

International Research Journal of Applied and Basic Sciences  
© 2013 Available online at [www.irjabs.com](http://www.irjabs.com)  
ISSN 2251-838X / Vol, 5 (7): 891-896  
Science Explorer Publications



# Capital Structure Decisions and Determinants: An Empirical Study in Iran

Aiyoub Ahmadimousaabad<sup>1</sup>, Melati Ahmad Anuar<sup>2</sup>, Saudah Sofian<sup>3</sup>, and Agha Jahanzeb<sup>4</sup>

1,2,3,4. Financial Management, Faculty of Management, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia.

*Corresponding author email:* [aiyuob151@yahoo.com](mailto:aiyuob151@yahoo.com)

**ABSTRACT:** The present study is aimed to investigate the determinants of capital structure of Iranian firms listed on Tehran Stock Exchange for the period between 2001 and 2010. A panel data set of 123 (1230 observation) companies for the 10 years period is collected from published annual reports of companies from Tehran Stock Exchange. The study explores the traditional financial theories (Trade-off theory and Pecking order theory) to investigate the determinants of capital structure. The variables of size, profit, growth, tangibility, and risk factors are included to represent the potential influence of traditional theories. The study analyzes the impact of the financial factors on the debt and equity structure of the Iranian firms. The results indicate that the size and risk are positively related to capital structure. In addition, profitability, growth and tangibility are negatively related to capital structure. The result of firm size is consistent with the trade-off theory and result of profitability is consistent with the pecking order theory.

**Key Words:** Capital Structure, Debt Equity ratio, Trade off Theory and Pecking Order Theory.

## INTRODUCTION

Capital structure refers to the combination of debt and equity but giving priority over each other in a financial decision of a firm to invest in pursuit of maximizing value of the firm and its shareholders wealth. The financial decision of capital structure is not only concerned with finding the right kind of finance, but is also concerned with choosing the best overall mixture of these funding options for commencement and running the operations of business. Therefore, the financial decision is considered as to have occupying important role in financial management to formulate the capital structure of the firms, which affects its overall operations, growth and value.

Modigliani and Miller (1958) initially asserted that the value of firm is entirely independent of its capital structure under perfect capital markets; therefore debt and equity finance can substitute perfectly for each other. Modigliani and Miller (1963) later found that the presence of taxes and information asymmetry lead to the choice of capital structure and significantly affect the value of the firm. Accordingly, the choice of capital structure waxes and wanes the value of companies. A right choice builds an optimal capital structure that maximizes their value. Therefore, the study on the determinants of capital structure is necessary to provide companies in making an optimal choice between debt and equity to achieve the maximum value of firms.

## Literature Review

The issue of capital structure remains a puzzle to scholars, although many studies have been conducted on it (Harris and Raviv, 1991; Swanson et al., 2003). The theories of capital structure were first propounded in the 1950s (Durand, 1952; Modigliani and Miller 1958). Durand (1952) put forward his 'relevance theory' stating that capital structure affects the value of firms and companies because of the impact of relative different costs of debt and equity have on the weighted average cost of capital. In contrast, Modigliani and Miller's (1958) 'irrelevance theory' explained that capital structure does not affect the value of firms under perfect market conditions because it is the return to assets rather than the costs of capital that determine the value of the firms.

The "financial determinant" is a dimension suggested by the "trade-off theory" and was developed with regard to Modigliani and Miller's irrelevance theory. Trade-off theory considers some conditions of imperfect market and explains that firms determine their optimal capital structure by finding the balance between benefits of debt and

costs of debt. The theory of trade-off mainly takes under consideration how capital structure is affected by corporate tax (Modigliani and Miller, 1963); personal tax (Miller, 1977); non-debt tax shields (DeAngelo and Masulis, 1980) and bankruptcy costs (Baron, 1974; Warner, 1977). Modigliani and Miller (1958) conceive capital structure as mainly financial, tax and growth factors. A different perspective from Modigliani and Miller's theory is the "signalling models" that considers the impact of information asymmetry on capital structure. Myers and Majluf (1984) regarded debt or equity as a signal of information to markets and developed the "pecking order theory". This theory asserts that firms and companies often finance their investments in the order of using retained earnings, debt and then equity due to asymmetric information in different financial funding instruments, such as debt funding versus equity funding and as internal funding versus external funding.

