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Research Article

THE RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND VALUE OF EQUITIES IN FIRMS LISTED IN TEHRAN STOCK EXCHANGE

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ABSTRACT
The present study investigated the relationship between capital structure and value of equities of firms listed in Tehran Stock Exchange. The base model used in the study is known as Myers-Burgstahler-Dichev model in which the stock market value is equivalent to book value of equities plus the value of the expected growth opportunities for the firm. The research hypotheses were tested using four linear regression models derived from the base model. The firms under study were selected through conditional sampling provided that they release their financial statements for the time period from 2006 to 2011. Accordingly, the final sample consisted of 30 firms from different groups of industries. The results of the data analysis are as follows:
1. The correlation between debt ratio and earnings per share (EPS) is -0.66; indicating a negative relationship between EPS and leverage through debt.
2. There is a significant relationship between the ratio of book value to market value of equities, the rate of returns on assets, and changes in the capital structure of the firms under study.
3. There is a positive significant relationship between the ratio of debt to equity and P/E ratio.
4. There is positive significant correlation between the ratio of debt to equity and EBIT/BVE.
5. There is a negative significant correlation between the ratio of debt to equity and Q-Tobin.
6. There is a positive significant relationship between market value of equities (MVE) and EBIT (profit margin as a proxy of opportunities for growth and profitability).

INTRODUCTION
Determining the optimal combination of capital structure in a way that brings the maximum value for shareholders has turned into a complex puzzle whose solution has been discussed for several decades and leading professional has theorized in this field. The issue is also significant for Iranian firms operating in the stock market. Accordingly, the present study is going to explore and explain the relationship between capital structure and value of equities of listed firms in Tehran Stock Exchange.
An awareness of composition of assets and capital structure is of significance for potential shareholders and investors as well as for financial creditors of the firms. Beyond this, the decision on selecting a way of financing in many firms is dependent on the market value of equities in the firm. For example, stock issuance is one of the well-known ways of financing for firms and thus the issuance time is of importance. An important question is: When shall firms issue their shares? The decision on stock issuance as a way of financing is related to the issuance time, capital structure, firm size, capital cost, and possibly other factors.
The main problem in this study is the type of the relationship between capital structure and value of equities in firms listed in Tehran Stock Exchange and factors affecting capital structure and the impact of capital structure on value of equities and shareholders' interests. We know that many theories have been proposed about capital structure as well as theories about factors affecting value of equities in firms. An investigation of such issues has been considered among firms in Tehran Stock Exchange for reasons that will be mentioned later on. In any case, determining the optimal capital structure and its effect on the value of equities has always been an interesting and researchable concept and is now considered by economic circles, stock agencies, managers, shareholders, and researchers in this field.

Significance of the Study

As an accepted principle, people's intention of investing on shares of a firm is to gain profit. In contrast, the ultimate goal of managers in non-profit institutions is to maximize shareholder wealth. In most cases, the financial management efforts to increase shareholder wealth are focused on ways of financing for firms, which consequently leads to a change in the capital structure of firms. Firms often choose different financing strategies, each affecting capital structure, shareholder wealth, and ultimately the value of equities in the firm. To make investments with higher profits, financial suppliers and investors are also interested in value of equities and capital structure of firms. Therefore, it seems that firms face a complex puzzle known as the optimal capital structure puzzle. Besides, the existence/nonexistence of such structure is subjected to lots of controversies. Several models have been proposed to account for capital structure of firms also sometimes contradictory results have been observed from different studies and investigations. It seems that the existence of a relationship between capital structure and value of equities in a given firm is a significant issue for managers, shareholders, potential investors, and capital market analysts.

Research model

The present study employed a quasi-experimental design based on objective and experimental data, extraction and evaluation of realized data and financial performance data contained in income statements, balance sheets, and other financial accounts reported such as cash flows and auditing data of a sample of firms listed in the Tehran Stock Exchange selected through conditional sampling. The method used in this study included the steps of data collection on the research problem, identifying and defining research variables, data analysis, and hypothesis testing, and reporting the results of the study. A brief description of these steps is presented as follows:

Data Collection

Reports of firms listed in Tehran Stock Exchange collected by Management of Research and Development of Tehran Stock Exchange and published at http://www.opencube.com were extracted and used for data analysis. In addition, a software package developed by the database of the Tehran Stock Exchange Library containing the latest financial information of the member firms was also used.

