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# Firm Characteristics and Capital Structure: A case of Iranian Firms

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**ABSTRACT**

The purpose of this paper is to examine empirically the impact of firm characteristics on capital structure in Iran. Using five different attributes of firm characteristics including: firm size, profitability, firm growth, firm tangibility and volatility of earnings, data analysis over a period of five years (2009–2013) revealed that capital structure is positively related to firm size and tangibility, and negatively associated with firm profitability. However, contrary to expectation, we fail to find a significant association between firm growth and volatility of earnings with the Iranian firm's capital structure. Results indicate that there is a positive significant relationship between size of firm and capital structure. Results indicate that there is a positive significant relationship between firm tangibility and capital structure. Results indicate that the relationship between firm growth and capital structure has not been significant. This is in a way that it was expected based on theoretical foundation that by increasing earnings volatility of firms due to lack of the possibility for prediction of upcoming earnings by investors, the cost of firms' capital has increased and consequently the firms have preferred the debt over stock.

*Key words:* Firm size, Profitability, Firm growth, Firm tangibility and Volatility of earnings.

## INTRODUCTION

Capital structure is one of the issues that accepted companies in stock exchange face it. The problem over how much of the capital structure consists of debt and how much it consists of equity in order that the optimal capital structure results in minimization of financing costs and increase of Stock market value of firms, has been considered as a major problem from the early. Capital structure of firms in different countries differs from each other, thus the managers, in deciding about the optimal capital structure, oblige to use various factors of characteristics of the company such as size of company, profitability, company growth, Tangibility of assets and earnings volatility; further managers must draw attention into the decisions about financing and effects of these factors on decisions of capital structure, and seek to maximize value of company in this way. Effects of characteristics of the company on decisions of capital structure have been studied in various countries around the world. In this regard, recognizing characteristics of the company that affect capital structure of companies is highly important, because considering these factors and characteristics and the extent to which they affect decisions of capital structure can help the companies to determine an optimal capital structure. Effective factors on view of financial managers on sources and uses of fund determine how and why choose a specific source with regard to requirements in outside and prevailing phenomena and properties within the company [1]. Indeed, this study aims to examine the relationship between capital structure and some of firm characteristics including size of company, profitability, company growth, Tangibility of assets and earnings volatility, in order to use the results of real information from managers, investors, and beneficiaries in their decision making models. Various factors and variables through affecting selection of an optimal capital structure can affect profitability and enterprise performance [2,6]. Hence, studying how much capital structure of firms can be affected by various parameters including firm characteristics and importance of firms in terms of their performance, profitability, the possibility for growth, size of company and type of activity that determines their financial need, will specify the performance of companies in the capital market, and will inform the managers about the internal and external opportunities and threats which exist in these activities. Hence, according to what mentioned above, this study aims to find empirical evidences to give a response to such questions to observe whether

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variables of size of company, profitability, company growth, Tangibility of assets and earnings volatility as some of firm characteristics affect decisions of capital structure in Iranian capital market or not?

*2. Literature review and hypothesis development:*

Modigliani & Miller in their theories regarding the assumptions including perfect competition market, lack of income tax, absence of bankruptcy costs, lack of agency costs and information asymmetry among the capital market activists, replacing internal sources of financing with external sources of financing, expressed that the managers cannot change the value of firm exclusively by making changes in mix of sources of financing. In other words, the value of the firm is independent of its capital structure.

Modigliani & Miller had a revision in their early theories by considering corporation income tax, and proposed a new theory. In their new theory, they have argued that borrowing raises tax advantage for the firm, thus it must expect that the firms preferably use borrowing among various sources of financing, because more use of borrowing will result in increasing value of firm.

Huang & song in their study entitled "factors affecting capital structure in China" examined the effect of factors including profitability, size of firm, the opportunities for growth and corporate structure of companies on capital structure of 1200 Chinese companies during 1994-2003.

They used the debt-to-assets ratio as the criterion for capital structure and return on asset (ROA) as the criterion for profitability of companies, and concluded that financial leverage increases by increasing the size of firm, but decreases by increasing the profitability and opportunities for company growth.

Sogorb [16] in his study examined how firm characteristics affect capital structure in Spain. Using sample data of 6482 companies at 8 industrial classes, he conducted a study aiming at examining the effect of small firms' characteristics on decisions of capital structure in 1994-1998.

The results of this study indicated that tax shield and profitability of these firms have a negative relationship with the capital structure, and this is in a way that opportunities for growth, size of firms and Tangibility of assets have a positive relationship with capital structure.

