Analyze the Linear and Curvature Relationship of Financing by Debt and Firms Performance and Moderator Role of Firm Size

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Abstract
Achieve to optimal financial leverage for achieving to maximum profitable, value and minimum capital are important topics of research that studies by financial experts. Economic researchers found that capital structure and firms performance are affiliated with each other but the relationship between them according to financial operations in international affairs is not the same and according to country type depends on financial structure and economic conditions. The aim of the present article is to evaluate the mutual relationship between financial leverage and firm performance concerning the moderating role of the firm size. Given that, the financial information of 108 listed companies in Tehran Stock Exchange were used during the financial period from 2005 to 2014. Multivariable regression model was employed for hypotheses testing. The results indicated that there is a positive and significant relationship between financial leverage and firm performance and the firm size has no moderating effect on the relationship between the two variables. Moreover, there is a negative and significant relationship between financial leverage and the changes of firm performance and the firm size has no moderating impact on these relationships. On the other hand, there is a negative and significant relationship between firm performance and the changes of financial leverage. Similarly, the moderating effect of the firm size was not significant in these relationships.

1- Introduction

Capital structure has been mentioned as the most important parameter affecting on companies structure and to prevent them in capital markets. Now changing environment also calculation of company's ion terms of credit has been affiliated to their capital structure. This has a close relation with their strategic planning to select of effective resources with aim to the maximization of shareholder wealth.

Fluid variables and factors affecting on capital structure can affect on companies performance and efficiency covering the goal of the agency theory and pecking order theory. it is clear that financial decision markers in compliance with matching principle when financing the funds is considered a effective approach in modifying these decisions with respect to requirements of the economic environment and also is a suitable model for increasing the efficacy dominant thinking on companies performance. (sinayi and rezaian, 2006).

The main problem with the capital structure is that according to differences between stocks and debt that with having a suitable performance, how much stock and debt should be in the capital structure so that company is not at risk of bankruptcy and also it pay less costs? Ultimately, the question arises that does the financial leverage affect on the companies performance? (Nikbakht and Pykani, 2010).

Maximizing the value of companies requires to the implementation of profitable projects. in today's world, duo to the competition market situation, it is necessary to determine the appropriate financing methods to increasing the profitable and continuing the life of the companies. shareholders also with respect to separation of ownership from management, requires to vast financial recourses in companies and also fans of financial resources use their financial resources to increasing the wealth to analyze the companies performance and their capital structures so that they can get to the right investment.

In field of the relationship between financing decisions and companies profitability mainly from four Miller and Modiglian theories is mentioned the agency theory, static balance theory and pecking order theory. financial economy researchers found that capital structure and performance depends on together but relationship between them according to financial operations of stock companies internationally is not the same and according to

country type is depend to financial structures and economic conditions. therefore, researchers according to the country type are analyze the relationship between capital structures and performance that of course the results obtained in this regard is different from each other. several factors such as nature of activity, assets and economic conditions governing on society can effect on financing the companies and, consequently, on the profitable that identify the results of these economic activities by using the efficient and dynamic analytical methods can provide a knowledge – based decision making tool by governors, managers and investors. (shahedani et.al, 2013)

Financial leverage has the ability to change efficiency and companies risks. So capital structure in each company has a close relationship with its financial leverage. Therefore, using of the companies from different financing methods is depend to existence of conditions and effect of contingency variables that sometimes occurs according to position and to prevent of the companies in markets and also their assessment by credit institutions. but the need to pay attention to the agency theory is that conflict of stock holders, ownerships, managers as well as bond owners effect on the capital financing decision and investment.

Hensen &Mecking(1976), Myers(1977) also say that amount of debt is create by tax deduction paid interest, bankruptcy costs and agency costs which is effects in the schedule investment decisions and company's value.

Modigliani &Miller (1963) are stated that company's value and capital structure is affiliated together till constituent elements of capital structure has the ability to complete the replacement

Currently, the identification of contributing factors on performance is one of the major concerns in entrepreneurship research studies. According to the report of American Small Business Administration (SBA), more than 50% of small businesses will fail in their first year and 90% collapse within the first five years. However, the rank of business setting index in the U.S. was two times higher in 2006. This indicates that the environmental factors could affect the business failure, but 90% of failure is derived from some internal factors, which have dramatic effects on the downfall of a business firm.

