

The relationship between the capital structure and the performance of the firms listed in the Tehran stock exchange

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Abstract: Firm, when making financing decisions perform a risk assessment of all financial instruments and choose those which maximize dividends and return on equities. The use of debt instruments are of interest to financial decision-makers given their tax savings and lower costs compared with capital securities. Accordingly, the present study aims to explore the relationship between the capital structure and the performance of the firms listed in the Tehran Stock Exchange. To this end, a sample of 150 firms selected from food and drink production, auto manufacturing and car parts, machineries, and equipment industries was studied over a 6-year period from 2007 to 2012. The relationship between the ratio of debt, short-term debt, long-term debt as capital structure variables and corporate performance indices such as return on equities, return on investments and dividends per share was explored using the fitness of multivariate regression models. The results suggested that financing through short-term and long-term debts has a negative impact on corporate performance. However, these results were different among various industries under study.

Key words: Capital structure; Financing tools; Corporate performance

1. Introduction

In the modern corporate finance, capital structure is closely related to Modigliani and Miller's (1958) study. They argue that in the capital market, there is no distinction between financing through equities and debts given the firm value. Therefore, financing decisions are of no additional value and thus there is nothing to worry about for the manager. Evidence suggests that this is not so in reality. As such, an investigation of the firm capital structure is of great importance. There is much research on corporate financing, seeking to explain that there are situations where the firm value may be affected by the firm capital structure. Although there are a great number of empirical studies in this field largely in the U.S.A and other developed countries that have similar institutional characteristics, there is no such justification in the literature concerning the capital structure for developing countries.

1.1. Statement of the problem

The maximization of the firm value requires implementing profitable projects. In today's competitive world, choosing an appropriate method of financing is necessary for increased profitability and optimal performance. A company to grow and survive needs to attract resources. Investors and creditors are suppliers of the capital structure. Investors are always looking for good investment opportunities to maximize their wealth and return

on their investments. Creditors are also willing to lend to companies with good performance. What encourages financial suppliers to invest their resources in a given business is the optimal performance of that business. The performance measurement serves as a basis for many decisions, the most important of which can be financial decisions. From a firm perspective, debts incur fewer costs as the debt costs in tax laws are more reasonable. Therefore, if financing is made through equities, the firm will be deprived of tax benefits. Although debt is a cheap source of funding, it is considered as risky method because of the interest must be paid on due to avoid bankruptcy. Besides, skyrocketing debts increase the chances of going bankrupt and make the firm shares lose their values. Therefore, based on what was mentioned, the capital structure would be optimal if it reduces the firm capital costs to a minimum, thereby maximizing shareholders' wealth. Accordingly, financial managers are recommended to pay more attention to possible consequences of using different methods of financing for risks and returns in the firm. Besides, they have to assess the impact of using different combinations of the capital structure on shareholders' wealth. Consequently, the main research question to be answered in this study is as follows:

Does the capital structure composition affect the corporate performance?

1.2. Significance of the study

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Today, the credit rating of firms depends largely on their capital structure. In fact, production and service delivery is based on the way funds are supplied and spent. In addition, the capital structure of every firm is seen as an early warning about the firm financial hardship. Therefore, factors affecting the efficiency of corporate finance must be taken into account seriously in firms' strategic planning.

The present study is an applied research as its findings can be beneficial for many users such as shareholders as the main users of accounting information and thus a major supplier of capital markets, creditors, analysts, suppliers, governments, organizations, privatization agencies, managers, and employees. The findings of this study can also be used by the Tehran Stock Exchange in determining the optimum combination of the capital structure as well as in the efficient allocation of resources in order to improve the corporate performance and, consequently, to facilitate the development and growth of the Iranian economy.

2. Research objectives

The main objective of the present study is to examine the relationship between capital structure and corporate performance with emphasis on the type of industry. In other words, given the differences between equity and debt in the capital structure, how much debt and how much stock a firm should possess in order not to be exposed to the risk of bankruptcy. Furthermore, the impact of the selected method of financing will be measured in this study.

3. Theoretical framework of the study

3.1. Capital structure

Making financing decisions is of the major tasks in the firms. Besides, managers are required to make appropriate decisions to succeed in determining the most suitable financing composition. The capital structure is conceptually more limited than financial structure which refers somehow to the ways a firm's assets are financed. The capital structure, in fact, includes all items in the left-hand side of the balance sheet. The capital structure refers to the combination of long-term financing and it covers items such as long-term debt and common and preferred stocks. However, it does not deal with short-term credits. Therefore, the capital structure is only a part of the financial structure. It should be noted that Iranian banks grants their loans as their main sources of financing in the form of partnership, contractual, and callable loans to firms. As a result, the firm financing is limited to these short-term loans (Jahankhahi, 2008).

