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**ORIGINAL ARTICLE****Investigation Effect of Firm Characteristics on Capital Structure Firms Listed in Tehran Security Exchange****<sup>1</sup>Saber akbarian, <sup>2</sup>Shahryar Fathi, <sup>3</sup>Shaban moradi**<sup>1,2</sup> Malekan Branch, Islamic Azad University, Malekan, Iran<sup>3</sup>Member ship Shahid Sattari University Master, Tehran, Iran

Saber akbarian, Shahryar Fathi, shaban moradi: Investigation Effect of Firm Characteristics on Capital Structure Firms Listed in Tehran Security Exchange

**ABSTRACT**

The aim of this research is to study the surveying effect of firm characteristics on capital structure firms listed in Tehran Stock Exchange. The variables are in the paper capital structure (financial leverage) dependent variable and characteristics firm (size, profitability, tangibility, liquidity, growth opportunities and age firm) independent variables. This research is applied and the statistic population is firm listed in Tehran Stock Exchange. By using the omission sampling method, 88 firms listed in Tehran Stock Exchange, has been selected during the years 2006 to 2010. The panel data and multiple regressions have been used to test research hypothesis. The findings of this study show that there is a negative relation between capital structure and profitability and liquidity. The between variables size, tangibility, growth opportunities and age firm is not significant relation on the capital structure.

**Key words:** capital structure, tangibility, profitability, growth opportunities, liquidity, financial leverage**Introduction**

The various financing decisions are vital for the financial welfare of the firm. A false decision about the capital structure may lead to financial distress and eventually to bankruptcy. The management of a firm sets its capital structure in a way that firm's value is maximized. However, firms do choose different financial leverage levels in their effort to attain an optimal capital structure. Although theoretical and empirical research suggests that there is an optimal capital structure, there is no specified methodology, yet, that financial managers can use in order to achieve an optimal debt level. However, financial theory does provide some help in understanding how the chosen financing mix affects the firm's value.

*Theoretical Framework:**Review of Capital Structure Theories:*

Miller [6] included personal taxes in the solution for capital structure. This conceptual framework builds on the capital structure paradigm of MM. As before, the firm is modeled with two investment components that generate value and they are equity and debt. The market value of the equity

or debt will be reduced by a factor of minus the personal tax rate.

*The Trade-off Theory:*

In this section I will review literature that suggests that debt has a central role in firm financing. Jensen argues that debt is an efficient means by which to reduce the agency costs associated with equity. Klaus and Litzenberger show that with the tax advantages of debt, optimal capital structure includes debt financing. Ross and Leland and Pyle argue that debt can be valuable as a device for signaling firm value. The three main hypotheses that are used to explain differences in capital structure between companies are the transaction-cost hypothesis, the asymmetric information hypothesis and the tax hypothesis. According to Harris and Raviv [28], 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.

*The Pecking Order Theory:*

According to the pecking order theory, the firms will prefer internal financing. The firms prefers internal to external financing, and debt to equity if

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the firm issues securities. In the pure pecking order theory, the firms have no well-defined debt-to-value ratio. There is a distinction between internal and external equity. Several authors have been given credit for introducing signaling as an argument in the discussion of debt's explanatory factors. Ross, Leland and Pyle and Myers and Majluf [8] are often quoted as the seminal articles in this branch of the literature.

Myers and Majluf [8] describe the preference like this: The firms prefer internal financing; they target dividends given investment opportunities, then chose debt and finally raise external equity. The pecking order was traditionally explained by transaction and issuing costs. Retained earnings involve few transaction costs and issuing debt incurs lower transaction costs than equity issues. Debt financing also involves a tax - reduction if the firm has a taxable profit. Myers and Majluf [8] invoked asymmetric information to give a theoretical explanation for the pecking order phenomena. The signaling model described in Section A leads to a pecking order concept of capital structure, where retained earnings are preferred to debt and debt is preferred to new equity. The signaling model showed that only low profit type firms would issue equity in a separating equilibrium. Rational investors foresee this and demand a discount in Initial Public Offerings (IPO). This discount is a cost of raising equity that will be borne by the internal stockholders. Debt signals to the capital market that the issuing firm is a high performance firm. There are different theories of capital structure. David Durand propounded the net income approach of capital structure in 1952 [12]. This approach states that firm can increase its value or lower the cost of capital by using the debt capital. Net operating income approach is converse to this approach. This approach contends that the value of a firm and cost of the capital are independent to capital structure. Thus, the firm cannot increase its value by judicial mixture of debt and equity capital. These are two extreme approaches to capital structure. Solomon developed the intermediate approach to the capital structure in 1963. This traditional theory of capital structure pleads that value of the firm goes increase to a certain level of debt capital and after then it tends to remain constant with a moderate use of debt capital, and finally value of the firm decreases. Thus, this theory holds the concept of optimal capital structure.