Research Scope

Physical scope of this study included 30 Iranian firms listed in Tehran Stock Exchange and its temporal scope was the time period from 2006 to 2011, on condition that the financial data of the firms under study should have been available for the period in question and the firms should not have been among investment, intermediary, holding, banking, insurance, and leasing firms.

Population and Sampling

Currently, 325 firms are listed in Tehran Stock Exchange and the operating firms are divided into two groups: 1) production firms and 2) investment firms. The financial data for the listed firms were available at the time of conducting this study. Besides, these firms were operating in 30 industrial fields. Accordingly, a total number of 30 firms were selected randomly and their financial statements and performance data for 2006-32011 were analyzed.

Data Analysis

Profitability, leverage rations, and profit margins of the firms in the research sample were analyzed in this study to determine the composition of assets and capital structure of the firms under study. The instruments used for data analysis were Quattro Pro Spreadsheet and Microsoft Office Excel. Besides, the software provided by the Tehran Stock Exchange was used to access, extract, and classify the collected data. Correlation analysis was also employed to determine correlations between changes in the capital structure market value of equities of the firms under study. Furthermore, a comparison of rations of market value of equities to dividends per share and market value of equities to book value of equities was also made through correlation analysis to determine their relationships with financial leverage and liquidity ratios. Finally, the research hypotheses were tested and the results are tabulated and presented.

Research Variables

The main variables manipulated in this study are as follows:

1. Leverage (LEV) as total debts divided by total capital
2. Return on assets (ROA)
3. Return on equities (ROE)
4. Earnings per share (EPS)

Variables related to capital structure were used in this study as independent variables. In contrast, market value of equities for the firms in the sample was used as the dependent variable. Independent and dependent variables were identified and defined accurately in the conceptual model of the study.

RESULTS AND DISCUSSION

Results

Table 1 shows descriptive statistics for firms listed in Tehran Stock Exchange. As can be seen, by the end of 2006 a total number of 418 firms were listed in Tehran Stock Exchange:

Table 1: Descriptive statistics for firms listed in Tehran Stock Exchange

Firms	**Number**	**Percentage**
Investing firms	63	15%
Banks and financial and monetary institutions	29	7%
Firms operating in real estate and housing	21	5%
Production firms (industrial, mining, chemical, food, etc.)	188	45%
Others	117	28%
Total	418	100%

Percent	**Count**	**As companies**
%15	63	Companies investors
%7	29	Banks and financial and monetary institutions
%5	21	Mass and real estate and housing activists makers
%45	188	Group production (industrial, mining, chemical, food, etc.)
%28	117	Other
%100	418	The total companies listed in Tehran Stock Exchange

Table 2: Results of ANOVA

Total squares	**Degree of freedom df**	**Mean square variance Mean Square**	**F**
Sum of Squares	k-1	MSR=SSR/k-1	$F=\frac{MSR}{MSE}$
SSR	n-k	MSE=SSE/n-k	
Total square regression	n-1	-	

Table 3: Results of the analysis of position of the firms under study

Cov(DTA ratio,EPS)<> 0			**Statistical pattern described:**
P-value	Statistics t	coefficient	Independent
0.000000000372986	9.730911	1323.6663179	Constant
0.0001771676	-4.370081	-1488.72613	DTA_ratio

Table 4: Regression correlations between leverage (the ratio of debt to total assets), EPS, and coefficient of determination (R^2)

Multiple R	**0.658084936009423**
R Square	0.433075783002526
Adjusted R Square	0.410398814322627
Standard Error	455.020435215288
Observations	27

Table 5: Results of F test

	df	**Sum of Squares**	**Mean Square**	**F**	**Significance F**
Regression	1	3954036.7550	3954036.7551	19.09760467	0.00019068418238
Residual	25	5176089.9116	207043.59646		
Total	26	9130126.6667			

	Upper 95.00%	***Lower 95.00%***
Intercept	1603.81909959708	1043.51353620378
debt ratio	-787.116911654309	-2190.33535096667

