoid, their position of economic "fixity," dictated by their nature as productive entities, endows them with a general kind of creditworthiness that they will wish to exploit.

The target gearing ratio emerges as a practical response to these conflicting considerations, and the analysis, it is claimed, throws light on a number of salient "facts of capital structure" that defy explanation in orthodox terms.

The conclusion focuses on the implication of the discussion as a whole: Corporate capital structures observed in the real world are to be understood in terms not of imperfections that impede the operation of market forces, but as the product of essential features of the environment in which these forces operate.

This in turn implies that Gordon concedes too much when he states that:

> "The Modigliani and Miller theorem is true to perfectly competitive capital markets (PCCM) because the assumptions of PCCM make personal leverage a perfect substitute for corporate leverage" (1992, p.430).

PCCM will not by themselves dissuade lenders from setting maximum gearing ratios or favoring corporate over personal borrowers. Consequently, Modigliani and Miller arbitrage does not combine with PCCM to represent a sufficient condition for money neutrality.

To achieve this, two further palpably preverce assumptions have to be made; (1) that the stochastic paradigm holds, and (2) that firms are not operating in a position of "fixity" within a monetary production economy.

At the beginning of his article, Miller asserts (p.99) that:

"Our Proposition 1... is accepted as an implication of equilibrium in perfect capital markets."

3.1.7 **Multinational Corporations and their Capital Structures**

An important decision that a Multinational Corporation (MNC) must take is whether to use the parent firm's cost of capital or the subsidiary's in evaluating a project. From a normative viewpoint, the corporate wide weighted average cost of capital (WACC) should be utilized in decision making. Capital that is raised locally should merely fit into the total package of sources of financing that is available to the firm worldwide. Once the worldwide WACC is determined, adjustments can be made to take into account the risk of a particular country or project, or from a portfolio perspective, to take into consideration the interaction between the project and the total composition of investments.

In the current study, 53.8% of the respondents indicated they used corporate wide WACC as the baseline for investments.

This is a slight movement towards the normative from the Stanley and Block study in 1983, in which 49% of the respondents used the firm's cost of capital rather than an affiliate's cost of capital within a given country. However, any movement towards the normative is disappointedly slow.

A related question asked whether the subsidiary's capital structure should conform to the MNCs worldwide capital structure. This is a valid question regardless of whose WACC is used in evaluating investments. Assume a foreign subsidiary in Germany represents 2% of the capital mix of the U.S. parent. Should the foreign firm be asked to conform to the capital mix of the parent, which might be 30% debt, 10% preferred stock and 60% equity?

Only 19% of the respondents deemed it necessary for the foreign affiliate to adhere to the parent company's percentage composition. This viewpoint was generally true regardless of whether the affiliate used corporate wide WACC or affiliated / project specific cost of capital.

The emphasis on structuring the affiliate capital structure to conform to local conditions can be traced to a number of factors as indicated by the responses to an open-ended question. Local customs may dictate the appropriate amount of debt or equity in the capital structure. Furthermore, some foreign governments require a certain percentage of equity to ensure the permanence of the parent's commitment, or conversely, to enable local investors to have an ownership interest.

Also, competitive conditions associated with other local companies may dictate an acceptable norm for the capital structure. Likewise, low interest loans may be available to a foreign affiliate only through government agencies.

Management of foreign exchange exposure may further influence the local capital structure. Tax exposure and repatriation of funds are other considerations. The ultimate threat of expropriation of property may also be reduced / incurred by the nature of the local company's capital structure.

While over 80% of the respondents to this study said the local capital structure should not conform to the corporate wide capital structure, there is still a belief that MNCs should synchronize the activities of their subsidiaries.

Particularly for those firms that use corporate wide WACC, there was almost unanimous agreement (96.6%) that the activities of the subsidiaries should be monitored to ensure that corporate wide targets are met.

Much of the discussion thus far of worldwide WACC has pertained to the influence of country norms. Others would suggest that industry norms are of equal or greater importance. Proponents of the later include Bowen, Daley and Huber, Eurrunza, Ferri and Jones, and Sekely and Collins.

Their argument is that regardless of what country a firm is in, industry norms will have a strong influence on capital structure. Firms that have ownership positions in real estate or that provide bank finance are likely to have high debt regardless of the country of origin. Similarly, companies that provide computer software and other MIS services may be primarily supported by equity regardless of what part of the world they are in.

Nevertheless, 68% of the respondents said country of origin was more important than industry in determining WACC, 26% viewed industry as more influential and 6% had no opinion.

3.1.8 Symposium Corporation continues strengthening of its Capital Structure

Symposium Corporation, a cross media direct marketing company, today announced that it greatly strengthened the capital structure of the company by the redemption / conversion of all of the Series B Convertible Preferred Stock and the favorable modification of the conversion terms of the Series C Preferred Stock.

In response to an offer made by the company in June of this year, all the outstanding shares of the Series B Convertible securities were either redeemed or converted into common stock. Since the conversion price of the preferred was $2.00 per share, the potential negative future dilutive impact of this conversion feature has been eliminated. Today, there are current approximately 28 million common shares outstanding.

Additionally, the holders of the Series C Preferred shares have agreed to reduce the shares issuable upon conversion from a maximum of approximately 24 million to approximately 7.5 million shares.

Ronald Altbach, CEO of the company, commenting on the restructuring said,

"This significant streamlining of our capital structure contains two very important messages for our shareholders. Firstly, it clearly shows the confidence level of our principal investors in the company's business model and our implementation since our acquisition of DSI in January 2000. It also significantly limits future dilution and therefore creates greater potential value for our common stockholders."

3.1.9 Money Neutrality and the Peculiarities of the Modigliani and Miller Treatment of Bankruptcy

In the post Modigliani and Miller orthodoxy, the putative risks to shareholders associated with costs of bankruptcy plays a major role.

Modigliani and Miller recognize the possibility of such costs in a footnote where they state: Once we relax the assumption that all bonds have certain yields, our arbitrage operator faces the danger of something comparable to "gambler's ruin."

That is, there is always the possibility that an otherwise sound concern might be forced into liquidation as a result of a run of temporary losses.

Since reorganization involves costs we might expect heavily levered companies to sell at a slight discount relative to less heavily indebted companies of the same class. It falls to writers of financial texts to try to present this speculation in ways that will make sense to their readers.

A pair of examples will prove instructive.