3.2. Optimal capital structure

The optimal capital structure is a combination of debts and equities that minimizes the firm capital costs and at the same time maximizing the shareholders' wealth. Most studies are trying to examine the optimal capital structure in order to determine factors affecting the level of financial leverage in different industries. In spite of all such efforts, there is no answer to date to the question enquiring what the optimal level of the capital structure is. However, the results of such efforts is the recognition of costs and identification the strengths and weaknesses of loans used to finance firms. Besides, it is clear to some extent that when it is beneficial for firms to issue bond instead of stocks, and which companies or organizations must get more loans and which ones must receive less loans (Jahankhahi, 2008)

4. Factors affecting the capital structure

Two main sources of financing in any economic entity in general are:

1. Capital debts
2. Equities

The question is that how much should be the value of debt-to-equity ratio in the capital structure of a business entity so that it can approach its main objective that is obtaining the maximum returns and enhancing shareholders' wealth. Making important decisions concerning the capital structure and adjusting each component of the capital structure, like many other management decisions, are influenced by many factors such as internal and external factors associated with the firm operations and its business environment.

5. Theories of capital structure

5.1. Static equilibrium theory

The static equilibrium theory assumes the existence of optimal capital structure. This structure is accessible through a combination of different sources of financing which make equal the costs and benefits of debt financing. The theory also assumes that there is an optimal financial leverage ratio and the market sees any deviation from the ratio (either increase or decrease) as undesirable news. This optimal financial leverage can be identified through making a balance of costs and benefits from additional liability amounts (Chen and Strange, 2005).

5.2. Free cash flow hypothesis

The hypothesis was proposed in 1986 by Michael Jensen. According to this hypothesis, paying dividends to shareholders reduces free cash flows, so it is expected increased payable dividends will increase shareholders' interests by reducing managers' ability to pursue objectives or activities conflicting with shareholders' interests. Moreover,

since the interest and principal debt are a part of the firm fixed obligations and must be paid when due, the increased level of borrowing can also reduce free cash flow level (Jensen, 1986).

Accordingly, the free cash flow hypothesis suggests that as debt reduces the chance of wasting the firm resources by the managers, turning away from stocks towards debt financing will increase the firm value.

6. Literature review

Fama and French (1992) studied cross-sectional differences between average stock returns, market risk, the firm size, financial leverage of equities (book value) to equities (market value), and the ratio of price to profit using the regression analysis. They concluded that the market risk and stock returns are not correlated with the average stock returns. However, the average stock returns are negatively associated with the book value of financial leverage and the stock market value so that the average stock returns are negatively correlated with the book value of financial leverage and positively related to the market value of financial leverage.

Kovenock and Phillips (2001) examined reactions shown towards capital structure decisions and production market performance and concluded that the companies that have the equipment and machines with the low efficiency may resort to debt financing and invest liabilities acquired in machinery and equipment.

Akhtar (2005) studied the relationship between the variables affecting the capital structure of Australian multinational and domestic corporations over the time period from 1992 to 2000 using the cross-sectional regression. The results indicated that in all firms, opportunities for growth, profitability, and the firm size are determining factors of the debt ratio. The results of the study concerning individual industries suggested that some these factors are more important in some industries than are in others.

Huang and Song (2006) conducted a study on 1200 Chinese companies to explore the relationship

between some elements of the capital structure and debt ratio. They found that the debt ratio increases as the profitability decreases or when the firm value increases. It was also noted that the level of tangible assets has a positive effect on the debt ratio.

Fose Berg and Ghosh (2006) conducted a study on the New York Stock Exchange. Given that American companies used about 5-8% extra debts in their capital structure, the relationship between the return on assets (ROA) and the capital structure was negative in the New York Stock Exchange.

Tian and Zeitun (2011) studied the relationship between capital structure and corporate performance using data from 167 firms in Jordan during 1989-2003. Their findings indicated that there is a significant relationship between ratios of short-term debts to total assets, total debts to total assets, long-term debts to total assets, total debts to total equities, and ROA ratio.