Since financial limitations could hinder the growth opportunities, bank financing is a way to alleviate some of the restrictions and consequently to boost firm growth, entrepreneurship, and performance. Entrepreneurship and small businesses are always faced with lack of investment opportunities in developing countries. Most research studies from macroeconomics viewpoint are concerned with the effect of financial development on firm growth. This topic could best describe the relationship between financial development and economic growth in all countries (Levine). Due to availability of loan facility, most corporates are inclined toward bank resources to supply the required properties and this could be a reason why the financial risk of such firms elevated. There is always the rationale that the incremental growth of bank debts could lower the inverse effect of the increase of financial leverage. This means that the long-term performance of firms with higher bank finance is less than those corporates that benefited from nonbank debts, such that companies that used bank resources for financing were faced with abnormal negative return of share price during a three-year period (Duchin, et al. 2010).

Corporate debt, by assuming that the growth opportunities are available, could have a mutual role in firm value, which could be elaborated by two approaches of investment deduction and additional investment. Investment deduction approach first introduced by Myers (1997) expressing that high range of debts has a negative effect on firm value, and could cause the inclination of managers toward profitable investment projects.

Therefore, by assuming the existence of growth opportunities, we could expect a negative relationship between debts and firm value. Debt financing could support the value of the participant and moderate the inefficiency of managers by restricting their access to free cash flows. In other words, according to this approach, in cases that no growth opportunity is available, a positive relationship between debts and firm value is expected (Singh and Faircloth, 2005). Regarding the abovementioned topics, the aim of the present study is to investigate the mutual relationship between financial leverage and firm performance and to discover the moderating impact of firm size on these relationships.

2- Review of literature

Gunny et al. (2008) investigated the data of Chinese companies from 1994 to 2006 in 12 different industries and found that there is a nonlinear relationship between capital

structure and competitive market of a product based on the type of industry, size, and growth opportunities and Chinese companies try to moderate their capital structure, over time.

Nikolas et al. (2007) within a research, entitled "how the firm properties could affect the capital structure of Greece Market?" indicated that quick ratio, interest coverage ratio, and expected growth have negative relationship with capital structure and there is a positive relationship between firm size and capital structure.

Ogundipe et al. (2012) studied the effect of working capital management on performance and value of companies listed on Nigerian Stock Exchange from 1995 to 2009. Their results illustrated that there is a negative and significant relationship between cash conversion cycle, market value, and firm performance. In addition, their findings showed that debt ratio has a positive and negative relationship with market value and with firm performance, respectively.

Vithessonthi and Tongurai (2014) argued that financial leverage has a positive and significant impact on firm performance in small businesses. In addition, the financial leveragehas a negative and significant effect on firm performance of large corporates. The negative effect of the financial leverage is more severe on extremely small businesses than the larger ones. Moreover, the positive effect of financial leverage on firm performance in extremely large corporates is stronger. Besides, results indicated that there is a nonlinear and curved relationship between financial leverage and firm performance at various levels of firm sizes.

Multy and Manage (2014) evaluated the effect of firm size on the relationship of financial leverage with firm performance from 2007 to 2009 in companies listed on Thailand Stock Exchange. Their resultsindicated that financial leverage has negative impact on performance in corporate with various sizes and this effect is significant in corporates with large and small sizes.

Namazi and Shirzadeh (2005) investigated the relationship between capital structure and profitability. They also assessed the relationship between mean debt ratio and return of assets. However, such relationship is statistically less strong. The relationship between capital structure and profitability depends on the type of industry, as well. The capital

structure could be established in various industries and the relationship between capital structure and profitability depends on how profitability is defined.

Faramarzi (2005) examined the relationship between capital structure and profitability. According to the results of the experiments carried out on all companies, we could substantiate the direct relationship between variables, which are indicative of type of capital structure applied in companies, and asset return ratio, which is an index for describing corporate profitability. Results showed that the higher the proportion of equity than debts in companies, the higher is the profitability. Actually, profitability is a function of equity ratio to debts.