Puxty and Dodds (1991, p.298) state:

"The continuity of that [tax] shield is removed by the presence of...financial risk...It is not gearing per se which is the real culprit here: rather it is the cyclical nature of the earnings which cannot support the gearing, and earlier we referred to the switch between financial surplus and deficit of the whole sector that can occur within a year."

Notice here how allusion to the economic cycle appears to add plausibility to the Modigliani and Miller inspired conception of bankruptcy by offering one readily understandable reason why earnings may be variable and years of poor results may bunch together.

Levy and Sarnat, on the other hand, offer a thought experiment which, they imply, captures the very essence of bankruptcy costs. In very telling fashion, they make it possible to have bankruptcy costs without bankruptcy.

> "By increasing its use of leverage," they write, "the firm also increases its financial risk and thereby the probability of financial failure. Fortunately, the probability of bankruptcy and its impact on financial decision making can be incorporated by utilizing a convenient hypothesis device."

> "Suppose that each year the firm insure(s) itself against the possibility of bankruptcy. Such an arrangement implies that the insurance company will pay the interest (and other fixed charges) in years in which losses are sustained. This assumption allows us to retain the Modigliani and Miller assumption of no bankruptcy while also reflecting the costs of avoiding this risk." (1978, pp.234-236)

Perhaps the last word on financial failure a la Modigliani and Miller should be left to Miller himself, who demonstrates perfect consistency with his earlier writings and those of other writers cited when he notes, (1998, p.113)

> "A run of very bad years might actually find a highly levered firm unable to meet its debt-service requirements, precipitating thereby any of the several processes of recontracting that go under the general name of bankruptcy. These renegotiations can be costly indeed to the debtor's estate."

These statements share some curious but apparently unnoticed features which we now enumerate:

1. The focus on bankruptcy costs and not on bankruptcy per se. The event of bankruptcy is treated as incidental and one that holds no fear for any of the interested parties. Only the costs that may follow in its wake are seen to matter.

2. The presentation of bankruptcy as typically a passing phase, albeit one that may carry costs with it.

   "O death, where is thy sting?" (1 Cor 15:55)

3. The suggestion that bankruptcy costs, when they are incurred, fall exclusively on shareholders. Bankruptcy, even if arising only in a world in which bond yields are uncertain, carries no threats for debt holders' wealth.

4. The reduction of the phenomenon of bankruptcy to a set of processes of recontracting and its depiction as a cause of subsequent problems (in that it positively worsens shareholders' prospects) not as a consequence, much less the culmination, of an earlier history of them.

5. And finally, and most important, the interpretation of bankruptcy as a matter of bad luck, such as could happen to any firm.

Certainly, something akin to "gambler's ruin" can befall firms: Fluctuations in earnings, arising from cyclical downturns or any other cause, do not occasion create financial difficulties on a scale that threatens their continued existence. Nevertheless, there is something distinctly odd about this characterization of bankruptcy as a contingency affecting, to repeat the Modigliani and Miller phrase, otherwise sound concerns, so sound in fact that they could in theory afford to insure against this risk.

The main objection here is that the bankruptcy of the basically sound enterprise is treated, by default, as the sole possibility since the sound enterprise is the only case orthodox theorists seem prepared to consider. And, within this idiosyncratic framework, all the peculiar features of the orthodox account acquire a kind of logic:

If the firm is basically sound, bankruptcy must be a matter of bad luck, an unfortunate random episodic event, a cause rather than a consequence of problems.

If the firm is basically sound, there is no reason why bankruptcy should be more than a transitory phase and a good prospect that it will be a reasonable bloodless affair.

Furthermore, if any blood is spilled, it will always be that of shareholders. The assets are sound. Why should lenders suffer?

However, all this amounts to passing the merely possible off as the norm. In the real world, bankruptcy primarily represents the fate of unsound concerns, the outcome of an often protracted and inexorable downward spiral in the affairs of a company rather than simply a symptom of a bad patch it is going through, the culmination of preexisting problems and not the first cloud on the horizon.

Since that is so, the conception of bankruptcy as an affliction of sound concerns must be a caricature and the analysis based on it no more than a parody.

What could have induced such a selective and distorted way of looking at the world?

Pike and Neale offer an important clue when they observe (1993, p.362) that:

> "It may seem surprising...that Modigliani and Miller should have omitted liquidation costs from their analysis, but this was a logical consequence of their perfect capital market assumptions. In such a market the resale value of assets, even those being sold in a liquidation, will reflect their true economic values as measured by the present values of their future income flows. In other words, the mere event of insolvency is irrelevant, except insofar as it involves a change of ownership."

If markets are perfect, bankruptcy is a matter of supreme irrelevance. It follows logically that the same is true of the level of gearing at which the firm operates. Both, by implication, matter only under imperfect markets. Here we have it. With this vision of bankruptcy and in a perfect market, money is neutral.

But if Pike and Neale are unaware that Modigliani and Miller did in fact refer to bankruptcy costs in their original article, they seem equally oblivious of the premise of that discussion: the sound firm suffering temporary losses.

Be this as it may, it is the restriction of the analysis to sound firms only that makes possible the neutral-money conclusion implicit in their discussion and explicit in Modigliani and Miller. This restriction, however, introduces logical difficulties of its own.

Suppose a firm has experienced a string of poor earnings figures, as a result of which it faces difficulties in meeting lenders' claims. The institution of insolvency proceedings would then be the creditors' prerogative. But why, in a perfect capital market, should creditors of an "otherwise sound" company ever be induced to go down this road? They would know that the current difficulties faced by the company had no implications for the market value of their claims and that it was simply experiencing the downside, ex hypothesi temporary, of a volatile situation.

And should this situation have arisen at a time when individual creditors needed cash, they could realize funds without loss either by selling their claims on the firm or by borrowing on the strength of them.

In a perfect market, bankruptcy would not only be irrelevant, it would be irrational.

In fact, even assuming that markets are imperfect does little to improve the coherence of the orthodox account.

In an imperfect capital market, forcing a company into liquidation might represent the only means open to creditors to realize their wealth. Yet taking such a step would do nothing to increase that wealth, given the premise that the company is "otherwise sound." That creditor should take action of this kind would therefore be inexplicable unless it were also assumed that they were facing liquidity problems of their own, for example, that they too were financially distressed. But lenders, too, would presumable be "sound concerns" and the puzzle of why bankruptcy should ever occur would then just be shifted one stage further down the line.