Testing Second Research Hypothesis

Table 6: Results of Eq. (12)

$$BVE/MVE_{it} = \alpha_0 + \alpha_1 ROA_{it} + \alpha_2 \left(\Delta \frac{Debt}{Asset}\right)_{it} + v_{it}$$

A significant level of	**Statistics F**	**coefficient**	**Statistical pattern described: Independent variables**
0.000000000319117	25.1910128	0.56429649	Mqdarsabt:
		0.746335156	Changes in capital structure:
		-0.18327521	Return on total assets:

Table 7: Results of regression for testing the second hypothesis

Regression Statistics	
Multiple R	0.49170
R Square	0.24177
Adjusted R Square	0.23217
Standard Error	0.302270
Observations	161

Table 8: Results of t-test concerning the firm performance in 2011

	Coefficients	**Standard Error**	**t Statistic**	**P-value**	**Lower 95.00%**	**Upper 95.00%**
Intercept	0.51382	0.11431	4.49491	0.00013	0.27790	0.74975
ΔDTA ratio	0.68933	0.22148	3.11242	0.00447	0.23222	1.14644
ROA	-0.15570	0.59298	-0.26258	0.79494	-1.37955	1.06815

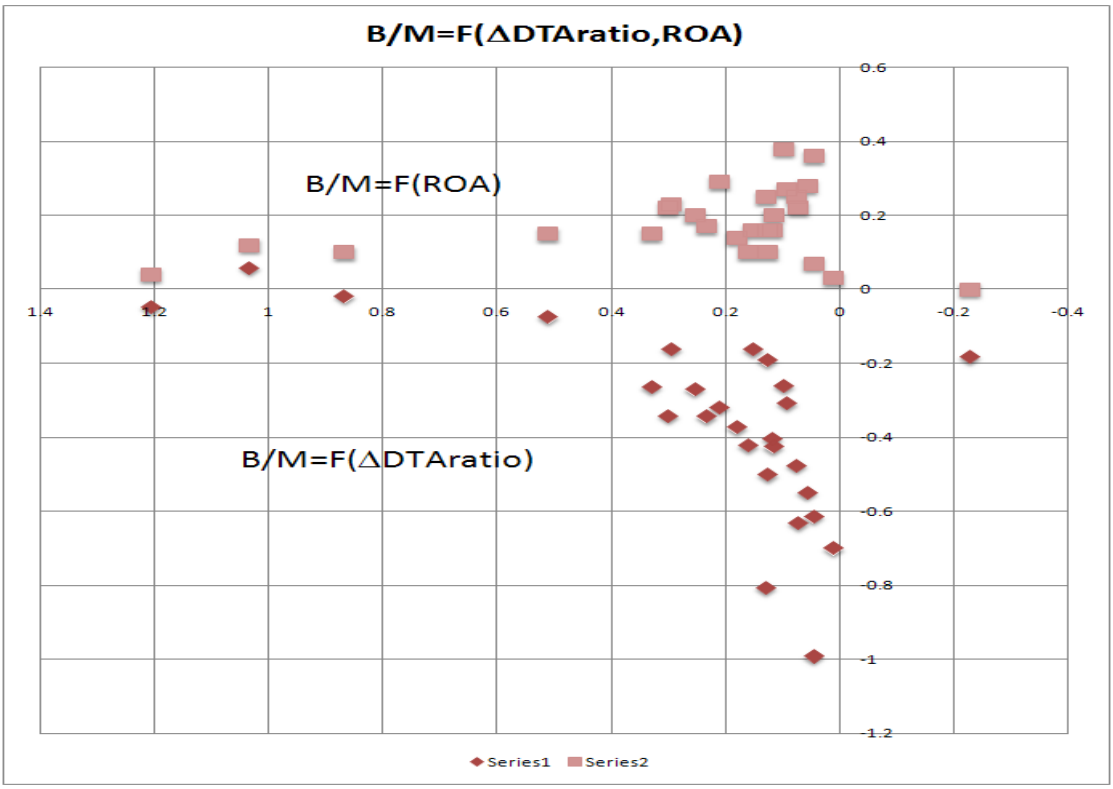

Figure 1: The relationship between the ratio of market value and book value of equities, capital structure, and ROA