Eriotis *et al*. [6] in their study entitled "how firm characteristics affect capital structure" and using the sample data consisting of the data of 129 companies in Greece's market during 1997-2001 examined the relationship between corporate characteristics and capital structure. Using multivariate regression models, the results from testing the research hypotheses indicated that a negative relationship exists between capital structure and interest coverage ratio and company's growth. Further, there is a positive relationship between size of firm and capital structure.

ChiangLee and Meng Fan Hessy in a study have studied the effect of bank's capital structure on risk and profitability in Asian banking system. In this study, data fusion techniques and data of banks around 42 Asian countries during 1994-2008 were used. The results of this study indicate that capital decreases in banks by changing the categories of banks, and also the capital structure affects the profitability of banks. Yet, capital structure has an inverse effect on risk in commercial banks. Meanwhile, capital structure has more effect on profitability in the countries with low income. Banks at countries with average income have the most inverse effect on risk. Yet, this is vice versa in the countries with the low income.

Bin Karim and his colleagues in their study entitled "how firm characteristics affect capital structure in small and large firms in France?" have addressed whether a significant relationship exists between capital structure and firm characteristics including size of firm, structure of asset, earnings volatility, company's growth and profitability or not?

The sample of this study consists of 2222 accepted companied in France's stock exchange during 2003-2006.

Using the multivariable regression models, the research findings indicated that a negative relationship exists between profitability of firm with debt ratio, and the variables including size of firm, company's growth and Tangibility of assets have a positive significant relationship with debt ratio. Yet, no evidence exists on earnings volatility and debt ratio.

In the light of this theoretical and empirical literature, it is possible to formulate the following hypotheses:

1-There is a significant relationship between size of firm and capital structure.

2- There is a significant relationship between profitability of firm and capital structure.

3- There is a significant relationship between growth of firm and capital structure.

4- There is a significant relationship between Tangibility of assets and capital structure.

5- There is a significant relationship between earnings volatility and capital structure.

**Materials and Methods**

*3.1. Sample:*

We select all publicly- listed companies in Tehran Stock Exchange (TSE) over the entire duration of the estimation time period (2009–2013) as initial samples. Of these initial samples, companies whose stock trading days are less than 25 in a quarter and firms that are either missing financial variables or that have insufficient data are eliminated. Financial institutions, banking, finance

and investment firms are also eliminated, since their accounting and reporting environments differ from those in other industries. This gives a final sample of 460 firm-year observations from the fiscal years 2009 to 2013.

*3.2. Variables measurement:*

*3.2.1. Dependent variable:*

Capital structure is the dependant variable of this study. In most of studies on capital structure, debt to asset ratio has been used as the criterion for capital structure.

Hence, this ratio is used to measure the capital structure in this study that is calculated with regard to the equation as follow:

$$TDA_{i,t} = \frac{TD_{i,t}}{TA_{i,t}}$$

Where $TDA_{i,t}$ , $TD_{i,t}$, $TA_{i,t}$ represent debt to total assets ratio of company i in year t, total short-term and long-term debt of company i in year t and assets of company i in year t.

*3.2.2. Independent variables:*

Firm characteristics have been considered as independent variables in this study, that how to calculate each of them has been defined in following:

*1. Firm Size:*

To measure size of firm, various criteria are used. In this study, the natural logarithm of net sales has been used to measure the size of firm, so that:

$$Size_{i,t} = LogS_{i,t}$$

Where represent $Size_{i,t}$, $S_{i,t}$ the size of company i in year t and net sale of company i in year t.

*2. Profitability:*

In this study, Return on equity has been used to measure the profitability of company that is calculated as follow:

$$ROE_{i,t} = \frac{NI_{i,t}}{MV_{i,t}}$$

Where $ROE_{i,t}$, $NI_{i,t}$ , $MV_{i,t}$ represent Return on equity of company i in year t, net earnings of company i in year t, market value of equity in company i in year t.

*3. Firm Growth:*

Firm growth equals to the annual growth rate of sales that is calculated as follow:

$$GWT_{i,t} = \frac{S_{i,t} - S_{i,t-1}}{S_{i,t-1}}$$

Where $GWT_{i,t}$, $S_{i,t}$, $S_{i,t-1}$ represent sale growth of company i in year t, sum of sale of company i in year t, sum of sale of company i in year t-1.

*4.Firm Tangibility:*

Firm tangibility represents the ability for corporate bond that is measured through ratio of fixed assets that obtains from dividing ratio of fixed assets to total assets, so that:

$$Tang_{i,t} = \frac{PPE_{i,t}}{TA_{i,t}}$$

Where $PPE_{i,t}$, $TA_{i,t}$ represent ratio of fixed assets or net properties, machineries and equipment of company i in year t, sum of assets of company i in year t.