In the end, therefore, the Modigliani and Miller theory is trapped in a logical dilemma: If the firm is sound, why should bankruptcy ever occur? But if it might not be sound, what are the grounds for claiming that money is neutral and gearing irrelevant?

3.2.0 Gearing Down

The balance sheet of British business has passed through a truly remarkable transformation over the past two years. Statistics and anecdotal evidence in every sector and at every level from giant household names down to modest seven-figure enterprises all confirm the pattern: gearing levels radically reduced businesses managing their cash flow more intelligently than ever before and deep-seated reluctance to borrow afresh.

In many respects this is a positive story. Companies are emerging from recession in impressive shape having learned the lesson of sound financial management through bitter experience. But this raises three interesting questions.

Firstly, will the caution now being displayed by many British companies cause them to miss investment opportunities and allow foreign competitors to reap the benefits of economic recovery? Second, what will the banks now rediscovering their enthusiasm for corporate lending - do with their money? And third, should analysts tear up traditional balance sheet ratios and find new ways of assessing relative corporate creditworthiness?

The big picture is provided by Bank of England statistics which show that industrial and commercial companies have been repaying debt steadily since the beginning of 1993.

The net reduction for the seven quarters up to September 1994 was £7 billion.

New financing was provided instead by a combination of capital issues (£16 billion) and retained earnings which rose by 3% in 1993 and began 1994 at double the level of the worst period of recession. Helped by lower nominal interest rates since the pound fell out of the ERM interest costs fell by more than a third between 1990 and 1994. The crucial ratio of income gearing (interest costs net of profits) across the corporate spectrum has halved from over 30% to about 15% today.

Ratios of debt to equity which is important for large companies seeking to maintain formal credit ratings or comply with syndicated loan covenants have improved by 30-40% since the peck of the lending extravaganza. A survey by accountants KPMG of 133 quoted companies in West Midlands shows the average debt / equity ratio falling between 1992/3 and 1993/4 from 32% and 23%. Within those figures the biggest percentage reduction in gearing (37%) was in companies with market capitalization of £100 million plus.

These quantum changes in gearing levels have been achieved despite a policy shift which has had the opposite effect on some big companies balance sheets: this was the decision by the Accounting Standards Board to take a tougher line on the classification of impermanent hybrid securities as debt rather than equity.

Clever City inventions such as the auction market preferred share and the convertible capital bond were re-bracketed as liabilities affecting a variety of major companies from British Airways to Reckitt & Colman. Creative accounting is now very much yesterday's game.

Attitudes of straightforward prudence now apply both to capital investment and to working capital financing. In both respects, the quelling of inflation to almost negligible levels of 1-2% per annum is a new factor.

Without inflation, real costs of borrowing and rates of return are theoretically plainer to compare. Without inflation, real costs of borrowing and rates of return are theoretically plainer to compare.

Economists argue that serious long-term investment is thereby encouraged, but many smaller businessmen are deterred by the rigorous nature of the calculation involved: in crude terms investment was easier in the old days because term debt was easier to repay as inflation acted to diminish it while boosting the residual value of the asset financed.

	1993/94	1992/93
Equity gearing ratios by company size	Total %	Total %
Large (market cap.>100m)	22.4	35.7
Medium (50-100m)	23.4	29.3
Small (<50m)	35.1	43.3
Equity gearing ratios by sector		
Construction and property	30.8	45.5
Motor and distributors	22	32
Food and drink	23.8	28.9
Engineering	42.3	43.9
Retailing	-	2.5
Utilities	14.2	19
Industrial materials	28.9	37.8
Electrical	20.2	22.3
Electronics	-	2.4
Other	38.5	72.5
Average	**23.4**	**32**

Equity gearing ratio = $\dfrac{\text{Total borrowings net of cash}}{\text{Share capital plus reserves}}$

Source: KPMG West Midlands plc annual report

Absence of inflation in working capital requirements also reduces demand for overdraft financing. But more importantly, so also do the structural changes which have taken place as a result of the recession, in the way businesses manage their cash flow.

According to Jennings, Director of Commercial Marketing at National Westminster Bank, there has been a "major shift in business literacy," in which managers have learned to run higher levels of turnover on lower levels of short-term finance by much more rigorous attention to stocks, debtors and creditors.

Technology has helped both in computerized stock control and in the use of electronic cash management products offered by the banks. The new techniques have sometimes tended to favor big companies over small ones. Powerful manufacturers and retail groups have learned to extract longer credit terms from smaller suppliers who depend on them for orders. At the most sophisticated level, just-in-time components and stock delivery has tended to shift the financing requirement down the chain of suppliers, forcing each participant to re-examine his modus operandi.

One entrepreneur who felt this squeeze is Quinton Cornforth, who runs Bodybits, a chain of discount body-panel stores in the Midlands:

"Yes, we're much better at managing our stock and our cash flow than we used to be and we've reduced our borrowings enormously. But our exposure to debtors has gone up by 30% because all our big customers are asking for longer credit terms. In some ways, the trend has gone far: maybe we're all spending too many hours checking stock controls and chasing debtors to keep our overdrafts to a minimum."

But most post-recession entrepreneurs agree that is well worth the headaches to keep borrowing to a minimum.

Reflex Magnetics is a successful computer software maker and furniture importer in Kilburn, northwest London. Its Managing Director, John Buckle, says:

"I've always tried to keep my bank debt well under control and I've never had any grief from them. Gearing ratios as such don't really concern me at all, but I'm constantly watching three figures which give me an overview of the net trading position, the overdraft, what I owe suppliers and what my customers owe me. If the pattern looks positive then I'm prepared to look at new investments."

After a faltering start to the recovery, new capital is at last a live possibility again for many British companies.

Jennings of NatWest has observed a real improvement in confidence, particularly among medium-sized businesses in the manufacturing sector, since April 1994.

Bruce Robinson, Executive Director of Arbuthnot Latham, confirms the picture:

> "Investment in capital goods is certainly picking up, often driven by advances in technology rather than market expansion. Companies which haven't invested seriously for three to four years - in the printing industry, for instance - have fallen behind the game. They've survived this far, but they've got to start investing in new-generation equipment if they want to be really competitive."

In the new mood of realism, borrowing demand is likely to be seen first in the safety sectors, where entrepreneurs are able to believe in their own business plans, rather than in the more speculative sectors. The 1980s view that any business should gear up for expansion if it has room in its balance sheet now counts as a flat-earth theory of corporate finance.

Similarly, the standard sectoral gearing ratios which credit analysts looked for in earlier business cycles are for the time being much less useful benchmarks.