Testing Third Research Hypothesis

Table 9: Constants and variables of the model under study and significance test (F-test)

$$DTE\_ratio_{it} = \alpha_0 + \alpha_1 P/E_{it} + \alpha_2 Qtobin_{it} + \alpha_3 EBIT/BVE_{it} + v_{it}$$

Significance	Statistics F	coefficient	Independent variables
		1.93734493	Intercept
Yes	135.095686	0.13046819	P/E_{it}
		-0.2792378	$Qtobin_{it}$
		2.4465257	$EBIT/BVE_{it}$

Table 10: Results of ANOVA

Analysis of Variance					
Significance F	**F**	**Mean Square**	**Sum of Squares**	**df**	
2.74E-43	135.0957	241.425	724.2749	3	Regression
		1.787066	280.5694	157	Residual
			1004.844	160	Total

Table 11: Correlation coefficient and coefficient of determination (R^2)

Regression statistics	
Multiple R	0.8489895
R Square	0.7207831
Adjusted R Square	0.71544783
Standard Error	1.33681200
Observations	161

Table 12: Results of t-test

t Statistic	*Standard Error*	*Coefficients*	
4.65625938	0.4160732	1.93734493	Intercept
6.88632800	0.3552729	2.44652575	EBIT/BE
-5.66142094	0.0493229	-0.27923781	Qtobin
8.18792438	0.0159342	0.13046819	P/E

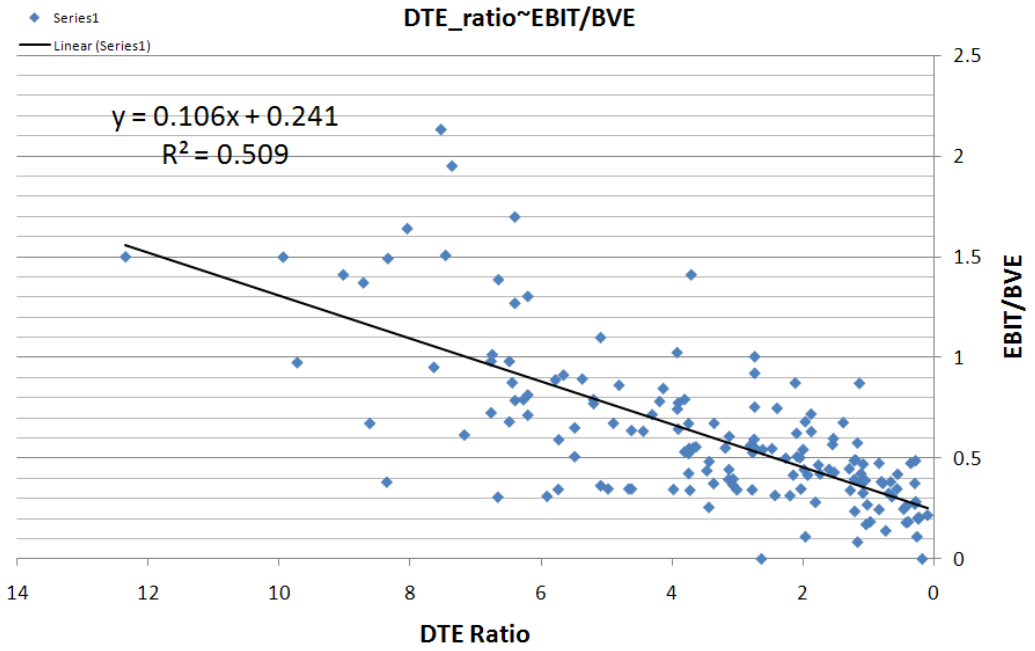

Figure 2: The relationship between capital structure and ration of profit margins to the book value of equities

