

# Theoretical and Practical Review of Capital Structure and its Determinants

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## Abstract

Capital structure is the mixture of debt and equity financing. Its choice and determinants related to many different factors. This thesis firstly present several traditional theories discussed on capital structure, such as trade-off theory, agency cost theory and theory of pecking-order. Then the paper concluded seven determined factors from practical aspects and discussed on the correlations among these factors and the choice of capital structure.

**Keywords:** Capital structure, Pecking-order theory, Agency costs, Tangibility, Growth opportunity

## 1. Introduction

The capital structure of a firm describes the way in which a firm raised capital needed to establish and expand its business activities. It is a mixture of various types of equity and debt capital a firm maintained resulting from the firm's financing decisions.

More than four decades ago the modern theory of capital structure established after the publication of the celebrated paper of Modigliani and Miller (1958). Capital structure choice has inspired and fascinated many researchers. Countless studies investigated into the explanations of firms' capital structure choice, both theoretical studies and empirical ones. There still remains no clear answer to Myers 20 years old question (1984, p575) "How do firms choose their capital structure?" Different theories answer this question from different point of view. For instance, traditional trade-off theory postulates the existing of an optimal capital structure, which indicates the optimal choice of capital structure by firms is a balance of corporate tax shield against the bankruptcy cost and agency cost. However pecking order theory throws doubt on the existence of target capital structure, suggesting that firms use debt only when the internal financing is not available.

Previous studies concluded that firms' leverage ratio closely related to firm-level characteristics. For an instance, Harris and Raviv (1991) summarize that "leverage increases with fixed assets, non-debt tax shields, investment opportunities and firm size and decreases with volatility, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product." Most of previous empirical evidences were based on US firms with few notable exceptions. However, the experience of a single country may cover the effects of different financial system and economic tradition on capital structure choice. Cross-country comparisons are essential for the understanding of the difference in leverage choices across countries. And also cross-country comparison can be used to suggest linkages between institutional differences and empirical results about capital structure.

Among the notable exceptions, Rajan and Zingales (1995) investigated the leverage ratios and capital structure determinants in G-7 countries. They found that although belonging to different financial systems, the firms are levered similarly across G-7 countries at the aggregate level with only U.K and Germany being less levered. And the factors related to leverage identified by studies in the United States seems similarly related to the leverage choice in G-7 countries as well.

The variation in the results suggests that the institutional differences contribute to the capital structure choice of the firms.

## 2. Theory Review of Capital Structure and its Determinants

### 2.1 MM Theory

Regarded as the starting of modern theory of capital structure, Modigliani and Miller (1958) illustrates that under certain key assumptions, firm's value is unaffected by its capital structure. Capital market is assumed to be perfect in MM world, where insiders and outsiders have symmetric information; no transactions cost, bankruptcy cost or distortionary taxation exist; equity and debt choice becomes irrelevant and internal and external funds can be perfectly substituted. If these key assumptions are relaxed, capital structure may become relevant to the firm's value. So following research efforts have been contributed to relaxing the ideal assumptions and describing the consequences.

## 2.2 Static Trade-off Theory

In a static trade-off framework, the firm is viewed as setting a target debt-equity ratio and gradually moving towards it. Debt financing has one important advantage over equity: the interests that firm pays are tax-deductible while equity income is subject to corporate tax. But debt also increases financial risk that makes debt-financing choice not cheaper than equity. So, in a static trade-off consideration, managers regard the firm's debt-equity decision as a trade-off between interest tax shields of debt and the costs of financial distress. In particular, capital structure moves towards targets that reflect tax rates, assets type, business risk, profitability and bankruptcy costs. Actually, the firm is balancing the costs and benefits of borrowings, holding its assets and investment plans constant (Myers, 1984, p.577).

The general results of various work in this aspect of leverage choice is that if there are significant "leverage-related" costs, such as bankruptcy costs, agency costs of debt, and loss of non-debt tax shields, and if the income from equity is untaxed, then the marginal bondholder's tax rate will be less than the corporate rate and there will be a positive net tax advantage to corporate debt financing. The firm's optimal capital structure will involve the trade-off between the tax advantage of debt and various leverage-related costs.