Latham says the following:

> "all well-run businesses, whatever their sector, are now finding ways of running themselves on lower levels of debt, but those which are lending the recovery are likely to gear up ahead of those which are traditionally heavier borrowers."

Credit analysts will have to re-write their own rules, concentrating less on the bald figures of the balance sheet and more on the realities of cash flow and the persuasiveness of future business plans. There is, of course, another side to the story.

Demand for borrowing may be under control, but what of supply? In the last boom it was undeniably true that banks poured fuel onto the flames by their very aggressive lending policies, driven by the need to fill their own balance sheets in order to show an adequate return on capital.

More recently, the talk has been of a "flight to qualify" and as Martin Taylor of Barclays told Management Today (November 1994) a willingness to shrink the lending business in order to stay within acceptable parameters of risk.

But the willingness of the wider corporate lending market to take such a radically sensible view is called into question by a new survey by the Bank Relationship Consulting (BRC). Of the 139 banks polled, 68% expected to be growing their loan books in a year's time: of those, three-quarters foresaw a growth rate of more than 5% and 17 of them were looking for growth of more than 15%. The survey of corporate borrowing intentions makes these ambitions look wildly unrealistic: one third of companies were planning to increase their bank debt next year, but another quarter were still planning to reduce it.

Even worse news for the lenders is that many companies will meet their new funding requirements from sources other than banks - the buzz word is "disintermediation."

In the BRC survey, bank debt emerges as a low choice, behind private placement, leasing and bonds, with many of the largest companies planning to switch out of bank debt to the advantage of these other markets.

A vivid example of this trend is Guinness, which reduced bank borrowings as a proportion of total debt from 91% in 1987 to 15% in 1993. The NatWest's latest quarterly survey of companies with less than £130 million turnover also finds many of them expecting to borrow from non-bank sources, or use more trade credit, or seek access to venture capital, as alternatives to borrowing from their banks.

This yawning discrepancy between demand and supply can only lead in one direction: towards a cutting of margins, a relaxation of gearing and other covenants and a quiet bending of quality parameters on the part of bankers.

The favored recipients of the banks' marketing attentions according to the BBC, will be the food, utilities, chemicals, machinery and retail sectors. Anything property-related (or connected with the public sector - NHS trusts and local authorities, for example) will continue to be left out in the cold. But perhaps not for long, as the credit cycle begins to gather fresh momentum.

"The speed of change in the banks' attitudes has really surprised us this year," says Michael Bryant, Deputy Treasurer of GKN. "It's the exact reverse of the situation just a few years ago when companies needed the money and the banks were walking away. Now we're liquid and they're beginning to fall over themselves to lend again. We're almost as selective in who we're prepared to borrow from as they used to be in assessing us."

One smaller factory owner puts it even more succinctly:

"I may have tended to err on the side of safety, but I'm bloody glad that I did. Experience says that the one time you shouldn't be gearing up is when the banks start telling you it's a good idea."

3.2.1 Cost of Equity Capital Redefined

The Modigliani and Miller theory of corporate finance has been subjected to considerable debate and interest for over 30 years. Today it is the dominant theory in the field. The following highlights an intuitively unappealing implication of the Modigliani and Miller model that has remained unnoticed or at least has not received due attention. An alternative definition of the cost of equity is presented that does not have this drawback.

Modigliani and Miller revolutionized corporate finance. The idea presented in their major articles (1958, 1963, 1966) have become central to the capital structure and cost of capital theories.

The following highlights a troublesome property implicated in the Modigliani and Miller theory and proposes a new approach that offers a satisfactory solution to this trouble spot.

The basic assumption of the original Modigliani and Miller paper (perfect capital markets, rational investor behavior, no tax differentials, and the implication of no bankruptcy costs) are retained.

According to Modigliani and Miller, the value of a levered firm ($V[sub L]$) with a permanent level of debt (D) in its capital structure is given by:

(1) $V[sub L] = V[sub U] + tauD = (1 - tau)E(X)/rho + tauR / r$

where:

$V[sub U]$ = The value of an unlevered firm;
tau = The corporate tax rate;

E(X) = The expected level of average annual earnings generated by the asset of the firm;

$1/p$ = The market capitalization rate for an unlevered firm in the firm's risk class;

r = The rate of Interest, assumed to be constant and independent of the size of debt; and

R = The size of the interest bill = rD

Further, the value of a firm naturally must be equal to the sum of the values of equity (S) and debt (D), so that:

(2) $V_L = S + D$

The line of reasoning leading to the central formula of the Modigliani and Miller theory is broadly as follows. The after tax return (earnings after interest and taxes, plus interest), denoted by the random variable X^τ, can be expressed as:

(3) $x^\tau = (1 - \tau)(X - R) + R = (1 - \tau)X + \tau R$

Modigliani and Miller (1963) argue that from the investor's point of view, the long-run average stream of after tax returns appears as a sum of two components: an uncertain stream, $(1 - \tau)X$, and a sure stream, τR.

This suggests that the equilibrium market value of the combined stream can be found by capitalizing each component separately.

The Inconsistency Implication in the Modigliani and Miller Model

The cost of equity capital, i^{*}, is defined as the rate of return required on a firm's equity by the market. In the Modigliani and Miller framework, i^{*} can be derived as follows. Utilizing **(3)**:

(4) $E(X^{\tau}) - \tau R = (1-\tau)E(X)$.

Therefore, equation (1) can be expressed equivalently as:

(5) $V_L = E(X^{\tau}) - \tau R \mathbin{/} \rho + \tau D = E(X^{\tau} - \tau r D + \rho \tau D \mathbin{/} \rho = E(X^{\tau}) + \tau(\rho - r)D \mathbin{/} \rho$.

X^{τ} also can be considered to consist of the following two streams (see equation **(3)**):

- The net profit after interest and taxes accruing to common shareholder. Deducting from earnings before interest and taxes, (EBIT), X, the amounts of taxes, (X-R)tau, and interest charges, R, yields the net profit, pi, which belongs to the shareholders:

(6) pi = X - (X - R)tau - R = (1-tau)(X-R).

The expected size of the annual profit stream will be:

(7) E(pi) = (1-tau)[E(X) - R].

- The second part of X[sup tau] is the amount of interest charges, R = rD.