Udom Sirikul (2010) studied the effect of liquidity on the capital structure of the Thai firms. The sample consists of 707 firms studied from 2002 to 2008. The results indicated that firms with higher liquidity are more willing to finance through stocks than the creation of debt in the capital structure. Therefore, there is a negative relationship between liquidity characteristics and the firm financial leverage.

Que and La (2012) examined the relationship between the corporate features and the capital structure of Australian companies. They collected their data from a sample of Australian companies from 1992-2006. Their findings indicated that there is a positive significant relationship between capital structure and tangible assets. However, the capital structure was found to have a negative significant correlation with growth opportunities, profitability, and business risk. They did not find a significant relationship between the capital structure and the firm size. These findings are consistent with the hierarchy theory and the agency costs theory.

7. Conceptual model of the study

Fig. 1 shows the conceptual model used in this study:

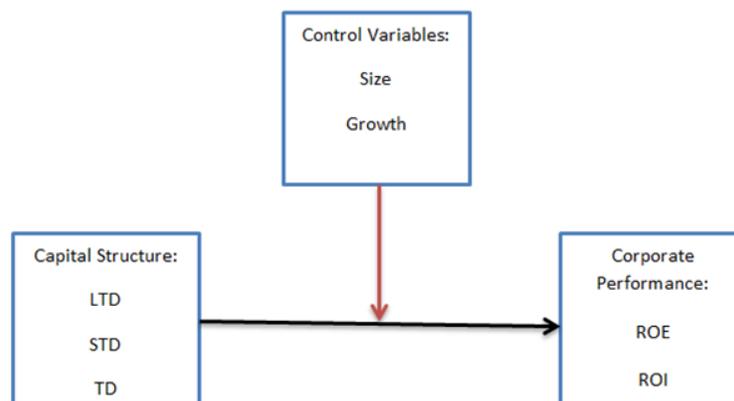


Fig. 1: Conceptual Model of the Study (Dimitris, 2014)

The variables used in this study were divided into three categories of dependent, independent, and control variables as follows:

8. Dependent variables

To measure corporate performance, following variables were used in this study (Dimitris, 2014):

8.1 Return on investments (ROI)

Return on investments (ROI) as a dependent variable was calculated through the following equation:

$$ROI = \frac{\text{Operating Income}}{\text{Average Investment}}$$

8.2. Return on equities (ROE)

Return on equities (ROE) was calculated in this study through the following equation:

$$ROE = \frac{\text{Operating income}}{\text{Average Owners equity}}$$

8.3. Independent variables

The independent variables manipulated in this study were as follows (Dimitris, 2014):

1. Short-term debt
2. Long-term debt
3. Debt ratio (TD)

Debt ratio (TD) was calculated by the following equation:

$$TD = \frac{\text{Total Debt}}{\text{Total Asset}}$$

To calculate short-term and long-term debts, debts related to accounts payable and those related to savings for retirement were not taken into account.

8.4. Control variables

Size: The firm size refers to the natural logarithm of the firm assets (Margaritis & Sillaki, 2009).

Growth: It is the firm growth level that is the percentage of changes in the firm assets in Year t compared with Year t-1.

9. Research hypotheses

In scientific research, a hypothesis refers to a conjectural and speculative statement or a tentative proposition about how a number of variables are related to each other. As such, a hypothesis is a statement that is experimentally falsifiable. It is a justified suggestion or a proposed solution to a problem in a way that result in making conclusions and also helps to find order among realities. Therefore, it may be suggested that one cannot embark on a research without stating a hypothesis.

9.1. Main research hypothesis

There is a significant relationship between composition of the capital structure and corporate performance.

Sub-hypothesis No. 1: There is a significant relationship between the capital structure and return on investment

The econometric model of the above hypothesis is stated as follows:

$$\begin{aligned} ROI_{i,t}(\text{Performance}) \\ = \beta_0 + \beta_1 \beta LTD_{i,t} + \beta_2 \beta Size_{i,t} \\ + \beta_4 TD + \beta_5 STD + \epsilon_{i,t} \end{aligned}$$

Sub-hypothesis No. 2: There is a significant relationship between the capital structure and dividends per share.

Sub-hypothesis No. 3: There is a significant relationship between the capital structure and return on equities.

The econometric model of the above hypothesis is stated as follows:

$$\begin{aligned} ROE_{i,t}(\text{Performance}) \\ = \beta_0 + \beta_1 \beta LTD_{i,t} + \beta_2 \beta Size_{i,t} \\ + \beta_4 TD + \beta_5 STD + \epsilon_{i,t} \end{aligned}$$

10. Domain of the Study

Thematic domain: This study examines the relationship between capital structure and corporate performance in various industries.