Due to the distinctions in firm-specific characteristics, target leverage ratios will vary from company to company. Institutional differences, such as different financial systems, tax rate and bankruptcy law etc, will also lead the target ratio to differ across countries. The trade-off theory predicts that safe firms, firms with more tangible assets and more taxable income to shield should have high debt ratios. While risky firms, firms with more intangible assets that the value will disappear in case of liquidation, ought to rely more on equity financing. In terms of profitability, trade-off theory predicts that more profitable firms should mean more debt-serving capacity and more taxable income to shield, therefore a higher debt ratio will be anticipated. Under trade-off theory, the firms with high growth opportunities should borrow less because it is more likely to lose value in financial distress.

## 2.3 Agency costs based theory

Theory based on agency costs illustrates that firm's capital structure is determined by agency costs, which includes the costs for both debt and equity issue. The costs related to equity issue may include: i) the monitoring expenses of the principal (the equity holders); ii) the bonding expenses of the agent (the manager); iii) reduced welfare for principal due to the divergence of agent's decisions from those which maximize the welfare of the principal. Besides, debt issue increases the owner-manager's incentive to invest in high-risk projects that yield high returns to the owner-manager but increase the likelihood of failure that the debt holders have to share if it is realized. If debtholders anticipate this, a higher premium will be required, which in turns increase the costs of debt. Then, the agency costs of debt include the opportunity costs caused by the impact of debt on the investment decisions of the firm; the monitoring and bond expenditures by both the bondholders and the owner-manager; and the costs associated with bankruptcy and reorganization (See Hunsaker 1999). Since both equity and debt incur agency costs, the optimal debt-equity ratio involves a trade-off between the two types of cost.

Agency costs arise due to the conflicts of interest between firm's owners and managers. Jensen and Meckling (1976) introduce two types of conflicts: conflicts between shareholders and managers; and conflicts between shareholders and bondholders:

### 2.3.1 Shareholders-managers conflicts

This kind of conflict stems from the separation of ownership and control. If managers do not own 100% of the firm, they can only capture a fraction of the gain earned from their value enhancement activities but they need to bear the entire costs of these activities. The shareholders-managers conflicts take several distinct forms: the first (Jensen and Meckling (1976)) is that divergent from the shareholder's interest of firm value maximization, managers prefer to exert less effort and have greater perquisite levels, such as luxuriant office and corporate jets, etc. In this case, increasing the managers' equity holdings will help to align the interests of shareholders and managers. Or, keeping managers equity investment constant, increasing the debt level also helps to mitigate the loss of conflicts between shareholders and managers. Since debt forces managers to pay out cash, reducing the free cash flow managers can waste on the perquisites. The second (Masulis (1988)) arises because managers may prefer short-term projects, which produce results early and enhance their reputation quickly, rather than more profitable long-term projects. Third, managers may prefer less risky investments and lower leverage to reduce the probability of bankruptcy (see Hunsaker (1999)). Fourth, according to Garvey and Hanka (1998), managers want to stay in their positions, so they wish to minimize the likelihood of employment termination. As this increases with changes in corporate control, management may resist takeovers, irrespective of their effect on shareholder value. On operating decisions, managers and shareholders may also have different preferences: Harris and Raviv (1990) observe that managers will

typically wish to continue operating the firm even if liquidation is preferred by shareholders; Stulz (1991) observes that managers prefer to invest all available funds even if shareholders want to be paid dividends.

A special case of the conflicts between shareholders and managers is the overinvestment problem. Jensen (1986) argues that, instead of working under shareholders interests to maximize firm's value, managers prefer to increase firm's size to enjoy the benefit of control. In this case, managers have incentives to cause their firm to grow beyond the optimal size and accept negative net present value (NPV) projects. Jensen argues that the overinvestment problem can be aggravated by more free cash flow and less growth opportunities. Issuing debt helps to mitigate agency problems that arise from managerial behavior under divergent interests between shareholders and managers. For example, the overinvestment problem can be mitigated by issuing debt since debt commits firm to pay out cash so prevents managers from investing in negative NPV projects. Jensen refers to the non-discretionary nature of debt as the disciplining role of debt. As Hunsaker (1999) points out, an increase in debt also increases the risk of bankruptcy, therefore limits management's consumption of perquisites. Besides, issue convertible debt also helps to discipline managers' behavior because they give managers a chance to share in a firm's profits in case of good performance and thus reduces the monitoring costs.