The modern theory of capital structure began with the celebrated paper of Modigliani and Miller published in 1958 [28]. In this paper, they supported the net operating income approach and rejected the traditional theory of capital structure. They contend in their first proposition that the market value of any firm is independent to its capital structure and is given by capitalizing its expected return at the rate appropriate to the risk class [6]. This was theoretically very sound but was based on the

assumptions of perfect capital market and no tax world, which were not valid in reality. So, this was corrected in 1963. In correction, they incorporated the effect of tax on value and cost of the capital of the firm [7]; and contend that, in the presence of corporate tax, the value of the firm varies with the variation of the use of the debt due to tax benefit on interest bill [14].

In 1976, Miller propounded the next version of irrelevancy theory of capital structure. He pleaded in his presidential address to Annual Meeting of American Finance Association held on September 17, 1976 in Atlanta City, New Jersey that capital structure decisions of firms with both corporate and personal taxes are irrelevant. In 1974, Myers and Pogue developed three theories-the lenders chickens out first, the manager's chickens out first, and the shareholders chickens out first-of debt capacity. The third theory-the shareholders chickens out first-pleads the optimal capital structure. In the 1970s, a number of scholars developed debt capacity theory. Among them, Scott's multiperiod model of debt is considerable debt capacity theory. This theory pleads that the value of non-bankrupt firm is a function of expected earnings and the liquidating value of its assets and the optimal level of debt is an increasing function of liquidating value of the firm's assets, the corporate tax rate, and the size of the firm. Martin and others summarized the debt capacity theories developed by different scholars during 1970s and concluded that the value of the firm is maximized when marginal benefit of debt is equal to the marginal cost of debt (1988, 356). Jensen and Meckling developed the capital structure theory based on the agency costs in 1976. Firm incurs two types of agency costs-cost associated with the outside equity holders and cost associated with the presence of debt in capital structure. Total agency cost first decreases and after certain level of outside equity capital in

Capital structure, it increases. The total agency cost becomes minimal at certain level of outside equity capital. Thus, this theory pleads the concept of optimal capital structure. Two sets of capital structure theories were developed during the latter half of the 1970s and first half of the 1980s. Ross developed one set of capital structure theories based on the asymmetric information in 1977, and Myers and Majluf developed the next set in 1984. The first set pleads that the choice of firm's capital structure signals to outside investors the information of insiders, and the second set contends that capital structure is designed to mitigate the inefficiency in the investment decision caused by the information asymmetry [28] In the course of the development of capital structure theory, Myers elaborated and brought out the Pecking order theory in 1984 originally developed by Donaldson in 1961. According to this theory, management strongly favors internal generation as a source of new funds

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even to the exclusion of external sources except for occasional unavoidable bulge in the need for funds. This theory explains the negative relation between profitability and debt ratio and contends that there is no target debt-equity ratio. In financing, first, management prefers the internal equity financing, and then debt financing and finally external equity financing. Thus, this theory explains the financing behavior of management.

#### *Determinants of Capital Structure:*

Capital structure of a firm is determined by various internal and external factors. The macro variables of the economy of a country like tax policy of government, inflation rate, capital market condition, are the major external factors that affect the capital structure of a firm. The characteristics of an individual firm, which are termed here as micro factors (internal), also affect the capital structure of enterprises. This section presents how the micro-factors affect the capital structure of a firm with reference to the relevant capital structure theories stated earlier.

#### *Size of a Firm:*

The bankruptcy cost theory explains the positive relation between the capital structure and size of a firm. The large firms are more diversified, have easy access to the capital market, receive higher credit ratings for debt issues, and pay lower interest rate on debt capital. Further, larger firms are less prone to bankruptcy [29] and this implies the less probability of bankruptcy and lower bankruptcy costs. The bankruptcy cost theory suggests the lower bankruptcy costs, the higher debt level. The empirical studies carried out during the 1970s, as suggested by this theory, also show the positive relation between the size of firms and capital structure. But results of some empirical studies do not corroborate with this theoretical relation.