Badri and Imenifar (2011) showed that drawing a conclusion from capital structure analyses depends on financial leverage on the one hand, and is affected by defected measurements of the scholar on the other hand. Moreover, their results indicated that the level of leverage has an inverse relationship with the variables of growth opportunities and profitability and a direct relationship with the firm size, but is in no relationship with asset structure.

3- Research hypotheses

With regard to the proposed theoretical principles, research hypotheses will be put forward as follows:

There is a meaningful relationship Between financial leverage with firm performance, financial leverage changes with company's performance changes and financial leverage changes with company's performance and firm size has a moderator effect in this field.

Therefore, the main hypothesis in the form of 7 sub- hypotheses is expressed as follows:

Hypothesis 1: there is a significant relationship between financial leverage and firm performance.

Hypothesis 2: firm size has a moderating effect on the relationship between financial leverage and firm performance.

Hypothesis 3: there is a nonlinear (curved) relationship between financial leverage and firm performance.

Hypothesis 4: there is a significant relationship between the changes of financial leverage and firm performance.

Hypothesis 5: firm size has a moderating effect on the relationship between the changes of financial leverage and firm performance.

Hypothesis 6: there is a significant relationship between firm performance and the changes of financial leverage.

Hypothesis 7: firm size has a moderating effect on the relationship between firm performance and the changes of financial leverage.

4- Methodology

4-1 statistical population, sampling, and data collection

The statistical population is the listed companies on Tehran Stock Exchange from 2005 to 2011. The final sample is selected randomly among the companies listed on Tehran Stock Exchange prior to 2005, their end of fiscal year was on March 19th, had no changes or stop in their financial period, were not affiliated with banks, financial institutions (investment companies, intermediaries, holdings, leasing), and their data were available. The required data were extracted, by defining the dependent and independent variables, from reliable sources, including Rah-AvarNovin database and Tehran Stock Exchange publisher system (CODAL). After data collection and establishing the model, data were initially placed as the panel data and EviewsSoftware was used for hypothesis testing.

4-2 research variables

Table 1 displays the variables used in this research for hypothesis testing along with their specific calculation method, separately.

4-2-1 dependent variable: firm performance

Several agents have been used by scholars for measuring performance, among which we could refer to corporate profitability, and asset return. Tobin's Q ratio has been used in this research for computing performance.

4-2-2 independent variable: financial leverage

To calculate the financial leverage, two ratios of office leverage (the proportion of total book value of debt to total asset book value) and marker leverage (the proportion of long-term debt book value to total asset book value) were used.

4-2-3 moderating variable: firm size

The total assets natural logarithm was used for calculating the firm size.

4-2-4 control variables: interest rate, GDP growth, age, size, and earnings

To control other contributing factors on explanatory power of the relationship between variables, a number of control variables were inserted to control the potential effect of firm performance.

Table 1. Defining the variables of the hypothesis testing model

Symbol	Name	Calculation method
Firm Performance i; t	Tobin's Q Ratio	$\dfrac{\text{market value of total assets}}{\text{total assets book value}} = \dfrac{\text{book debt value} + \text{common stock market value}}{\text{common stock market value}}$ $= \text{Tobin's Q Ratio}$
LEV i; t	Financial leverage	$\dfrac{totaldebtbookvalue}{\text{total assets book value}}$ و $\dfrac{long-termdebtsbookvalue}{\text{total assets book value}}$کل
ΔLEV i; t	Changes of financial leverage	Financial leverage of end of the year - Financial leverage of the previous year
Size Dummy	Artificial variable of the firm size	Is equal to 1, should the firm size is more than the mean of total firms. Is equal to 0, should the firm size is less than the mean of total firms
INT t	Interest rate	Average interest rate for 12 months
GDP t	Gross domestic product growth	The growth rate of gross domestic product compared with the previous year
AGE i; t	Firm age	Natural logarithm of years passed from the year of establishment
SIZE i; t	Firm size	Natural logarithm of assets book value
EBIT i; t	Earnings before interest and taxes	Firm's earnings before interest and taxes
ε i; t	Residual or component error	

5- Data analysis

5-1variable stationary test

Before research hypotheses test, firstly examined the stationary of variables used in this research, because the variables' nonsense in case of the time series data and panel data are caused the false regression. But in addition to what is customary in case of the time series data, in case of the panel data not can used from Foler Diky test for monotony but it is necessary tests the variables collective monotony which for this purpose should use from Hadri tests.

