SOME ASPECTS AND DETERMINANTS OF CORPORATE CAPITAL STRUCTURE

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Introduction

Modigliani and Miller (1958) argued that borrowing had no effect on a firm's value provided that the following conditions are met: capital markets are frictionless, individuals can borrow at a risk-free rate, firms issue only two types of claims (risk-free debt and equity), all firms are in the same risk class, there are no agency costs, there are no bankruptcy costs and there is no asymmetric information. In that case, investors can always undo a firm's decisions on leverage by creating their own level of leverage by borrowing and lending at the risk-free rate and purchasing firms' shares. In other words, Miller and Modigliani (1958) argued that there was no optimal capital structure.

Relaxing the restrictive assumptions introduced by Miller and Modigliani provides basis for various theories of capital structure. This paper provides an account of the theoretical assumptions and empirical findings related to the following theories of capital structure: (i) theories based on the trade-off between taxes and bankruptcy costs; (ii) theories based on agency costs, (iii) pecking order theory of capital structure. On the end, paper deals with the four determinants of corporate capital structure and leverage.

1. Theories of capital structure based on the trade-off between taxes and bankruptcy costs

In 1963, Miller and Modigliani dropped their assumption of no taxes as it did not conform well to reality and came to the conclusion that the availability of tax shield on debt should encourage firms to choose a capital structure comprising solely of debt. Even this result was found to be unrealistic due to the existence of the costs of bankruptcy and financial distress. If leverage increases to an extreme level, the probability of default will increase. Hence, tax advantages stemming from a high level of indebtedness are offset by the costs of financial distress. This provides a basis for defining an optimal capital

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1 Borio (1990) defines bankruptcy costs as costs associated with the transfer of ownership and control rights from equity holders to creditors. These costs can be direct (legal and
structure. According to the static trade-off hypothesis by Myers (1984), the optimal capital structure, i.e. the capital structure maximising the value of the firm, can be presented with the following equation:

\[
\text{Value of a firm} = \text{Value if all-equity} + \text{Present value of tax shield} - \text{Present value of the costs of financial distress}.
\]

Additionally, Miller (1977) argues that although the existence of corporate taxes provides some advantage to debt financing, the existence of personal taxes diminishes the tax advantages of debt.

On the other hand, Myers (1984) argues that Miller’s complete elimination of the tax advantage does not occur because firms do not encounter the same marginal tax rate. Additionally, DeAngelo and Masulis (1980) demonstrate that personal taxes diminish tax shield on a firm’s value but they do not entirely eliminate this shield as the effective tax rate increases.

Bradley et al. (1984) found intra-industry similarities in firm leverage and persistent inter-industry differences in this regard. They also found highly significant inverse relation between leverage and earnings volatility. These findings are consistent with the trade-off theory of capital structure.

On the other hand, Fama and French (1998) conducted an empirical study using time series data and failed to find any evidence that interest tax shields contribute to a firm’s value. Additionally, it is even more difficult to detect the effects of the advantages of tax shields on a firm’s value using cross-sectional data because it is not possible to analyse the influence of changes in tax rates on corporate capital structure.

Given the insufficiently long time span of the present study, it will not be possible to analyse the impact of taxes on corporate capital structure using a time series model.

2. Theories of capital structure based on agency costs

According to Jensen and Meckling (1976), agency costs arise because of the two types of conflict. First, there is a conflict of interests between managers and shareholders. Second, there is a conflict of interests between shareholders and creditors.

Conflicts between managers and shareholders arise because managers do not capture the entire gain from their profit enhancement activities but they bear the entire costs of these activities. Consequently, managers tend to overindulge themselves in the consumption of perquisites in order to capture a greater portion of the gain from their profit enhancement activities. Jensen and Meckling (1976) argue that increasing the fraction of common stock held by managers can reduce these inefficiencies. It can be achieved by increasing the administrative costs) and indirect (loss of sales, liquidation rather than reorganisation when the going-concern value is higher than liquidation value).

2 The existence of non-debt tax shields, such as depreciation tax credits and investment tax credits, proves that some industries encounter very low marginal rates.