The value of the firm can now be expressed as:

(8) V[sub L] = E(pi) + rD + tau(rho - r)D / rho,
and the value of equity is:

(9) S = V[sub L] - D = E(pi) + rD + tau(rho-r)D - rhoD / rho
= E(pi) - (1-tau)(rho - r)D / rho

whereby:

(10) rho = E(pi) / S - (1-tau)(rho - r)D / S.

As growth is excluded from the model, the expected rate of return to the shareholders (cost of equity), $i[\text{sup } *]$, is obtained directly by dividing the expected net profit by the market value of equity (e.g. Hamada, 1969; Rubinstein, 1973, and Copeland and Weston, 1998). Consequently, rearranging equation **(10)** yields the Modigliani and Miller (1963) expression of $i[\text{sup } *]$:

(11) $I[\text{sup } *] = E(pi) / S = rho + (1\text{-}tau)(rho\text{-}r)D/S$.

One can argue, however, that it is basically the required rate of return, $i[\text{sup }]$, that determines S in the market, not vice versa. Thus, a more specific expression for $i[\text{sup}]$ is needed than is provided by equation **(11)** above.

Although not given by Modigliani and Miller, this can be accomplished in the Modigliani and Miller framework as follows.

Based on equations **(1)** and **(2)**, the value of equity, S, can be written as:

(12) $S = V[\text{sub L}] - D = (1 - tau)E(X) / rho + tauR / r\text{-}R / r = (1 - tau)E(X) / rho - (1 - tau)R / r$.

By noting that the expected net profit to the shareholders is $E(pi) = (1-tau)(E(X) R)$, $i[sup *]$ can be expressed as:

(13) Multiple line equation(s) cannot be represented in ASCII text.

To illustrate, assume:

$E(X) = 1000$

$r = .05$

$p = .10$

$tau = 0$ or, alternatively, $tau = .50$.

Table 1 shows how increasing leverage affects key valuation variables in the Modigliani and Miller framework. Figures for the following variables are tabulated:

- Expected annual earnings, $E(X)$;
- The assumed amounts of interest charges, R;
- Required rate of return on equity $i[sup *]$, obtained from equation **(13)**; 1
- The value of the whole firm, V (from equation **(1)**);
- The amounts of debt, D (=R/r);
- The value of equity, S (given, e.g., by $S = E(pi)/i[sup *]$, by equation **(9)**, or, simply, S = V - D);

- Net profits to common shareholders after interest and taxes, $E(pi) = (1-tau)(E(X) - R)$.

The tax rate is assumed to be zero in table 1. Table 2 is based on otherwise identical assumptions except that the tax rate is 50 percent ($tau = .50$).

Table 1 shows that in the absence of taxes, the value of the firm (v) does not depend on leverage. With Taxes, the value of the firm increases due to the tax saving induced by leverage. Introducing taxation does not cause differences in the rates of return for stockholders, if leverage is measured in terms of total earnings and interest payments. (Note that if leverage is measured in terms of market values (for instance by D/S), the i^* - values would differ.) And while the tax shield increases the value of the firm with taxation, it does not affect the rate of return on common stock, i^*.

Table 1

Impact of Increasing Leverage (tau = .0)

E(X)	R	i[sup *]	V	D	S	E(pi)
1000	0	0.1	10000	0	10000	1000
1000	100	0.113	10000	2000	8000	900
1000	200	0.113	10000	4000	6000	800
1000	300	0.175	10000	6000	4000	700
1000	400	0.3	10000	8000	2000	600
1000	500	infinity	10000	10000	0	500
1000	600	neg.	10000	12000	-2000	400

Table 2

Impact of Increasing Leverage (tau = .50)

1000	0	0.1	5000	0	5000	500
1000	100	0.113	600	2000	4000	450
1000	200	0.113	7000	4000	3000	400
1000	300	0.175	8000	6000	2000	350
1000	400	0.3	9000	8000	1000	300
1000	500	infinity	10000	10000	0	250
1000	600	neg.	11000	12000	-1000	200

The troublesome aspect of the two tables is that the value of equity becomes zero in both cases when the interest bill (R) is only half of the total earnings. The Modigliani and Miller theory causes the value of equity to become worthless too soon. **(2)** (The figures for the example are taken from Modigliani and Miller (1958, p. 271, footnote 12), where they restricted the illustration to a single case in which R = 200, implying i* = .133.)

If the figures in Table 2 are in millions of dollars, the share of this firm, which is expected to earn $250,000,000 annually, are worthless.

Note that a shareholder has limited liability. In the worst possible case of bankruptcy, the shareholder will receive nothing. The shareholder, however, does not have to pay any of the firm's losses or costs associated with bankruptcy.

The reason for the inconsistency in the Modigliani and Miller model becomes evident if equation **(13)** is examined.

The equity becomes zero (and i* infinite) when:

$(E(x) / rho) - (R / r) = 0$ or **(14)**;

$(E(X)) / (rho = (R / r)$.

Because p is expected to exceed the risk free rate R, both sides of equation **(14)** become equal before $E(X) = R$. How much before depends on the relation of p to r.

Thus, one can argue that the model does not give realistic solutions. (Even the well-known extreme corner solution, which suggests that a firm should have nearly 100% debt, occurs when the firm may have normal levels of R/E(X).)

The proposed new approach, (The model for the valuation of the firm) consider the expected earnings after taxes, X[sup tau], which is the sum $E(pi) + R$. This can be expressed, as already noted in equation **(3)**, as:
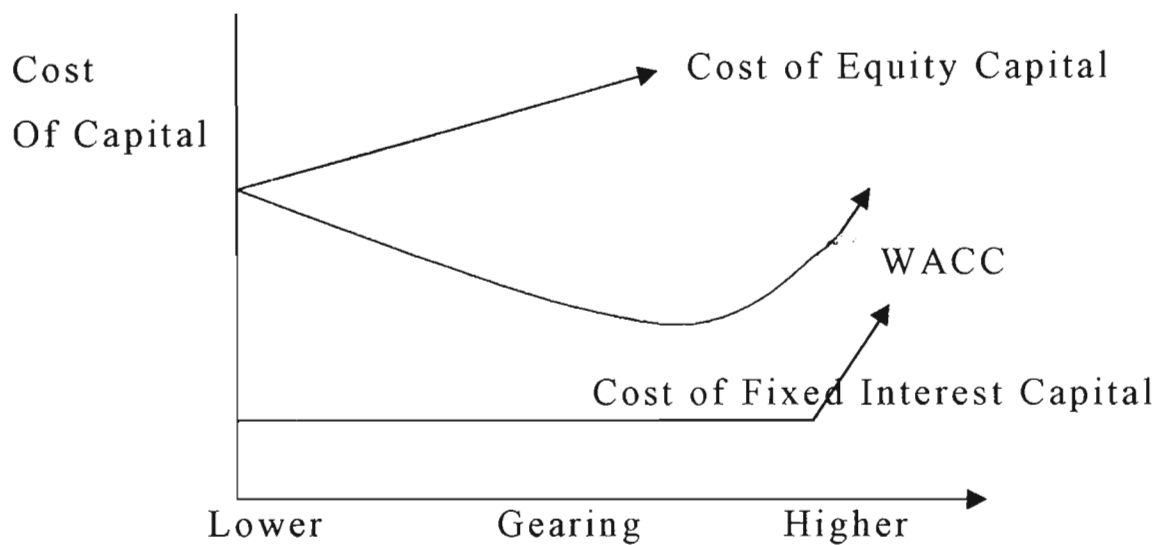
(15) $E(pi) + R = (1-tau)E(X) + tauR = (1-tau)(X) - R) + R$.