The stationary of variables used in this research were evaluated prior to the hypotheses testing. The results are illustrated in table 2. According to the results, the null hypothesis, that is a unit root variables or their non-stationary is rejected at 0.05 confidence level and all research variables are stationary. Thus, we could estimate the pattern of the present study without being concerned of unit root variables.

Table 2. Results of unit root test using the Haderi Test

Symbol	Name	Haderi Test		Stationary state
		test of significance	Test of statistic	
Firm Performance i; t	Asset return	***0.0000	11.0309	Stationary
	Tobin's Q Ratio	***0.0000	11.5890	
	Modified economic value added	***0.0000	15.4573	
LEV i; t	Financial leverage	***0.0000	13.6107	Stationary
ΔLEV i; t	Changes of financial leverage	***0.0000	10.9851	Stationary
LEV2 i; t	Square of financial leverage	***0.0000	17.0123	Stationary
Size Dummy	Artificial variable of the firm size	***0.0000	12.2704	Stationary
INT t	Interest rate	***0.0000	16.4059	Stationary
GDP t	Gross domestic product growth	***0.0000	18.4062	Stationary
AGE i; t	Firm age	***0.0000	19.5645	Stationary
SIZE i; t	Firm size	***0.0000	19.1752	Stationary
EBIT i; t	Earnings before interest and taxes	***0.0000	14.7012	Stationary
ΔQ TOBIN i; t	Changes of firm performance	***0.0000	11.2433	Stationary

5-2 testing research hypotheses

5-2-1 testing the first hypothesis: the relationship between financial leverage and firm performance

The following regression pattern is estimated to evaluate the relationship between financial leverage and firm performance:

$$Firm\ Performance_{it} = \beta_0 + \beta_1 INT_t + \beta_2 GDP_t + \beta_3 AGE_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 EBIT_{i,t} + \beta_6 LEV_{i,t} + v_i + \varepsilon_{i,t},$$

The results depicted in table 3 indicate that the financial leverage (LEV variable) at the significance level of 0.0000 has a positive and significant relationship with firm performance (Tobin's Q ratio). The descriptive power (modified coefficient of determination) of this model is 84.91%. The result shows a positive and significant relationship between financial leverage and firm performance (Tobin's Q ratio) in companies listed on Tehran Stock Exchange. Accordingly, the first hypothesis is accepted.

Table 3. Results of regression test of the first hypothesis

Descriptive variable	Coefficient	Standard error	T statistic	Prob
INT t	0.023761	0.007869	3.019506	***0.0026
GDP t	-0.111262	0.056150	-1.981523	**0.0479
AGE i; t	0.389422	0.251929	1.545763	0.1225
SIZE i; t	-0.127615	0.044515	-2.866815	***0.0042
EBIT i; t	1.79E-08	8.38E-09	2.135694	**0.0330
LEV i; t	0.888632	0.033205	26.76201	***0.0000
ε i;t	1.793969	0.672477	2.667703	***0.0078
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	Prob			
48.73875	0.0000	0.866910	0.849124	2.115190
Panel tests				
Detection tests		Statistic test	Significance	Result
Generalized F test		8.546407	0.0000	Emphasis on use of FE against PLS
Hausman Test		31.996739	0.0000	Emphasis on use of

			FE against RE
Final result		Emphasis on use of FE against PLS and RE	
FE: fixed effects model. RE: random effect model. PLS: integrative data model.			
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.			