*5. Earnings Volatility:*

To measure earnings volatility, changes in net profit that is calculated as follow, has been used:

$$VOL_{i,t} = \frac{NI_{i,t} - NI_{i,t-1}}{NI_{i,t-1}}$$

Where $VOL_{i,t}$, $NI_{i,t}$, $NI_{i,t-1}$ represent net earnings volatility of company i in year t, net earnings of company i in year t, and net earnings of company i in year t-1.

*3.3 Regression models:*

To examine the relationship between firm characteristics and capital structure, the model of Ibn Karim and his colleague has been used in this study. The model which has been used in this study is as follow:

$$TDA_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 ROE_{i,t} + \beta_3 GWTH_{i,t} + \beta_4 TANG_{i,t} + \beta_4 VOL_{i,t} + \varepsilon_{i,t}$$

Where $TDA_{i,t}$ $SIZE_{i,t}$ , $ROE_{i,t}$, $GWTH_{i,t}$, $TANG_{i,t}$, $VOL_{i,t}$, $\varepsilon_{i,t}$ represent the debt ratio to some of assets of company i in year t, size of company i in year t, return on equity of company i in year t, sale growth at company i in year t, ratio of fixed assets to sum of assets of company i in year t, earnings volatility of company i in year t, Error component regression model.

**Results and Discussion**

*4.1. Descriptive statistics:*

According to table 1, mean of debt ratio equals to 0.652, indicating that in average about 65% of financial resources that are required for sample firms have been supplied from debts, and this indicates the importance of using debt in the capital structure of companies in Iran's capital market. Size of firm is calculated through logarithm of annual sales by

company that has the mean and median equal to 11.9 and 11.89, respectively. Also, the minimum and maximum value of this variable equals to 9.01 and 13.44, respectively. Net earnings of sample firms equals to 18% of market value of equity. Further, annual sales rate of companies has been in range of -0.39 to 2.84 that the mean of this variable equals to 0.20.

**Table 1:** Descriptive statistics of the sample variables.

| Variable | Mean | Median | Minimum | Maximum | Standard deviation |
|---|---|---|---|---|---|
| *TDA* | 0/652 | 0/667 | 0/141 | 0/861 | 0/171 |
| *SIZE* | 11/973 | 11/893 | 9/017 | 13/444 | 0/585 |
| *ROE* | 0/182 | 0/174 | 0/097 | 0/633 | 0/150 |
| *GWTH* | 0/201 | 0/138 | -0/398 | 2/843 | 0/816 |
| *TANG* | 0/267 | 0/243 | 0/124 | 0/717 | 0/152 |
| *VOL* | 0/114 | 0/064 | -1/009 | 3/789 | 3/999 |

*TDA: The debt ratio of firm assets, Size: size of firm, ROE: profitability of firm, GWTH: sale growth of firm, TANG:* Firm Tangibility, VOL: Earnings Volatility

*4.2. Regression results:*

Table II displays the result of the regression model used to test H1-H5. The use of Multivariate hypothesis test is based on the assumption of no significant multicollinearity between the explanatory variables. To investigate the existence of multicollinearity, the variance inflation factors (VIFs) for each of the explanatory variables are computed. as reported in column 5 of Table II, the maximum VIF is 1.042, which is lower thanten, a number that is used as a rule of thumb as an indicator of multicollinearity problems. Thus, these results support the lack of presence of multicollinearity in the research model. The results of the regression analysis can, therefore, be interpreted with a greater degree of confidence.As shown in this table, the adjusted $R^2$ of 0.574 percent gives confidence in the explanatory power of the model.

**Table 2:** Multiple regression results.

| Explanatory variable | Expected Sign | Coefficients | t-statics | Collinearity Statistics |
|---|---|---|---|---|
| | | | | VIF |
| *C* | ? | -0.182 | -0.850 | - |
| *SIZE* | + | 0.065*** | 3.601 | 1.042 |
| *ROE* | - | -0.052** | -2.317 | 1.030 |
| *GWTH* | + | 0.004 | 1.434 | 1.003 |
| *TANG* | + | 0.274*** | 5.864 | 1.032 |
| *VOL* | + | 0.000 | 1.547 | 1.005 |
| Adjusted $R^2$ | 0.574 | | F-value | 13.955 |
| Durbin Watson | 1.872 | | *P*-value of F-test | 0.000 |

Notes: t-statistics are reported in parenthesis; ***, and ** denote significance at the 0.01 and 0.05 levels, respectively

The first research hypothesis: there is a significant relationship between size of firm and capital struture. As seen in table 2, the coefficients and t-statsitics relating to the variable of size are positive and significant at 1% error level. Hence, H0 hypothesis has been rejected and the first hypothesis is confirmed at 1% error level. Hence, it can say that there is a significiant positive relaitonship between size of firm and capital struture.