Temporal domain: The study was conducted over a six year period from 2007 to 2012.

Spatial domain: When studying the relationship between capital structure and corporate performance, one of the important factors that should be considered is the type of industrial in which the firm operates. The capital structure is industry-specific. That is the capital structure in some industries is different from that of other industries (Grassfield, 2010).

Of the listed firms, 150 firms were selected as the sample under study. These firms were mainly from 3 industries each containing more than six firms. The industries under study were: Car manufacturing and car parts industries, food products and a variety of beverages, machineries, and basic metallic equipment.

10.1. Instruments

The data analyzed in this study were available beforehand. The data needed to test research hypotheses were raw data of the firms listed in the Tehran Stock Exchange. Accordingly, data sources used in this study are as follows:

- Valid journals and websites to access to articles for use in the literature review
- Library resources to gain access to similar studies to be used in the literature

- TADBIR PARDAZEH and RAHAVARD NOVIN software to obtain the data from the firms' financial statements
- Financial data archive for the firms listed in the Tehran Stock Exchange compiled by the Management of Research, Development, and Islamic Studies to collect reports by boards of directors and the notes accompanying the financial statements.

The collected data were codified by the spreadsheet and analyzed by statistical software.

10.2. Data analysis

The tests used to examine the research hypotheses and to analyze the data are summarized as follows:

10.3. Chow test

Chow (1960) introduced a test to select one of the fixed effects model or the estimated model. The test assumptions are as follows (Beltaghi, 2005):

$$H_0: \mu_1 = \mu_2 = \dots = \mu_{n-1}$$

$$H_1 = \text{Not}$$

Where, μ is the coefficient of the dummy variable in the fixed effects model. The null hypothesis shows the equality of the coefficients and intercept in the firms under study. Therefore, the rejection of the null hypothesis is indicative of using the panel data technique while the confirmation of the null hypothesis points to the use of aggregated data technique.

10.4. Breusch-Pagan test

Breusch-Pagan used Lagrange coefficient in 1980 to select one of the random effects models or data aggregation model. The test assumptions are as follows (Beltaghi, 2005):

Data aggregation model is shown as follows:

$$H_0: \delta_a^2 = 0$$

Random effects model is shown as follows:

$$H_1: \delta_a^2 > 0$$

Where, δ_a^2 shows the variances of the cross-sectional effect of the model estimated through random effects.

10.5. Hausman test

Hausman test is used to select one of the fixed effects models with random effects model. The test assumptions are as follows (Beltaghi, 2005):

H0: Random effects

H1: Fixed effects

10.6. Test of significance

To test the research hypotheses and determine if there is a significant relationship between two or more variables, regression tests can be used. The purpose of performing the regression analysis is to examine the relationship between dependent and independent variables.

The independent variable coefficient is equal to zero (There is no linear relationship):

$$H_0: \beta_j = 0$$

The independent variable coefficient is not equal to zero:

$$H_1: \beta_j \neq 0$$

If the significance level is less than the error level, the coefficient is significant

10.7. The significance level of the regression model

If there is no relationship between dependent and independent variables in a regression model, the independent variable coefficient in the equation should be equal to zero. As such, the significance level of the regression model can be tested.

The regression model is not significant:

$$H_0: \beta_j = 0 \quad (j = 1, 2, 3 \dots k)$$

The regression model is significant:

$$H_0: \beta_j \neq 0 \quad (j = 1, 2, 3 \dots k)$$

The Fisher test can be used to test the above hypothesis. The values of the test for the model and regression analysis can be calculated from the following equation:

$$F = (SS_r / (k - 1)) \cdot SS_t / (n - k) \text{ }^{-1}$$

If the calculated F-value is less than the F-value in the table at the significance level of 95% (5% error level), the null hypothesis is confirmed; otherwise it is rejected.

11. Research sample

One of the important factors that should be considered when studying the relationship between capital structure and corporate performance is the type of industrial in which the firm operates. Accordingly, the firms in the research sample were divided based on the types of the industry into three groups to explore the relationship between the capital structure and corporate performance. The sample under study included 150 firms selected randomly based on the type and contribution of each industry to the population using the sample size formula.