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leverage while holding the absolute level of managers’ investment in the firm constant. Moreover, Jensen (1986) argues that high level of leverage commits a firm to pay out a greater portion of income in the form of interests, which disciplines managers. Grossman and Hart (1982) posit that increases in leverage might provide another incentive to managers to increase their efficiency. Since the probability of default increases as the leverage increases, managers will make more effort to increase the firm’s profitability if bankruptcy is costly to them.\(^3\)

Conflict between shareholders and creditors can be explained by the so-called ‘asset substitution effect’. Jensen and Meckling (1976) and Fama and Miller (1972) argue that an increase in leverage increases the incentive of shareholders to make risky investments that have low probability of success but may result in high returns in the case of success. The shareholders capture most of the gain provided that a risky project is successful. On the other hand, if the project fails, creditors incur most of the loss because of the limited liability of shareholders. Should creditors properly anticipate this behaviour, they will require higher returns on their investments, which implies that shareholders will, after all, incur these agency costs.

Myers (1977) relates the agency costs resulting from the conflict of interests between shareholders and creditors to the so-called underinvestment problem. He argues that increased probability of bankruptcy due to an increase in leverage will reduce incentives of shareholders to contribute to the funding of new projects since creditors capture most of the benefit from the success whereas shareholders incur most of the costs.

On the other hand, managers’ concern with reputation may reduce the agency costs resulting from the conflict of interests between shareholders and creditors. Since managers are concerned with the success of the project they undertake, they will prefer a project with a higher probability of success relative to the project that has a lower probability of success even if the latter has a higher expected return. (see Hirshleifer and Thakor, 1989).

Jensen and Meckling (1976) argue that an optimal capital structure is determined by the trade-off between the agency costs of debt and the benefits of debt as previously described.

### 3. Pecking order theory of capital structure

Myers and Majluf (1984) show that a firm’s equity may be severely mispriced by the market provided that outside investors are less well informed than the current firm’s insiders about the value of the firm’s assets. The extent to which the market misprices equity can be so severe that even projects with positive net present value may be rejected. Since internal funds and risk-free debt are not subject to undervaluation, they will be preferred to equity in this situation.

\(^3\) These costs make take form of the lost benefits of control and reputation (Grossman and Hart, 1982).
Myers (1984) regards this as a “pecking order” theory of financing. According to this theory, firms primarily raise internally generated funds and if their investment opportunities cannot be financed relying only on internal funds, they will raise funds from external sources. Of course, a firm will prefer debt to equity in order to avoid costs resulting from asymmetric information.

Pecking order theory implies that changes in debt ratios are driven by the need for external funds and not by any attempt to reach an optimal capital structure. There is no well-defined debt-equity ratio because it is changed when there is an imbalance of net cash inflows and real investment opportunities (see Shyam-Sunder and Myers, 1999). Consequently, profitable firms with limited investment opportunities should have relatively low debt-equity ratios.

It is interesting to explore whether the fact that firms issue new equity can be reconciled with the pecking order theory. Myers (1984) offers a possible explanation. He posits that firms issue equity in order to acquire financial slack (liquid assets), which decreases the probability of default previously enhanced by high leverage.

As for the empirical evidence regarding pecking order theory of capital structure, Harris and Raviv (1991) show that empirical results are not consistent with the pecking order theory. On the other hand, Shyam-Sunder and Myers (1999) found that a simple pecking order model explains much greater portion of the time series variation in actual debt ratios than a target adjusted model based on the static trade-off theory. Some other authors also find evidence in favour of the pecking order theory (see Sharpe, 1995; Jensen et al., 1992).

The theories of capital structure imply that various variables may influence corporate capital structure. However, Harris and Raviv (1991) state that previous empirical research identifies the following variables as being significantly related to leverage: tangible fixed assets, non-debt tax shields, growth opportunities, firm size, earnings volatility, advertising expenditure, probability of bankruptcy, profitability and uniqueness of the product. This paper is focussed on the following four variables: tangibility, size, profitability and growth opportunities.