The relative costs of debt and equity affect the choice of capital structure of firms and companies. In a chosen capital structure, the net balance of relative debt and equity costs (Durand, 1952) could affect the performance and value of firms. However, under optimal market conditions, the capital structure of a firm does not affect its value. In terms of performance and value of firms and companies, a mature field of research is the investigation of desires, optimal and actual capital structures of firms. Capital structure, may likely not affect the performance and the values of firms (Modigliani and Miller, 1958). A large number of theoretical and empirical studies on choosing capital structure have emerged after early studies on determinants of capital structure (Sametz, 1964; Harris and Raviv, 1991; Swanson et al., 2003). Over time, the theoretical paradigm has shifted gradually from financial approaches to non-financial ones, from country-based studies to regional ones, from developed economies to developing ones, and from market economies to transitional ones.

This study is to determine the financial factors underlying capital structure of Iranian non-financial industry listed companies in Tehran Stock Exchange during the years of 2001 to 2010. We investigate the standard firm-specific determinants of capital structure, like firm size, profitability, growth opportunities, tangibility and risk.

### ***Dependent Variable***

Following the similar studies (Rajan and Zingales, 1995; Wiwattanakantang, 1999; Korajczyk and Levy, 2003; Lipson and Mortal, 2009; Kayo and Kimura, 2011), capital structure is defined using two alternative measures, including book leverage and market leverage. The book leverage is computed as the ratio of total book value of debts to total book value of assets. The market leverage is calculated by dividing total book value of debt by the sum of book value of debts and market value of equity. This study uses book value measure of leverage and in the case of bankruptcy; book value of debt is taken into consideration. Secondly the market value of debt does not affect the tax shield (Banerjee et. al. 2000) and is immaterial in affecting the payment of debt and generating the cash saving through tax shield.

### ***Explanatory Variables***

#### ***Profitability***

Profitability of a firm has a predicted negative impact on debt level. A company with high profit has an opportunity and need to lower debt. According to Myers and Majluf (1984), firms are supposed to prefer internal financing to external. Accordingly, more profitable companies have a lower need for external financing whereby they have lower leverage. The hypothesis is that there is a negative relationship between profitability and capital structure. A bulk of empirical studies found a negative relationship between leverage and profitability (e.g. Kester, 1986; Friend and Lang, 1988; Titman and Wessels, 1988; Rajan and Zingales, 1995; Booth et al., 2001; Huang and Song, 2002; Lim, 2012; Qayyum, 2013; Cortez, 2012). While Long and Malitz (1985), Salawu and Agboola (2008) found the positive relationship.

#### ***Size***

A firm's size has a predicted positive impact on debt level. A large-sized company is less likely to become bankrupt, and therefore attracts more debt. The hypothesis is that there is a positive relationship between size and capital structure. Rajan and Zingales (1995), Huang and Song (2002) and Lim (2012) evidenced this positive relationship between company size and the possibility of bankruptcy from their analysis of the international data, concluding that large firms are less likely to become bankrupt. Warner (1977) and Ang et al. (1982) studied the negative relationship between a company's value and the direct bankruptcy costs and found that large firms tend to have less bankruptcy costs.

#### ***Growth***

A firm's growth potential has a predicted positive impact on debt level. A company with fast growth has great potential for revenue growth and, therefore, has high credit-worthiness to take up more debt. The hypothesis

is that there is a positive relationship between growth and capital structure. According to Kester (1986), a firm experiencing fast growth tends to borrow more than can be internally generated for growth. Lenders are also willing to lend to firms in fast growth. The debt-equity ratio increases with the growth of the firm's sales revenue. According to Myers (1977), a higher leveraged company most probably passes up profitable investment opportunities; therefore, firms with high future growth opportunities should use more equity financing. Such financing effectively transfers wealth from stockholders to debt holders (Huang and Song, 2002).

### **Tangibility**

A firm's tangibility has a predicted positive impact on debt level. A company with more tangible assets would have more collateral assets to service debt in the event of bankruptcy and, therefore, would have a greater ability to attract more debt (Philippe et al., 2005; Awanet al., 2011). The hypothesis is that there is a positive relationship between tangibility and capital structure. According to the theoretical point, tangible assets can be used as collateral (Kester, 1986). In the case of bankruptcy, higher tangibility lowers the risk of a creditor and increases the value of the assets. Several empirical studies confirm this prediction, a positive relation between tangibility and leverage, such as Friend and Lang, (1988), Titman and Wessels, (1988), Rajan and Zingales, (1995) and Cortez, (2012). On the other hand, Booth et al. (2001), Huang and Song (2002) and Bauer, (2004) displayed a negative relation between tangibility and leverage.