#### *Growth Rate:*

The agency cost theory and pecking order theory explain the contradictory relation between the growth rate and capital structure. Agency cost theory suggests that equity controlled firms have a tendency to invest sub-optimally to expropriate wealth from the enterprises' bondholders. The agency cost is likely to be higher for enterprises in growing industries which have more flexibility in their choice of future investment. Hence, growth rate is negatively related with long-term debt level. This theoretical result is backed up by the empirical studies carried out by Kim and Sorensen, and Titman and Wessels [29] but Kester study rejected this relation. Pecking order theory, contrary to the agency cost theory, shows the positive relation between the

growth rate and debt level of enterprises. This is based on the reasoning that a higher growth rate implies a higher demand for funds, and, *ceteris paribus*, a greater reliance on external financing through the preferred source of debt. For, pecking order theory contends that management prefers internal to external financing and debt to equity if it issues securities [8]. Thus, the pecking order theory suggests the higher proportion of debt in capital structure of the growing enterprises than that of the stagnant ones. Chung, Chaplinsky and Niehaus showed the evidence contrary to the pecking order theory.

#### *Profitability:*

The static trade-off hypothesis pleads for the low level of debt capital of risky firms [8]. The higher profitability of firms implies higher debt capacity and less risky to the debt holders. So, as per this theory, capital structure and profitability are positively associated. But pecking order theory suggests that this relation is negative. Since, as stated earlier, firm prefers internal financing and follows the sticky dividend policy. If the internal funds are not enough to finance financial requirements of the firm, it prefers debt financing to equity financing [8]. Thus, the higher profitability of the enterprise implies the internal financing of investment and less reliance on debt financing. Most of the empirical studies support the pecking order theory. The studies of Titman and Wessels [29], show the negative relation between the level of debt in capital structure and profitability. Indian and Nepalese studies also show the same evidence as foreign studies do [14]. Only a few studies show the evidence in favor of static trade-off hypothesis contention.

#### *Data and measurement of variables:*

In this paper, we investigate the determinants of capital structure for the firms listed in Tehran Stock Exchange market during the period 2006-2010. The final sample, after considering any missing data, consists of 88 firms.

Our dependent variable is the Financial Leverage (variable:  $FL_{i,t}$ ) which is defined as the ratio of total debt divided by the total assets of the firm. Total debt contains both long-term and short-term liabilities. The next variable we consider refers to the size of the firm. We proxy the size of the firm considering its sales (variable:  $SIZE_{i,t}$ ). We also consider the relation between the liquidity of the firm and its capital structure. We use the quick, or acid test, ratio (variable:  $LIQ_{i,t}$ ) which is equal to current assets minus inventories divided by current liabilities. This ratio shows the ability of the firm to cover its short-term liabilities and it measures the liquidity of the firm.

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Another variable that we also investigate if there is a relation between the growth opportunity of the firm and its capital structure (variable:  $GO_{i,t}$ ). We proxy our growth opportunity measurement as the annual change on earnings. The selected explanatory variables are: tangibility, age, profitability, and the level of growth opportunities. These four explanatory variables are identified as important factors in the G-7 countries, as well as in ten developing countries. Profitability is proxied by the ratio of profit before tax to the book value of total assets (variable:  $Prof_{i,t}$ ). Tangibility is measured by the ratio of fixed assets to total assets, and (variable:  $Tang_{i,t}$ ). age is measured by the logarithm of age.

#### Hypotheses:

This study has tested the following null hypotheses on relation between the defined variables and capital structure of listed companies:

HO1: There is no significant relation between the size and financial leverage.

HO2: There is no significant relation between the liquidity and financial leverage.

HO3: There is no significant relation between the growth opportunity and financial leverage.

HO4: There is no significant relation between the profitability and financial leverage.

HO5: There is no significant relation between the Tangibility and financial leverage.

HO6: There is no significant relation between the Age and financial leverage.

#### Specification of the Model:

Following multiple regression model has been used to test the theoretical relation between the financial leverage and characteristics of the firm.

$$FL = a + b_1 Size + b_2 Liq + b_3 GO + b_4 Prof + b_5 Tang + b_6 Age \quad (1)$$

#### Analysis of Regression Results:

##### Preliminary Analysis:

Multiple regression was run in SPSS to test the set hypotheses. Before running the regression, investigation into the multicollinearity problem was carried out. First of all, bivariate correlations among the independent variables were examined to find out the multicollinearity problem.