4. Determinants of corporate capital structure

This section provides an account of the empirical literature regarding the correlation between the four proposed determinants of corporate capital structure and leverage. The main purpose of this section is to identify proxies for the four proposed determinants of corporate capital structure. Table 1 provides a summary of results of the previous empirical research on corporate capital structure.
Determinants of corporate capital structure – empirical results

<table>
<thead>
<tr>
<th>Determinant</th>
<th>MAR</th>
<th>LM</th>
<th>KES</th>
<th>KS</th>
<th>TW</th>
<th>FL</th>
<th>AM</th>
<th>KP</th>
<th>HF</th>
<th>RZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangibility</td>
<td>+</td>
<td>+</td>
<td>n/a</td>
<td>n/a</td>
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<tr>
<td>Size</td>
<td>+</td>
<td>n/a</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td></td>
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<tr>
<td>Profitability</td>
<td>n/a</td>
<td>+</td>
<td>n/a</td>
<td>n/a</td>
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<td></td>
<td></td>
<td>n/a</td>
<td>n/a</td>
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<tr>
<td>Growth opportunities</td>
<td>n/a</td>
<td>n/a</td>
<td>+</td>
<td>s</td>
<td></td>
<td>n/a</td>
<td>n/a</td>
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</tr>
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</table>

Legend: MAR = Marsh (1982), LM = Long and Malitz (1985), KES = Kestner (1986), KS = Kim and Sorensen (1986), TW = Titman and Wessels (1988), FL = Friend and Lang (1988), AM = Allen and Mizuno (1989), KP = Kare and Price (1990), HF = Homaifar et al. (1994), RZ = Rajan and Zingales (1995), n/a = study does not include the variable, s = positive relation but variable was found not to be significant at conventional

**Tangibility.** - The main role of collateral is to decrease the costs of asymmetric information that are incurred by creditors who overstate the borrower’s ability to repay the debt (see Rajan and Winton, 1995). Since tangible assets may serve as a collateral against a firm’s debt, it is expected that the proportion of tangible assets in a firm’s total assets be inversely correlated with the firm’s leverage (see Rajan and Zingales, 1995).

On the other hand, Shleifer and Vishny (1992) argue that tangibility defined using book values might not be significant in explaining leverage as creditors tend to be more concerned with prices that firm’s assets can fetch in liquidation than with book values of these assets. However, difficulties related to an attempt to correctly estimate market values of a firm’s tangible assets in case that they are to be sold separately imply that book values may not be completely irrelevant to estimating the value of a firm’s assets.

Some empirical studies find evidence supportive of the claim that tangibility is positively related to leverage (see Rajan and Zingales, 1995, Long and Malitz, 1985 and Marsh, 1982). Conversely, Titman and Wessels (1988) find that tangibility is not significant in explaining the level of leverage. The previous empirical research measures a firm’s tangibility as a ratio of the firm’s fixed tangible assets to total assets.

**Size.** - A firm’s size is usually regarded as being inversely related to the probability of default. Therefore, according to the trade-off theory of capital structure, larger firms should have higher leverage, other things being equal. The rationale for the claim that size is inversely related to the probability of default is that larger firms tend to be more diversified, which decreases the probability that they will go bankrupt (see Rajan and Zingales, 1995). This implies that conglomerates should be more levered than specialised firms of the same size, other things being equal (see Harris and Raviv, 1991).

On the other hand, it is possible to argue that size is a proxy for information outside investors have. Therefore, provided that information asymmetry is inversely related to the size of a firm, larger companies should
find it easier to issue equity and, hence they should be less levered compared with smaller firms (see Rajan and Zingales, 1995). Similarly, Borio (1990) argues that small firms should be more levered because their access to capital markets is limited due to severe information asymmetry and hence, they are compelled to rely on customer relationships with few credit institutions.

Some empirical studies find that size is positively related to leverage (see Rajan and Zingales, 1995; Homafar et al. 1994; Marsh, 1982). On the other hand, some studies find that size is not significant (Aggarwal and Baliga, 1987; Kim and Sorensen, 1986; Ferri and Jones, 1979; Toy et al., 1974).