### **Volatility**

Volatility can be seen as a proxy for firm risk (probability of bankruptcy). Accordingly, volatility is assumed to be negatively related to leverage. This assumption was empirically founded (Bradley and Kim, 1984; Friend, and Lang, 1988). However, Huang and Song (2002, p. 9) stated that: "As the variance of the value of the firm's assets increases, the systematic risk of equity decreases. So the business risk is expected to be positively related to leverage." The positive relation between volatility and leverage was confirmed by Kim and Sorensen (1986) and Huang and Song (2002). Conversely, a negative relation is found by Bradley et al., (1984) and Titman and Wessels (1988). The volatility in a firm's earnings has a predicted negative impact on debt level. A company with high risk or great volatility in earnings is more likely to go bankrupt, and therefore has low credit-worthiness for debt. The hypothesis is that there is a negative relationship between risk and capital structure. Findings show that earnings risk negatively affects the debt-equity ratio (e.g., Bradley and Kim, 1984; Friend, and Lang, 1988). This is because high earnings risk casts a doubt on the firm's ability to pay interest and affects debt levels. High earnings risk also means a higher bankruptcy risk to creditors.

## **DATA AND METHODOLOGY**

### **Data**

This study used secondary data set that collected from annual reports of 123 listed companies within the period from 2001 to 2010 in Tehran Stock Exchange. This provided the study with availability and quality of data. The data set did not cover any financial institutions because they have different asset and liability structures.

## **METHODOLOGY**

The study used multiple regression analysis to test the dependent variable with the independent variables, so the result of the study estimates the following regression model.

$$y_{cp} = \beta_0 + a\text{PROF}_{cp} + b\text{SIZE}_{cp} + d\text{GROW}_{cp} + e\text{TANG}_{cp} + g\text{RISK}_{cp} + \varepsilon_{cp}$$

Where  $y_{cp}$  is the capital structure response for company C in year P, with financial covariates are effective profitability (PROF), firm's size (SIZE), growth (GROW), tangibility (TANG), and risk (RISK). The disturbance term denoted as  $\varepsilon_{cp}$  was assumed to be serially uncorrelated with mean zero.

### **Hypotheses**

In order to investigate the effect of independent variable (i.e. tax, profit, growth, tangibility and risk) on capital structure the study used five hypotheses:

H<sub>1</sub>: there is a negative relationship between profitability and capital structure.

H<sub>2</sub>: there is a positive relationship between size and capital structure.

H<sub>3</sub>: there is a positive relationship between growth and capital structure.

H<sub>4</sub>: there is a positive relationship between tangibility and capital structure.

H<sub>5</sub>: there is a negative relationship between risk and capital structure.

### **Analysis**

To obtain an overview of the nature of data set, descriptive statistics analyses (minimum, maximum, mean, standard deviation) were employed for the dependent and independent variables.

Table 4.1 indicates that the highest mean value of size 5.547 whereas the profit has 0.133 the lowest value. The debt equity ratio has highest standard deviation of 0.696 whereas the profit has the lowest standard deviation of 0.119.

To check the degree of correlation and direction of relationship between the independent and dependent attributes of capital structure choice, the spearman's correlation is run using EViews.

Table 4.2 indicates that the correlation coefficients among debt to equity and all the independent variables are significant. Debt to equity has positive significant relationship with the size ( $r = 0.0756$ ) and risk ( $r = 0.0564$ ) respectively. This means that firms which high in size and with high risk tend to have more debt. In addition, debt to equity is significantly and negatively related with relevance of profitability ( $r = -0.3690$ ), growth ( $r = 0.0256$ ) and tangibility ( $r = -0.1075$ ). This indicates that firms with high profitability, growth and high tangibility have low debt level.

Table 4.3 presents the influences of independent variables on debt equity ratio. Firm size is positively influencing the debt to equity and is consistent with trade off theory with coefficient value of 0.144 which is significant. A large-sized firm tends to be diversified in its business and has a greater separation of ownership from management, thus more debt is preferred. Afza and Hussain (2011) suggested that the firms which are large in size and having good assets structure should go for debt financing to finance new projects.