**Table 1:** Summaries of basic Descriptive statistics

	FL?	SIZE?	PROF?	TANG?	LIQ?	GO?	AGE?
Mean	0.650666	5.526841	0.192109	0.233391	0.856291	0.083925	1.463182
Median	0.663500	5.390000	0.157500	0.185000	0.712000	-0.006500	1.556000
Maximum	2.083000	7.974000	4.192000	0.889000	19.98800	49.66100	1.756000
Minimum	0.060000	4.358000	0.001000	0.003000	0.043000	-39.22700	0.602000
Std. Dev.	0.217111	0.625137	0.222745	0.166936	1.074432	3.725309	0.227005
Skewness	1.150410	1.158200	13.30797	1.235780	13.44751	2.940572	-1.388104
Kurtosis	9.946150	4.789090	237.6721	4.317064	231.9207	105.1838	4.186373
Jarque-Bera	981.6175	157.0534	1022622.	143.7932	974013.7	192062.1	167.1049
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

**Table 2:** The effect of the independent variables on the dependent using the total model - Panel Data Results

Cross-section random effects test equation:				
Dependent Variable: FL?				
Method: Panel Least Squares				
Sample: 2006 2010				
Included observations: 5				
Cross-sections included: 88				
Total pool (balanced) observations: 440				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.882278	0.280259	3.148086	0.0018
SALE?	0.001530	0.028748	0.053230	0.9576
PROF?	-0.160411	0.031048	-5.166467	0.0000
TANG?	-0.035528	0.071810	-0.494746	0.6211
LIQ?	-0.026647	0.006735	-3.956545	0.0001
GO?	0.000784	0.001912	0.409798	0.6822
AGE?	-0.121796	0.208989	-0.582786	0.5604
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.749894	Mean dependent var	0.650666	
Adjusted R-squared	0.682669	S.D. dependent var	0.217111	
S.E. of regression	0.122303	Akaike info criterion	-	
			1.177691	
Sum squared resid	5.175489	Schwarz criterion	-	
			0.304608	
Log likelihood	353.0921	Hannan-Quinn criter.	-	
			0.833259	

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F-statistic	11.15497	Durbin-Watson stat	1.751661
Prob(F-statistic)	0.000000		

Notes: Dependent variable: FL; Method: GLS (cross-section weights); White heteroskedasticity consistent standard errors and covariance

**Table 3:** Characteristics of Capital Structure - Regression Results

Method: Forward	F- statistic= 29/494		prob(F- statistic)= 0.000		
Variables	Coefficients		S.E	t- statistic	p- value
Constant	-.322	.280256	-18.506	0.000	Significant*
Prof	-.408	.031042	-8.884	0.000	Significant*
Liq	-.172	.00673	-3.735	0.000	Significant*
<b>R<sup>2</sup> =.66</b>					
<b>Adjusted R<sup>2</sup> =.65</b>					
<b>Durbin-Watson stat= 1.964</b>					

\*significant at .05 level using a two-tailed test.

According to TABLE2 AND TABLE3 independent variables of our model are statistically significant at 5 per cent. The F-statistic proves the high explanatory power of the estimated model and the high R<sup>2</sup> (adjusted) indicates that the estimated model explain the 65 per cent of the size in the dependent variable.

According to our findings the profitability of the firm has a negative relation with the financial leverage, something that has been confirmed by Chen and Poger [3], and which found similar results with us. Hence, findings the liquidity of the firm has a negative relation with the financial leverage, something that has been confirmed by Dimitrios Vasiliou and Zoe Ventoura-Neokosmidi [10] and Teker and Tasseven [11], which found similar results with us. The negative relation confirms that firms finance their activities following the financing pattern implied by the “pecking order” theory.

#### Conclusions:

In this study, we conduct our analysis in order to investigate how some specific firm characteristics determine the firm’s capital structure. We use the regression and panel data derived by the financial statements of 88 firms listed in Tehran Stock Exchange. In our calculations we consider the total model, the fixed effects model and the random effects model.

Out of six examined explanatory variables-size, liquidity, growth opportunity, profitability, Tangibility and Age, two–profitability and liquidity-are statistically significant determinants of financial leverage. Beta coefficients associated with profitability and liquidity are statistically significant at .05 level. These variables explain around 66% of variation in financial leverage. Our dependent variable is the financial leverage expressed as total liabilities divided by total assets. The debt ratio includes both long-term and short-term liabilities. According to the results, the financial leverage of the firm is negatively related to its profitability which is measured by the ratio of profit before tax to the book value of total assets.

On the other hand, our findings show that the liquidity of the firm is negatively related to its

financial leverage. We consider the liquidity of the firms using the quick, or acid test ratio which is equal to current assets minus inventories divided by current liabilities. These facts conclude that liquidity, and profitability play a major role in determination of the financial leverage in financial institutions; and size, growth opportunity, Tangibility and Age do a dismal role. Further, statistically insignificant coefficients associated with size, growth opportunity, Tangibility and Age; and significant coefficient associated with liquidity, and profitability imply that financial institutions.

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