### 2.3.2 Shareholder-bondholder conflicts

The typical phenomenon of these conflicts is that the shareholders or their representatives make decisions transferring wealth from bondholders to shareholders. Certainly, the bondholders are aware of the situations in which this wealth expropriation may occur, therefore, will demand a higher return on their bonds or debts. Debt aggravates agency conflicts between shareholders and bondholders in three distinguished categories that have been theoretically analyzed: i) The direct wealth-transfer from bondholders to shareholders (Smith and Warner (1979)): Shareholders can increase their wealth at the expense of bondholders' interests by increasing the dividend payment; The issuance of debt with higher priority will expropriate wealth from current bondholders. ii) Asset-substitution is another source of the conflicts (see Jensen and Meckling (1976) and Smith and Warner (1979)): When signing debt contracts, bondholders demand an interest rate according to the riskness of the firm's investment activities. While debt contracts gives shareholders an incentive to invest in risky projects because if it succeeds the returns above the face value of debt will be owned by shareholders and in case of failure, the consequence is mainly born by bondholders because of shareholders' limited liability. This excessive return from risky projects makes safe projects less attractive to shareholders since returns from the safe projects suffice to pay the bondholders. If bondholders can anticipate shareholders incentive of substituting safe projects by risky projects, they will ask for a higher risk premium. Also the anticipation of wealth expropriation will lead to the increase in risk premium. The increased costs of debt are then born by shareholders since they are residual claimants of the firm; iii) Underinvestment problem is another agency problem results in shareholder-bondholder conflicts (Myers (1977)): Underinvestment problem mostly incurs in financial distress. The overhang of debt decreases the shareholders incentives to invest in new projects (even the projects with high growth opportunities will be passed through) because the profits from these projects will be exhausted in debt repayment.

One way to minimize these conflicts is that firms with high growth opportunities should have lower leverage and use a greater amount of long-term debt than firms in more mature industries. The conflicts can also be mitigated by adjusting the properties of the debt contracts, for example, the adjustment can be done by including covenants such as adding limits on the dividends payment or setting restrictions on the disposition of assets as discussed by Smith and Warner (1979). Alternatively, debt can be secured by collateralization of tangible assets in the debt contracts that are thoroughly discussed in Stulz and Johnson (1985). The issue of convertible debt or debt with warrants can serve as another way of mitigating the conflicts as shown by Jensen and Meckling (1976) or Green (1984), because they argue that convertible debt will have lower agency costs than plain debt.

### 2.4 Asymmetric information

Theories based on asymmetric information assumed that firm managers and insiders possess private information about the firm's characteristics of return stream or investment opportunities that are rarely known by outside investors. Leverage choice under this framework is either designed to mitigate the inefficiencies of investment decisions that are caused by information asymmetry (Myers and Majluf (1984)) or used as a signal to outside investors about the information of insiders (Ross(1977)). And the pecking order theory results from asymmetric information will also be discussed in this section.

Myers and Majluf (1984) draw attention to the use of debt to avoid the inefficiencies in a firm's investment decisions that would otherwise result from information asymmetries. The nature of the asymmetric information in this case is that insiders (managers) know more about the companies' prospects, risks and values than do outside investors. Because this information asymmetry between investors and firm insiders, if firms need to finance the new

projects by issuing equity, the equity may be under-priced by the market. This has the effect of also under-pricing new equity which is used to finance new investment projects. Since theory under asymmetric information assumes that managers act at the interests of existing shareholders. The managers may even forgo a positive-NPV project if it would require the issue of new equity, since this would give much of the project's value to new shareholders at the expense of the old. (Myers and Majluf, 1984)

The fact that firms prefer internal to external financing and debt to equity if they issue securities is known as the hypothesis of pecking order (Myers (1984)). As internal funds (retained earnings) incur no flotation costs and require no additional disclosure financial information about the firms' investment opportunities and their potential profits that managers don't want to be made public. If a firm must use external funds, the preference is to use the following order of financing sources: debt, convertible securities, preferred stock, and common stock. Since only common stocks hold the right in the management, this preference reflects managers' incentives to retain control of the firms and willingness to avoid the negative market reaction to an announcement of a new equity issue. Myers (1984) also presents an asymmetric information model to explain this financing hierarchy. Firms prefer to finance real investment by issue less risky securities--bonds other than equity. In case of equity issuing, firms will fall into the dilemma of either passing up positive-NPV projects or issuing stocks at a price they think is too low.