The second research hypothesis: there is a significiant relaitonship between profitability of firm and capital struture. As seen in table 2, the coefficient and t-statsitics relating to the variable of profitability are negative and significant at 5% error level. Hence, H0 hypothesis has been rejected and the second hypothesis is confirmed at 5% error level. Hence, it can say that there is a significiant negative relaitonship between profitability of firm and capital struture.

The third research hypothesis:there is a significiant relaitonship between firm growth and capital struture. As seen in table 2, the coefficient and t-statsitics relating to the variable of firm growth are positive but this hypothesis is not significant. Hence, H0 hypothesis has been confirmed and the third hypothesis is rejected at 5% error level. Hence, it can say that there is not a significiant relaitonship between firm growth and capital struture.

The fourth research hypothesis: there is a significant relationship between firm tangibility and capital structure. As seen in table 2, the Coefficients and t-statistics relating to the variable of firm tangibility are positive and significant at 1% error level. Hence, H0 hypothesis has been rejected and the fourth hypothesis is confirmed at 1% error level. Hence, it can say that there is a significant positive relationship between firm tangibility and capital structure.

The fifth research hypothesis: there is a significiant relaitonship between earnings volatility and capital struture. As seen in table 2, the coefficient and t-statsitics relating to the variable of Earnings Volatility are positive but this hypothesis is not significant. Hence, H0 hypothesis has been confirmed and the third hypothesis is rejected at 5% error level. Hence, it can say that there is not a

significiant relaitonship between earnings volatility and capital struture.

*5. Conclusions:*

The first research hypothesis: Relationship between size of firm and capital structure has been tested in the first research hypothesis. As seen in table 2, the results from first hypothesis testing indicate that there is a positive significant relationship between size of firm and capital structure, and the first research hypothesis is confirmed.To confirm this hypothesis, it can argue that the larger companies due to being provided with more stable cash flows and more authenticity at market have been imposed less bankruptcy, thus they had enjoyed more ability for borrowing, and consequently they have faced more debt. This research finding is relevant with the results of research by Sogorb [16], Eriotis *et al*. [6], Bin Karim and his colleagues [4] concerning that a significant relationship exists between size of firm and capital structure. The second research hypothesis: Relationship between profitability of firm and capital structure has been tested in the second research hypothesis. As seen in table 2, the results from second hypothesis testing indicate that there is a positive significant relationship between profitability of firm and capital structure, and the second research hypothesis is confirmed. This finding implies that the profitable firms compared to other firms will be able to save more earnings, and consequently will use earnings for their new investments, and so they will ask less borrowing, thus their debt ratio will be lower. This research finding is relevant with the results of research by Sogorb[16], Bin Karim and his colleagues[4] concerning that profitable firms use less debt for their financing. The third research hypothesis: Relationship between firm growth and capital structure has been tested in the third research hypothesis. As seen in table 2, the results from first hypothesis testing indicate that the relationship between firm growth and capital structure has not been significant and the third research hypothesis is rejected.

This is in a way that it was expected based on theoretical foundation of research that the firms with the higher growth opportunities had been in need of financial sources so as to expand their growth process, and they have sought to borrowing as a financial source due to insufficient internal financial sources.

This research finding is inconsistent with the results of research by Sogorb[16], Bin Karim and his colleagues[4] concerning that by increasing firm growth, the tendency of firm to apply debt as a financial source in capital structure increases.

The fourth research hypothesis: Relationship between firm tangibility and capital structure has been tested in the first research hypothesis. As seen in table 2, the results from fourth hypothesis testing indicate that there is a positive significant relationship between firm tangibility and capital structure, and the fourth research hypothesis is confirmed.Confirming this hypothesis is possible by predicting the hierarchy theory which states that the firms with higher firm tangibility have more ability for collateral valuation. This research finding is relevant with the results of research by Sogorb[16], Bin Karim and his colleagues[4] concerning that the companies with more fixed assets due to lack of information asymmetry and more ability for collateral valuation, use more debts in their capital structure. The fifth research hypothesis: the relationship between earnings volatility and capital structure has been studied. As seen in table 2, the results from fifth hypothesis testing indicate that the relationship between earnings volatility and capital structure has not been significant and the fifth research hypothesis is rejected. This is in a way that it was expected based on theoretical foundation that by increasing earnings volatility of firms due to lack of the possibility for prediction of upcoming earnings by investors, the cost of firms' capital has increased and consequently the firms have preferred the debt over stock. This research finding is relevant with the results of research by Bin Karim and his colleagues[4] concerning that they have not obtained the evidences based on the relationship between earnings volatility and capital structure.

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