Table 1: Firms in the Research Sample

No.	Industry	Number of firms
1	Food products and beverages	50
2	Auto manufacturing and car parts	35
3	Machineries and equipment	65

12. Data analysis

Descriptive statistics deals with measures of central dispersion. An awareness of descriptive

statistics is a step toward understanding the mean of data orientation and the relationships among them as well as the approximate investigation of the way

variables are distributed. Table 2 shows the most important descriptive statistics concerning the variables manipulated in this study:

Table 2: Descriptive statistics concerning variables under study

Variables	Statistics				
	Mean	Median	Standard Deviation	Number of Observation (firm/year)	Sample firms
SIZE	5.259	0.636	0.517	6	900
GROWTH	5.028	0.175	1.07	6	900
LTD	130.866	42162	5.45	6	900
STD	1.108.729	239.655	4.68	6	900
TD	72	733	0.137	6	900

13. The model fit (with emphasis on the type of industry)

industry). Therefore, Chaw test was used to choose between the fixed effects model and aggregation model as shown in Table 3:

In the model under study, the dependent variables were analyzed along with the capital structure variables and control variables (in each

Table 3: Results of Chaw test for different industries

Industry	Test statistics			Sig.			Results		
	EPS	ROI	ROE	EPS	ROI	ROE	EPS	ROI	ROE
Auto industry	0.9921	0.208	0.2099	0.177	0.9696	0.9578	Aggregation	Aggregation	Aggregation
Machinery	0.5656	1.3314	0.4545	0.540	0.2689	0.2589	Aggregation	Aggregation	Aggregation
Food and drink	0.8821	1.0725	1.0624	0.3737	0.3845	0.3825	Aggregation	Aggregation	Aggregation

As can be seen in the above table, the aggregation model was confirmed by Chaw test in all industries under study.

Table 4 shows the results of the model fit for auto industry:

14. Testing research hypotheses based on industry type

Table 4: The model fit for auto industry

Variables	ROI		ROE	
	Coefficient	Sig.	Coefficient	Sig.
STD	0.51	0.000057	0.48	0.000066
LTD	-0.28	0.000077	-0.37	0.000066
TD	0.23	0.000049	0.41	0.000027
SIZE	-0.0011	0.0081	-0.0013	0.0078
GROWTH	-0.0037	0.0056	0.0051	0.0026
R ²	0.373		0.27	
Adjusted R ²	0.332		0.23	
F-value	5761		4132	
Durbin-Watson	1.530		1.535	

15. Car parts industry

Given the significance level in Table 4, it can be concluded that the calculated coefficients are significant. Besides, the F-value for the whole model shows that the model is also significant.

15.1. Return on investments (ROI)

As shown in Table 4, there is a negative significant relationship between return on investments and long-term debts, which suggests that as the long-term debts increase, return on

investments as a control variable decreases so it can be concluded that there is a positive significant relationship between return on investments, short-term debts, and total debts. In addition, the value of Durbin-Watson test regarding return on investments is 1.530 which suggests there is no correlation error. The value of coefficient of determination for return on investments is 0.373 showing that 37.3% of variations in return on investments are explained by the independent variables.

15.2. Return on equities

As the results in Table 4 concerning return on equities (as the performance indicator) indicate, it can be concluded that there is a negative significant relationship between return on equities and long-term debts. It shows that as the long-term debts increase, return on equities as a control variable decreases so it can be concluded that there is a positive significant relationship between return on equities and total debts. In addition, the value of Durbin-Watson test regarding return on equities is 1.535 which suggests there is no correlation error.

The value of coefficient of determination for return on equities is 0.27 showing that 27% of variations in return on equities are explained by the independent variables.

15.3. Food products and drink industry

The results of model testing concerning food products and drink industry are shown in Table 5:

Table 5: Model fit for food products and drink industry

Variables	ROI		ROE	
	Coefficient	Sig.	Coefficient	Sig.
STD	0.56	0.000051	0.53	0.000061
LTD	-0.33	0.000072	-0.42	0.000061
TD	0.28	0.000044	0.46	0.000022
SIZE	-0.6001	0.0076	-0.8001	0.0073
GROWTH	-0.0042	0.0051	-0.0056	0.0021
R ²	0.366		0.223	
Adjusted R ²	0.303		0.182	
F-value	5682		4063	
Durbin-Watson	1.630		1.565	

Given the significance level in Table 5, it can be concluded that the calculated coefficients are significant. Besides, the F-value for the whole model shows that the model is also significant.