### 3. Empirical Evidence on Capital Structure Determinants

Previous studies have shown that a number of factors affect firm's capital structure choice, such as tangibility, tax, size, profitability, growth opportunities and volatility etc. In their distinguished works, Harris and Raviv (1991) summarize that "leverage increases with fixed assets, non-debt tax shields, investment opportunities and firm size and decreases with volatility of earnings, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product." However, the relationship between the factors and capital structure is not consistent. The empirical results vary, and sometimes contradict in many studies. Moreover, comparisons of capital structure across countries reveal that institutional differences may affect the cross-sectional relation between leverage and factors. In the next sub-section, we will present the proxies used in this thesis to test the determinants of corporate leverage choice in U.K and Germany, the two countries that are homogeneous in their level of economic development but follow different institutional traditions.

#### 3.1 Tangibility

Theories generally state that tangibility is positively related to leverage. Since the tangible assets can be used as collateral in external borrowing, the presence of a large fraction of tangible assets of a firm help to get bank loans at a lower interest rate and it also helps to reduce the risk the lender suffering from the agency cost of debt. Since the debts can be secured by the collateralization of tangible assets, the firm's opportunity to engage in asset substitution is reduced by the presence of a large fraction of secured debts. (Stulz and Johnson (1985); Johnson (1997)) For firms with more intangible assets, the costs of capital are higher since monitoring is more difficult. Hence, a firm with a large fraction of tangible assets is expected to have more debt. We define tangibility as the book value of property, plants and equipment -total net (PPENT) scaled by total assets.

#### 3.2 Effective tax rate

The effect of tax rate on leverage ratio is rather mixed. On one hand, as the interest from loan is tax-deductible, firms with higher taxable income ought to have more debt to benefit from tax-shield gain. (Hauge and Senbet, 1986). As a result, effective tax rate is expected to be positively associated with the level of debt. While on the other hand, higher effective tax rate also reduce internal funds and increase the cost of capital. Therefore a negative relationship between effective tax rate and level of debt is expected. Among others, Titman and Wessel (1988) find no significant relation between effective tax rate and leverage ratio. We test the relationship between effective tax rate and leverage ratio by deriving the "tax rate" from *Compustat* to use as a proxy of effective tax rate. "Tax rate" is calculated by dividing the sum of income taxes by the pretax income less appropriations to untaxed reserves.

#### 3.3 Size

It is generally agreed that size is positively associated with leverage. On one hand, size may be an inverse proxy for the probability of bankruptcy. Larger firms are usually more diversified and have more stable cash flow. So the probability of bankruptcy is smaller for large firms compared with smaller ones. Furthermore, many studies suggest that large firms prefer to issue long-term debt while small firms choose short-term debt to finance their projects. And because of the advantage of economies of scale and bargaining power with creditors, large firms bear lower costs in issuing debt and equity compared with small firms (Michaelas et al. (1999)). This positive relation is verified by most studies with a few exceptions. For example, Rajan and Zingales (1995) found size to be positively associated with leverage in G-7 countries except Germany and this exception is hard to explain from the view of institutional differences. Since liquidation occurs more often in Germany than other countries, under the assumption

that liquidation is costly and firm is valued less in liquidation than going on operating, bankruptcy is potentially more costly in Germany and a stronger positive relationship between size and leverage is expected. On the other hand, size may also be a proxy information asymmetry between insiders and outsiders. Large firms are thought to be associated with lower degree of information asymmetry compared with smaller ones. Fama and Jensen (1983) argue that larger firms provide more information to outside investors than smaller firms. Benefiting from the low information asymmetry, larger firms are expected to have easier access to debt market and borrow at a lower cost. To capture the size effect on firm's leverage choice, we employ two measures--natural logarithm of total sales and natural logarithm of total assets proxies of firm's size.