To obtain the value of debt capital, the amount of interest charges, R, is discounted at the market determined rate of interest for the firm, r_r. Hence, $D = R/r_r$ (i.e., perpetual risky debt is assumed. The amount of interest payments is assumed to be fixed, however, so that R can be considered a constant). The remaining part of the earnings stream after taxes belongs to the shareholders and should be discounted at the appropriate market determined rate, i^*. The formula for the value of the firm becomes:
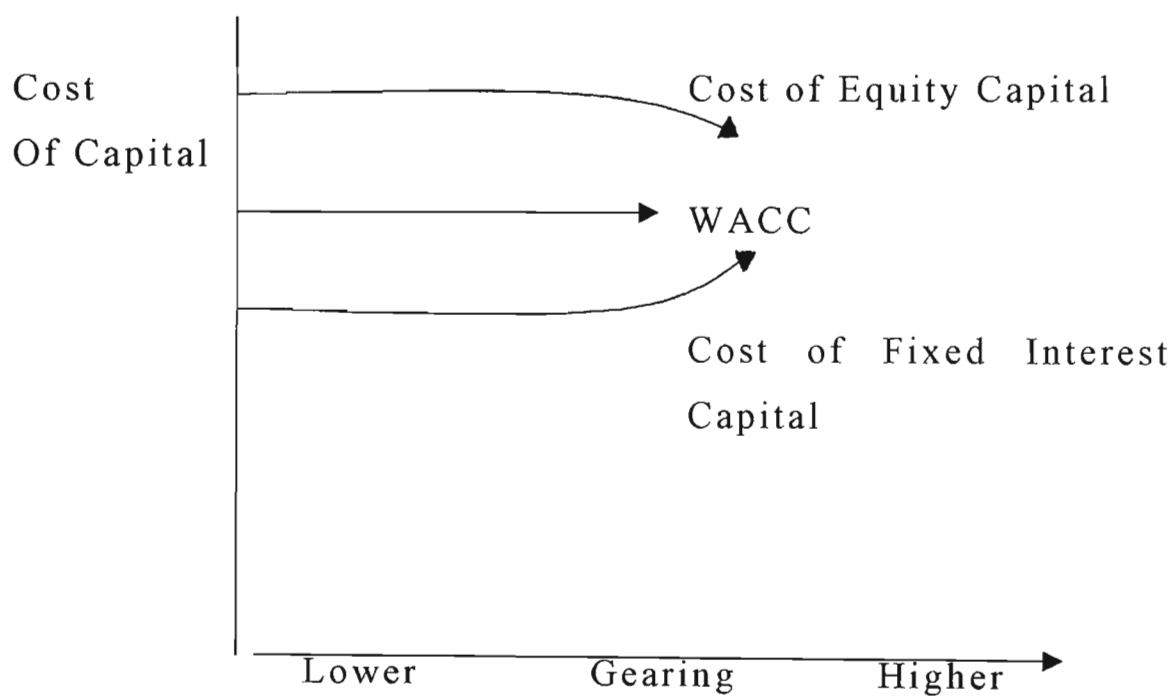
(16) $V_L = S + D = (1 - \text{tau})(E(X) - R) / i^* + R/r_r,$

but this is exactly the same as the formula under the traditional view strongly criticized by Modigliani and Miller (1958). But the traditionalists assumed that i^* is practically constant, at least up to some conventional level of leverage, then rises rapidly.

Traditional Theory

Cost
Of Capital

Cost of Equity Capital

WACC

Cost of Fixed Interest Capital

Lower   Gearing   Higher

Modigliani and Miller Theory

Cost
Of Capital

Cost of Equity Capital

WACC

Cost of Fixed Interest Capital

Lower   Gearing   Higher

Some share the opinion that there is nothing wrong in equation **(16)** as such. Instead, the key to valuation lies in the capitalized rate, i.e., how the market required rate of return , i[sup *] , is determined by the investors in common stock. (Besides, the Modigliani and Miller model also can be expressed so that it is equivalent in appearance to equation **(16)**.) The difference between the traditional view, the Modigliani and Miller theory, and the approach to be presented below are only due to differences in i[sup *].

The starting point of the proposed new approach is based on the treatment of risk by Modigliani and Miller (1963). They showed how the distribution of after tax earnings is affected by leverage. Their analysis proceeds basically as follows:

X is the (long run average) earning before interest and taxes generated by the currently owned assets of a given firm in some stated risk class, k. From the definition of risk class, [4] it follows that X can be expressed in the form E(X)Z, where E(X) is the expected value of X and the random variable Z = X/E(X), having the same value for all value for all firms in class k, is a drawing from distribution, say f[sub k](Z). Hence, the random variable X[sup tau], measuring the after tax return, can be expressed as:

(17) $X^{\tau} = (1-\tau)(X-R) + R = (L - \tau)X + \tau R = (1 - \tau)E(X)Z + \tau R$.

Cost of Equity Capital for an Unlevered firm.
(systematic risk not considered)

Define the cost of capital for an unlevered company to be equal to the risk free rate plus a premium paid on the business risk, measured by the coefficient of variation of its earnings (before or after taxes). In more specific terms:

$i^{*}_{U} = rf + a\, \delta_{x}$

where:

i^{*}_{U} = required rate of return (the subscription U denotes an unlevered firm);

rf = risk free rate

delta δ_{x} = coefficient of variation of the earnings of the firm; and

a = measure of market risk aversion

If $a > 0$, the market (investors in the aggregate) are risk averse. If $a = 0$, the market can be considered risk neutral. If $a < 0$, the market loves risk.