15.4. Machineries industry

Table 6 shows the model fit concerning the machineries industry:

Table 6: Model fit for the machineries industry

Variables	ROI		ROE	
	Coefficient	Sig.	Coefficient	Sig.
STD	52	0.000056	0.49	0.000061
LTD	-0.29	0.000076	-0.38	0.000061
TD	0.24	0.000048	0.42	0.000022
SIZE	-0.012	0.0078	-0.0013	0.0072
GROWTH	-0.0038	0.0055	-0.0052	0.0021
R ²	0.320		0.194	
Adjusted R ²	0.321		0.164	
F-value	5596		3965	
Durbin-Watson	1.432		1.440	

16. Discussion

The present study addressed the impact of the capital structure on the corporate performance. To this end, the research hypotheses were formed to examine the impact of the capital structure on the corporate performance. As such, the corporate performance was measured by return on investments and return on equities.

H1: The first research hypothesis addressed the relationship between short-term debts, long-term debts, the ratio of total debts to total assets, and return on investments. According to the findings of the study, there is a positive relationship between short-term debts and the ratio of debts to return on investments. However, it was noted that there is a negative relationship between long-term debts and return on investments.

H2: The second research hypothesis dealt with the relationship between short-term debts, long-term debts, and the ratio of total debts to total assets, and return on equities. The values of coefficients obtained through the regression model indicate that there is a positive relationship between short-term debts and the ratio of debts to return on equities. However, it was noted that there is a negative relationship between long-term debts and return on equities.

17. Conclusion

To draw a general conclusion based on testing the hypotheses, the results are summarized in Table 7 as follows:

Table 7: Summary of testing research hypotheses

Hypothesis	Statement	Null hypothesis	Alternative hypothesis	Confirmed hypothesis
H1	Relationship between the capital structure and return on investments	There is no relationship.	There is a relationship.	Alternative hypothesis
H2	Relationship between the capital structure and return on equities	There is no relationship.	There is a relationship.	Alternative hypothesis

The results from testing the research hypotheses suggest that there is a positive relationship between short-term debts, return on investments, and return on equities. This means financing through short-term debts will result in the improved corporate performance. Such finding can be possibly attributed the lower costs of short-term debts as a major part of short-term debt items has no cost. Besides, concerning other short-term debt items, the costs associated with short-term debt financing are lower than the costs of other debts under normal circumstances. As such, it can be concluded that short-term debts are regard as a cheap source of financing which lead to improved performance and improved dividends per share. This finding is consistent with a study conducted by Lara and Mesquita (2003) who found a positive relationship between short-term debts and the corporate performance.

In addition, the relationship between total debts, return on investments, and return on equities was explored in this study. The findings points to the existence of a type of positive relationship in this regard. Accordingly, debt financing can result in improved profitability in the firm. This is due to the fact that a major part of debt composition of the Iranian firms is made of short-term debts which are regarded as a rather cheaper source of financing compared with long-term financing. Besides, tax benefits and low costs associated with debt financing compared to other methods of financing can explain such findings which are consistent with the Free Cash Flow Hypothesis developed by Jensen (1986) and the results of research by Modigliani and Miller (1963), Roden and Lewellen (1995), Hadlock (2002), Abor (2005), and Namazi and Shirzadeh (n.d.).

It was also noted that there is a negative significant relationship between long-term debts and performance indicators. This suggests that the firms finance through long-term debts will face the reduced profitability. However, it is normally expected an increase in long-term debts because of its tax benefits results in improved corporate performance. One possible explanation is that long-term loans which require collaterals and high banking fees impose high costs on Iranian banks. Besides, since firms spend the funds from long-term loans in investment projects, they are not able to repay loans when they are due but they do not face heavy fine for banking non-confirmation and this increase the costs of long-term loans. Other reasons may include high temporal risk of long-term loans compared with short-term debts, which increases the loan costs while declining performance

indicators. This is in line with observations made by Fama and French (1992) and Lara and Mesquita (2003).

The research hypotheses were also tested at three industries with the highest number of firms in the sample. Different results were found for various industries. Therefore, it can be concluded that the relationship between the capital structure and the corporate performance is an industry-dependent relationship.

Previous research on the relationship between the capital structure and the corporate performance has addressed all short-term and long-term debts. However, previous studies disregarded the fact that some of debts have been incurred with the purpose of financing. Nevertheless, the present study excluded debts related to retirement savings as they have not incurred for financing purposes. In addition, debts associated with accounts payable where not taken into account in this study when calculating the short-term debts as they were not incurred for financing purposes either.

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