The previous empirical research of corporate capital structure uses different proxies for size. A vast majority of these studies uses the natural logarithm of a firm's sales as a proxy for size. However, some authors use additional proxies, such as the natural logarithm of a firm's total assets and the natural logarithm of a firm's market capitalisation (See Marsh (1982) and Kestner (1986)). The main drawback of the market capitalisation as a proxy for size is the fact that the changes in a firm's size might result from changes in market values of a firm's equity without being accompanied with changes in firm's assets. On the other hand, the reported value of a firm's asset depends on the choice of a particular accounting method for valuation of assets. In order to avoid these biases, vast majority of studies uses the natural logarithm of net sales as a proxy for size.

**Profitability.**— According to the pecking order theory, profitability should be inversely related to a firm's leverage because more profitable companies will have more internal resources to finance their investments. Of course, highly profitable firms may need to raise funds from external sources as they might be abundant in profitable opportunities. Martin and Scott (1974) reconcile these two stances by claiming that such firms may find it favourable to raise funds through new equity issues because they tend to experience rising share prices.

On the other hand, trade-off theory of capital structure implies that profitability is positively related to a firm's leverage due to the fact that highly profitable firms have a lot of taxable income to shield. The argument against this theory stems from the fact that debt does not present the only source of tax shield (see DeAngelo and Masulis, 1980).

However, most of the empirical studies find evidence in favour of the pecking order theory of capital structure (see Rajan and Zingales, 1995; Allen and Mizuno, 1989; Kestner, 1986). Conversely, Titman and Wessels (1988) present evidence that profitability is negatively related to leverage when leverage is measured in terms of market values but when leverage is measured in terms of book values, they find that profitability is not significant. They conclude that increase in market value of equity owing to an increase in profitability results in a decrease in a firm's debt ratio since firms may be using book values in order to set their target debt ratios.

Empirical literature on corporate capital structure usually uses the ratio...
of profit before interest, taxes and depreciation to net sales as a proxy for profitability. On the other hand, some studies use the ratio of profit before interest, taxes and depreciation to the book value of total assets as a proxy for a firm’s profitability (see Titman and Wessels, 1988). In order to avoid previously mentioned biases related to the use of either book values or market values of a firm’s assets, vast majority of studies uses the ratio of profit before interest, taxes and depreciation to net sales as a proxy for a firm’s profitability.

**Growth opportunities.** According to the theories of corporate capital structure based on agency costs, highly levered firms are likely to pass up profitable opportunities. Hence, firms with a lot of profitable opportunities will rely more heavily on equity finance as opposed to debt finance (see Myers, 1977). Empirical studies use the ratio of the market value of total assets to the book value of total assets as a proxy for growth opportunities (see Rajan and Zingales, 1995).

Rajan and Zingales (1995) found evidence supportive of the claim that market-to-book ratio is negatively correlated with leverage because firms tend to issue stocks when their stock price is high relative to book value. This implies that the method used to calculate leverage has significant impact on detected relationship between growth opportunities and leverage. Provided that market value of equity is used when calculating leverage, it is possible that low leverage coinciding with high market-to-book ratio is due to a considerable increase in market value of a firm’s equity rather than due to changes in the firm’s financing decisions. (Hence, in order to avoid this source of bias, it is necessary to use both book and market values of a firm’s equity when calculating leverage).

On the other hand, Kestner (1986) found a positive relationship between leverage and growth opportunities. Titman and Wessels (1988) found that growth opportunities are not significant in explaining the differences in leverage.

There are several possible reasons why the above results differ. First, the differences in results might stem from differences in samples. Second, the differences regarding the relation between the four proposed determinants of corporate capital structure and leverage might stem from the differences in accounting information that was used to calculate leverage. Third, the differences in results might stem from differences in models that were used by these authors. Finally, since the aforementioned studies cover different time spans, it is possible that the differences in results are due to the changes in the impact of the four determinants on leverage with the passage of time (see Rajan and Zingales, 1995).

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4 Profit is defined in such a way in order to diminishes the effect of taxes, interest rates and the choice of depreciation methods on a firm’s profitability.
References