Cost of Equity Capital for a Levered Firm.

(systematic risk not considered)

Leverage intensifies the variability of the earnings stream accruing to shareholders. The additional variability caused by leverage, called financial risk, increases total risk. The next step in determining the required rate of return is to see how the variability of after tax net profits increases with leverage.

Net profit after interest and taxes (pi) is equal to $X(1 - tau) - R + tauR$. In accordance with equation **(17)**:

$$pi = (1-tau)X - R + tauR = (1-tau)E(X)Z - R + tauR$$

It is important to note that $i[sup *]L$ becomes infinite (equity value becomes zero) only when the interest payment equal expected earnings before interest and taxes. The Modigliani and Miller theory, in contrast, implicitly assumes that the value of equity becomes zero before (and sometimes well before) the interest payments equal the expected earnings.

Cost of Equity Capital under the Proposed New Approach.
(systematic risk considered)

The analysis to this point has abstracted from portfolio considerations. Investors can eliminate a considerable amount of risk by diversifying their investments. According to the asset pricing model (CAPM), the only risk the investors should consider is systematic risk or market risk that cannot be diversified. According to Sharp and Cooper (1972),

> "the appropriate measure of risk for a security or portfolio is the covariance of its rate of return with that of a portfolio composed of all risky assets, each held in proportion to its total value."

The division of a security's total risk into systematic (non-diversifiable) and nonsystematic (diversifiable) components is given in the CAPM framework.

Admittedly, the CAPM approach is concerned with returns and variability of returns on securities, whereas the derivation of the cost of equity capital model here is in terms of earnings and variability of earnings of firms.

Neither the new approach nor Modigliani and Miller theory identifies an optimal capital structure. Both imply (bankruptcy costs aside) that the firm should finance with nearly all debt.

3.2.2 Weighted Average Cost of Capital (WACC)

WACC calculations are identical for all cost of equity models. The only variable for each WACC calculation is the cost of equity for each model. The following formula is used to derive the WACC: (assume no taxes)

$$WACC = k_e W_e + k_d W_d$$

where:

W_e = proportion of equity finance to total finance

W_d = proportion of debt finance to total finance

If some numbers are now put into this equation, conclusions might be possible about the optimal debt level and therefore the value of the firm. If it assumed that the cost of equity capital is 20%, the cost of debt capital 10%, and the equity and debt weights are both 50% the overall cost of capital is 15%.

$$WACC = 20 \times 0.5 + 10 \times 0.5 = 15\%$$

It is further assumed that the firm is expected to generate a perpetual annual cash flow of £1m, then the total value of the firm is:

$V = C_1 / WACC = £1m / 0.15 = £6.667m$

This whole area of finance revolves around what happens next, that is, when the proportion of debt is increased. So, let us assume that the debt ratio is increased to 70% through the substitution of debt for equity. I will consider four possible consequences.

1. The cost of equity remains at 20%, the WACC decreases to 13%
2. The cost of equity capital rises due to increased financial risk to exactly offset the effect of the lower cost of debt, the WACC remains constant at 15%
3. The cost of equity capital rises, but this does not completely offset all the benefits of the lower cost of debt capital. Let us assume that equity holders demand a return of 22% return at a 70% gearing level, WACC decreases to 13.6%. In this case the increase of debt manages to reduce the overall cost of capital and thus increase the value of the firm and shareholders wealth.

$V = £1m / 0.136 = £7.35m$

4. The cost of equity rises to more than offset the effect of the lower cost of debt. Here the equity holders are demanding much higher returns as compensation for the additional volatility and risk of liquidation. Let us assume that a return of 40% is required by shareholders.

WACC = 19%

V = £5.26m

3.2.3 WACC - The correct discount rate

Two discount cash flow techniques are cited in The Appraisal of Real Estate. In one, the market value estimate is derived by discounting the net cash flows by a single rate. In the other, it is derived by discounting the equity cash flows by the equity yield rate and adding the present value of debt. The following demonstrates why the WACC is the theoretically correct discount rate to apply to the pre-finance cash flows.

Assume that a client requests an estimate of market value for an income-producing property. A ten-year discounted cash flow (DCF) analysis is performed. The reversion occurs at the end of the tenth year and is predicated on the 11th year net operating income (NOI) being capitalized at 8%. Sales commissions of 4% are deducted from the gross reversion to yield the net sales proceeds.

The basic assumptions of DCF analysis include first-year revenue of $1,000,000 and expenses of $150,000. Inflation is estimated at 5% per year, vacancy and collection loss is estimated at 8% per year.

Market research shows that typical loan terms include 10% interest, a 70% loan-to-value ratio, and a 30-year amortization schedule (annual payments). Equity investors, given these debt financing terms and the anticipated risk of the investment, expect an 18% rate of return. The WACC is calculated as follows:

Component	Proportion	Cost	WACC
Debt	70%	10%	7%
Equity	30%	18%	5.40%
Total	100%		12.40%

In the DCF model for estimating market value in real estate, the total value of the project is estimated by discounting the net cash flows and the net sales proceeds by the WACC at the end of the holding period. Then, if the appraiser wishes, equity value can be estimated by subtracting the present value of the debt from the total project value. According to Rappaport:

"The appropriate rate for discounting the company's cash flow stream is the weighted average of the costs of debt and equity capital. The cost of capital rate incorporates the returns demanded by both debt holders and shareholders because pre-interest cash flows are discounted, that is, cash flows on which both debt holders and shareholders have claim. The appropriate cost of capital is therefore one that considers the claim of each group in proportion to its targeted relative capital contribution. The cash flows discounted by the cost of capital yields corporate value, and then debt is deducted to obtain shareholder value."

The correct discount rate for a real estate market-value DCF analysis is the pre-tax WACC as applied to pre-finance cash flows. The WACC is determined by the market; it is based on the perceived business and financial risk of expected net cash flows. A principle advantage of employing WACC is that it separates the investment and finance decisions. Conversely, by discounting each investor-specific cash flow (i.e., debt and equity capital) by its respective costs, the investment and finance decisions are automatically intertwined. As long as the cost of debt and equity are held constant over the investment term and the proportion of debt diminishes and the proportion of equity increases, the implicit WACC increases over the investment period.