### 3.4 Growth Opportunities

Theoretical studies generally suggest that there is a negative relationship between growth opportunities and leverage. In an underinvestment situation, firms with high growth opportunities may forgo positive NPV projects because the existing of outstanding debt (Myers(1977)). Since the returns from such investment will be transferred to debtholders rather than shareholders. If management pursues growth objectives, management and shareholder interests tend to coincide for firms with strong investment opportunities. In case of overinvestment, in which firms lacking investment opportunities, debt limits the agency costs of managerial discretion. So firms with high growth opportunity may not issue debt in the first place and an inverse relationship between growth opportunities and leverage is expected to hold. In their studies, Rajan and Zingales (1995) use market-to-book ratio (defined as market value of assets over book value of assets) as a proxy of growth opportunities and argue two main reasons why market-to-book ratio is negatively related leverage: First, firms with high market-to-book ratios suffer higher costs of financial distress; Second, firms prefer to issue stock when the stocks are overvalued.

In this study, another market-to-book ratio (defined as market value of equity over book value of equity) is adopted to measure growth opportunities of firms.

### 3.5 Profitability

Theoretical predictions yield no consistent conclusions for the correlation between profitability and leverage. Trade-off models argue that profitable firms have greater needs to shield income from corporate tax and should borrow more than less profitable firms. While pecking order theory suggests an inverse relationship between profitability and the level of debt. Firms are assumed to prefer internal financing to external financing in a pecking order framework. This preference leads firms to use retained earnings first as investment funds and move to external financing only when retained earnings are insufficient. When facing the choice between bonds and equity, firms will prefer debt issue to equity issue. In this case, profitable firms are expected to have less debt. Agency-based models give predictions upon this issue in the following ways: in the free cash flow theory, Jensen (1986) defines debt as a discipline device to enforce managers to pay out profits and as a result the cash flow wasted in empire-building is reduced. Therefore, a positive correlation between profitability and leverage is implied; in a signaling framework, profitable firms are assumed to use debt as a signal of the firm's quality, this theory also predicts a positive relationship.

However, most empirical studies confirm the negative correlation between profitability and leverage (See Titman and Wessels (1988), Rajan and Zingales (1995), Wald (1999) etc.) while the positive relationship are rarely supported by empirical studies. In this thesis, we use return on assets (defined as earnings before interest and tax (EBIT) over total assets) as a proxy for profitability.

### 3.6 Volatility of earnings

Volatility or business risk is a proxy for the probability of financial distress and it is generally expected to be inversely correlated with leverage. Several measures of volatility have been used in empirical studies such as standard deviation of the return on sales, standard deviation of the first difference in operating cash flow scaled by total assets, or standard deviation of the percentage change in operating income. Here we use standard deviation of returns on assets suggested by Booth et al. (2001) to measure volatility.

Firms with high volatility in earnings face a higher risk that earnings level drops below the debt service commitment. This may force firms to arrange funds at high cost to pay the debt or go to bankruptcy in an extreme case. However, if financed by equity, firms can choose to forgo dividends payments during the period of financial distress. This indicates that firms with high earnings volatility will borrow least and prefer equity to debt when facing external financing choices. Thus an inverse relationship between volatility and leverage is expected.

However, the potential cost occurs in time of financial distress may be reduced if firms have close relation with their lenders. Hence, German firms are expected to suffer less from the potential cost of failing to service the debt. While

the cost is high for the British counterparts since they raise funds from capital market and have arm length relation with the lenders.

### 3.7 Liquidity

As suggested by pecking-order theory, firms prefer internal financing to external financing. Therefore, firms are likely to create liquid reserves from retained earnings. If liquid assets are sufficient to finance the investments, firms will have no need to raise external funds. Hence, liquidity is expected to be negatively related to leverage.

Here we use current ratio (calculated as current assets over current liabilities) as a proxy of liquidity.

Now we summarize the firm-level determinants of capital structure, definitions and theoretical predicted signs in Table 1.

Table 1. Summaries of determinants of capital structure, definitions and theoretical predicted signs

Proxy (Abbreviation)	Definitions	Theoretical Predicted Signs
Tangibility (TANG)	Book value of plants and equipment -total net (PPENT) scaled by total assets.	+
Tax (TAX)	Effective tax rate	+/-
Size (SIZE)	Natural logarithm of total sales	+
Profitability (ROA)	Earnings before interest and tax divided	+/-
Growth opportunities (MTB)	Market value of assets over book value of assets	-
Volatility (VOL)	Standard deviation of ROA	-
Liquidity (LIQ)	Current assets divided by current liabilities	-

Note: “+” means that leverage increases with the factor.

“-” means that leverage decreases with the factor.

“+/-” means that both positive and negative relations between leverage and the factor are possible.

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