Profitability is negatively related on capital structure with coefficient value of -0.357 which is significant at 1% confidence level. Companies with high profitability do not usually seek for debt financing, whereas companies with low profitability are prone to increase debt level. Because of higher profitability, firms may prefer to keep their profits in the company as an internal funding source. The behavior of firms in Tehran Stock Exchange is following the Pecking Order Theory. Based on table 4.3 growth is insignificant as p-value is more than 0.05. Tangibility is negatively influencing the debt to equity and is inconsistent with Static Trade off Theory with coefficient value of -0.481 which is significant. An explanation for this result could be that high tangible assets of a company give rise to reduce information asymmetry between management and outside investors; therefore, these companies tend to issue the shares (equity). This research has displayed a negative relationship between growth and capital structure with coefficient value of -0.108 which is consistent with pecking order theory. Thus, these findings suggest that higher leveraged company most probably passes up profitable investment opportunities; therefore, firms with high future growth opportunities should use more equity financing. Such financing effectively transfers wealth from stockholders to debt holders. Risk is positively influencing the debt to equity and is inconsistent with Static Trade off Theory with coefficient value of 0.155 which is significant. The reason could be that risk in the developed countries is the probability of bankruptcy but Iranian companies do not pay attention the probable outcome of debt. Costs of bankruptcy in Iran are different from other countries; there is no proper bankruptcy rule (lack of effective bankruptcy laws) and also credit rating companies.

### **CONCLUSION**

Trade-off theory and pecking order theory are two main theories which affect the determinants of capital structure of firm either positively or negatively. First is the Trade-off theory which explains the tradeoff between the cost of bankruptcy and benefits of tax shield. Second is pecking order theory which developed by Myers and Majluf (1984). The behavior of firms in Tehran Stock Exchange shows that a large-sized company is less likely to become bankrupt, and therefore attracts more debt, supporting the static trade off theory. Profitability variable is negatively related to debt to equity and is consistent with the results of previous researches. The firms with higher profitability prefer equity financing than debt financing in the business and the result is significant, supporting the pecking order theory. In addition growth negatively related to debt to equity. Firms with high growth opportunity do not seek for debt financing and it is consistent with pecking order theory. In summary, this paper extends our understanding of the trade-off theory and pecking order theory in capital structure in explaining the financing choice of Iranian listed companies on Tehran Stock Exchange. The findings of this study generally suggest that financial factors are an important determinant of Tehran Stock Exchange's capital structure. It is, however, important for future research to also consider the financial issue in explaining the capital structure of Tehran Stock Exchange in order to better appreciate the relationship.

Table 2.1. Summary of Expected Results

Determinants	Proxy used in this study	Expected relationship
Leverage	Debt/Equity	-
Profitability	Net Profit/Total Asset	Negative
Size	log of Total Assets	Positive
Growth	log of Total Revenue	Negative
Tangibility	Fixed Assets /Total Assets	Positive
Risk	standard deviation of ROE	Negative

Table 4.1. Descriptive Statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
DE	1230	-5.32	12.43	2.690	2.242	-0.075	2.807
PROF	1230	-0.32	0.62	0.133	0.119	.638	2.022
SIZE	1230	3.46	7.98	5.547	0.636	.416	1.286
GROW	1230	2.44	8.54	5.400	0.691	.399	2.607
TANG	1230	0	0.88	0.244	0.166	1.215	1.489
RISK	1230	0	3.89	0.580	0.678	2.038	3.952

Table 4.2 Correlation Coefficient Analysis

variables	DE	PROF	SIZE	GROW	TANG	RISK
DE	1.0000					
PROF	-0.3690**	1.0000				
SIZE	0.0756**	-0.0052	1.0000			
GROW	-0.0256*	0.0541	0.6737**	1.0000		
TANG	-0.1075**	-0.0162	-0.513	-0.0950**	1.0000	
RISK	0.0564*	0.2513**	0.0549	0.0241	0.0156	1.0000

Correlation is significant at the 0.01 level \*\*

Correlation is significant at the 0.05 level \*

Table 4.3. Regression Analysis

$DE_{cp} = \beta_0 + aTXERCJ_{cp} + bPROF_{cp} + dGROW_{cp} + eTANG_{cp} + gRISK_{cp} + \epsilon_{cp}$		
Applying ordinary least squares		
Variables	Coefficient	p-value
Intercept	0.931	0.000*
PROF	-2.357	0.000*
SIZE	0.144	0.002*
GROW	-0.108	0.003*
TANG	-0.481	0.000*
RISK	0.155	0.000*
Adj.R2	0.179	
R2	0.182	
F-Value (Sig.F)	54.476	0.000

N = 1230 (number of observations)

\* are significant at p < 0.05

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