The implication is that the riskiness of the project is increasing over the investment term. By definition, the market-determined WACC incorporates equity investors' and creditors' expected returns based on anticipated risks. Sophisticated investors employ the WACC for discounting pre-finance cash flows. Discounting each capital source's cash flow by its respective cost results in an incorrect value estimate. It is theoretically indefensible and can cause investors to make less than optimal decisions.

3.2.4 Capital Structure Ratios

Debt / Total Capital

$$DTC_i = \frac{BD_i}{TC_i}$$

$$BD_i = STD_i + LTD_i + PSTK_i$$

$$TC_i = BD_i + EC_i$$

where,

DTC_i = Debt to total capital for company

BD_i = Book debt for company

TC_i = Total capitalization for company

STD_i = Book value of debt in current liabilities for company

LTD_i = Book value of long term debt for company

$PSTK_i$ = Book value of preferred stock for company

EC_i = Equity capitalization for company

Debt / M.V. Common Equity

$$DMVE_i = \frac{BD_i}{EC_i}$$

$$BD_i = STD_i + LTD_i + PSTK_i$$

$$EC_i = P_i \times S_i$$

where,

$DMVE_i$ = Debt to market value of equity for company

BD_i = Book debt for company

EC_i = Equity capitalization for company

STD_i = Book value of debt in current liabilities for company

LTD_i = Book value of long term debt for company

$PSTK_i$ = Book value of preferred stock for company

P_i = Price per common share for company

S_i = Common shares outstanding for company

The debt to market value of equity represents the most recent fiscal year's total book debt divided by the most recent month's equity capitalization.

Total equity capitalization represents the most recent month's closing stock price multiplied by the most recently available shares outstanding.

Debt to Equity, Debt Ratio & Interest Cover

Debt to Equity = $\dfrac{\text{Long-term loans}}{\text{Shareholders Equity}}$

Debt Ratio = $\dfrac{\text{Total Debt}}{\text{Total Assets}}$

Interest Cover = $\dfrac{\text{NOPBIT}}{\text{Interest}}$

These ratios examine the financing structure of the business. They focus on the combination of owners' equity and outside financing (long and short-term) used by the company.

The debt to equity ratio has attempted to concentrate only on long-term debt, that is debt which requires a reward in the form of interest. The comparison is thus between long-term loans and shareholders equity. The ratio may be interpreted to mean that for every £1 of capital provided by ordinary shareholders, "x" pence was raised through long-term loans. This ratio is often defined differently, most probably by comparing total debt to shareholders' equity.

Such a definition would provide little additional information to that already available from an intuitive interpretation of the debt ratio.

Comparing only the long-term loans to shareholders' equity provides insight into the capital structure of the company, thus providing information which will be useful in assessing financial risk.

The debt ratio has been defined as total debt compared to total assets.

The interest cover ratio, often referred to as the 'times interest earned ratio' shows the number of times which the net profit is able to cover the interest which is due. It is calculated before tax and interest in order to reflect the position more accurately.

4 Observation

The following is data extracted from audited financials and projections.

- Debt to Equity = <u>Long-term loans</u>

      Shareholders' Equity

Annual Audited	Annual Audited	Annual Audited	Annual Audited	Annual Audited	Annual Audited	Projected	Projected	Projected
1995	1996	1997	1998	1999	2000	2001	2002	2003
494%	412%	53%	15%	0%	10%	6%	10%	7%

The company has significantly reduced its levels of gearing over the last seven years (1995-2001). This is partly attributable to periodic capital injection by the shareholders into the business. All indications are that from a strategic point of view the company is to retain this policy of avoiding third party finance.

- Debt Ratio = <u>Total Debt</u>

      Total Assets

Annual Audited	Annual Audited	Annual Audited	Annual Audited	Annual Audited	Annual Audited	Projected	Projected	Projected
1995	1996	1997	1998	1999	2000	2001	2002	2003
89%	76%	48%	72%	73%	61%	45%	38%	34%

The company has moved towards a policy of using less debt to finance its assets. By comparing the two tables, it becomes evident that the majority of debt is involved in financing working capital.

With this policy in mind, of avoiding third party debt, I shall evaluate the impact of the two long-term loans on the capital structure.

This impact of long-term debt into the capital structure will strategically change the nature of the projected debt to equity ratio. By financing the business with more debt than equity, I shall measure the weighted average cost of capital (WACC), and the value of the firm (V) to determined whether or not shareholder maximization will be achieve.

5 Evaluation

Current Scenario:

WACC = 25% x 0.94 + 16% x 0.06 = 24.46%

V = R6'132'461

Proposed Scenario 1: (Lloyds TSB - UK)

WACC = 29% x 0.3 + 22% x 0.7 = 24.1%

V = R6'224'066

Proposed Scenario 2: (Investec Bank - SA)

WACC = 24% x 0.3 + 21% x 0.7 = 21.9%

V = R6'849'315

Scenario 2 is the preferred strategy towards maximizing shareholder wealth.

Based on the evaluation, I conclude that the null hypothesis (H_0) is rejected and the alternative (H_1) hypothesis is accepted.

Throughout the literature review we get a very distinct pattern developing from Modigliani and Miller's classical theory on capital structure to current world best practices currently being employed.

This pattern moves from higher to lower financial gearing levels throughout the decades. The 1980s view was that any business should gear up for expansion if it had room in its balance sheet now counts as a flat-earth theory of corporate finance.

There are numerous reasons for this pattern. Listed, are some of the key driving factors, resulting in the reduced levels of financial gearing, extracted from the literature review.

- Management's view about changes in the firms prospects for the future
- Increased economic uncertainty about the future
- Rapidly changing environments
- Maintaining a solid credit rating
- Increased understanding of financial distress
- The business specific issues (Trade-off Theory)
- The environment in which these forces operate
- The ability / inability to sustain stable cash flows
- A safety first approach

- Finding new ways of running business on lower levels of debt

In conclusion, it is interesting to note that this worldwide trend has been 'inline' with my business and its policy towards lower financial gearing. (Refer to audited financials)

In the past we have found ways of running our business on lower levels of debt. Our view of risk (interest rate, foreign exchange and inflation) has erred on the conservative but it has been well worth the headaches to keep borrowings to a minimum.

It was decided by the Directors at the Annual General Meeting, dated 25th January, 2001, that the company would maintain its current policy of 6% financial gearing.

Despite Scenario 2 proving to reduce the WACC and therefore maximize shareholders wealth and company value, we the Directors, have decided against this gearing strategy.

The current policy of 6% financial gearing will remain unchanged.

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