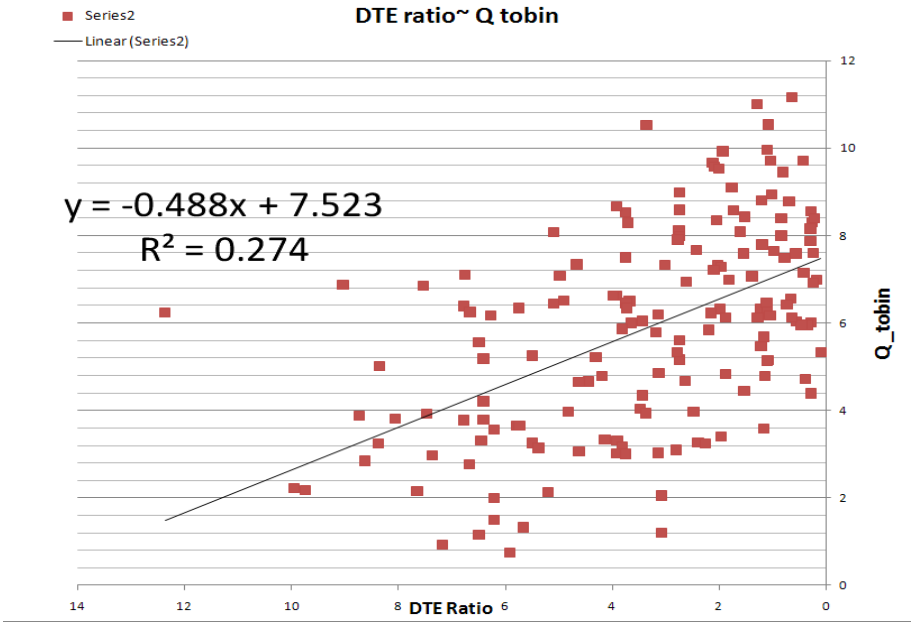

Figure 3: The relationship between capital structure and Q-Tobin

Discussion and Conclusion

Results of Hypothesis Testing

Testing the First Model Hypotheses

According to the results of the study, there is a negative significant relationship between capital structure (ratio of debts to assets) and earnings per share (EPS). Therefore, it can be suggested that firms with a high percentage of debt in their capital structure have less profitability. In addition, increasing debt in the firm financial structure will ultimately reduce earnings per share. Given that a goal of financing is to maximize shareholders' wealth, increased levels of debts will jeopardize shareholders' interests by reducing earnings per share.

Testing the Second Model Hypotheses

The second model consisted of two basic hypotheses, which were tested through a regression model. The first hypothesis deals with the relationship between the ratio of book value to market value of equities ad changes in the firm capital structure through changes in the ratio of debt to total assets. The second hypothesis tested the ratio of book-to-market values of equities to return on the firm total assets (ROA). The results of testing the first hypothesis show that there is a positive significant relationship between changes in the ratio of debt to total assets ($\Delta\frac{Debt}{Asset}$) and the ratio of book value to market value of equities. Accordingly, observations of the sample under study show that a change in the ratio of debt to total assets results in a change in the ratio of book value to market value of equities in the same direction. Similarly, an analysis of changes in the ratio of debt to total assets of 72 firms for two consecutive years shows that by reducing the size of the firm debt, the ratio of book value to market value of equities will increase. This suggests that the debt reduction during a performance period would increase the ratio of book value of equities to the the market value of equities and this is not an unexpected outcome. However, the results of testing the second hypothesis suggested that there is a negative relationship between the total return on assets (ROA) and ratio of book value to market value of equities; indicating that the return on assets has a stronger impact on the market value of equities (the denominator) than on the book value of equities (the numerator).

Testing the Third Model Hypotheses

The third model is a multivariate regression model that addressed the effect of three independent variables on the firm capital structure. The first hypothesis in this mode stated that there is a relationship between P/E and the ratio of debts to equities. The result of testing the hypothesis suggested that there is a positive significant correlation between these two variables. The implication is that firms with a high ratio of market value of equities to earning per share have also a higher debt-to-equity ratio. The second hypothesis dealt with relationship between the firms as a proxy for the firm growth. The results showed a negative relationship between Tobin and the firm capital structure. Accordingly, firms with a higher Q-Tobin have a lower ratio of debt to equities. The third hypothesis tested the relationship between the ratio of debt to equities and profit margins before interest tax. The results suggested that there is a positive relationship between these two variables. By implication, that firms with higher debt ratio have also a higher margin-to-equity ratio. This shows that earnings have gained mainly through debts. Besides, debt financing has had a positive effect on the profitability of the firms under study.

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