5-2-2 testing the second hypothesis: the modifying role of size on the relationship between leverage and firm performance

The following model is used for testing the second hypothesis:

$$Firm\ Performance_{i,t} = \beta_0 + \beta_1 INT_t + \beta_2 GDP_t + \beta_3 AGE_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 EBIT_{i,t}$$
$$+ \beta_6 LEV_{i,t} + \beta_7 LEV_{i,t} \times Size\ Dummy + v_i + \varepsilon_{i,t}.$$

Regarding the variable of Size Dummy, which is indicative of artificial variable of the firm size, the relationship between financial leverage and firm performance in large corporates (the size of which is larger than the mean of all companies and the Size Dummy variable of these companies is equal to 1) is examined via ($\beta 6 + \beta 7$).

Similarly, the relationship between financial leverage and firm performance in small companies (the size of which is smaller than the mean of all companies and the Size Dummy variable of these companies is equal to 0) is merely considered as $\beta 6$. Finally, the equation ($\beta 6 + \beta 7 \neq \beta 6$) should be satisfied for the acceptance of the second hypothesis.

Therefore, by simplifying the above equation, it is only required that the equation ($\beta 7 \neq 0$) be balanced and its respective variable be significant, so the second hypothesis is accepted.

The results of table 4 indicates that the artificial variable of firm size (LEV i; t * Size Dummy) at the significance level of 0.1835 has a negative and non-significant relationship with firm performance index (Tobin's Q ratio).

The descriptive power (modified coefficient of determination) of this model is 82.56% and this means that 82.56% of changes in dependent variables are expressed by the independent variables. Therefore, since ($\beta 7 \neq 0$) is a non-significant coefficient, the result of the second hypothesis is rejected and this is indicative of no modifying effect of the firm

size on the relationship between financial leverage and the firm performance (from Tobin's Q ratio) in companies listed on Tehran Stock Exchange.

Table 4. Results od second regression test

Descriptive variable	Coefficient	Standard error	T statistic	Prob
INT t	0.023824	0.008036	2.964571	***0.0031
GDP t	-0.112685	0.056718	-1.986762	**0.0473
AGE i; t	0.346844	0.241834	1.434222	0.1519
SIZE i; t	-0.118380	0.047831	-2.474970	**0.0135
EBIT i; t	1.65E-08	7.72E-09	2.138031	**0.0328
LEV i; t	0.880744	0.038337	22.97356	***0.0000
LEV i; t * Size Dummy	-0.012810	0.009624	-1.331127	0.1835
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R2	Durbin Watson statistic
F statistic	Prob			
40.82612	0.0000	0.846404	0.825672	2.113055
Panel tests				
Detection tests		Statistic test	Significance	Result
Generalized F test		8.337106	0.0000	Emphasis on use of FE against PLS
Hausman Test		29.716696	0.0000	Emphasis on use of FE against RE
Final result		Emphasis on use of FE against PLS and RE		
FE: fixed effects model. RE: random effect model. PLS: integrative data model.				
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

5-2-3 test of the third hypothesis: nonlinear (curved) relationship between leverage and firm performance

Following hypothesis is used for testing the third hypothesis:

$$Firm\ Performance_{it} = \beta_0 + \beta_1 INT_t + \beta_2 GDP_t + \beta_3 AGE_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 EBIT_{i,t} + \beta_6 LEV_{i,t} + \beta_7 LEV_{i,t}^2 + v_i + \varepsilon_{i,t}.$$

The result of table 5 illustrates that the index of financial leverage square (LEV^2 variable), at the significance level of 0.0000, has a positive and significant relationship with firm performance.

The descriptive power (modified coefficient of determination) of this model is 73.71% and this means that 73.71% of changes in dependent variables are expressed by the independent variables. The result of the third hypothesis substantiates a nonlinear (curved) relationship between financial leverage and firm performance (Tobin's Q ratio) in companies listed on Tehran Stock Exchange.

Table 5. Results of third regression

Descriptive variable	Coefficient	Standard error	T statistic	Prob
INT t	0.030586	0.006054	5.052229	***0.0000
GDP t	-0.017252	0.015340	-1.124590	0.2610
AGE i; t	0.002385	0.088447	0.026968	0.9785
SIZE i; t	-0.087382	0.035735	-2.445285	**0.0147
EBIT i; t	1.97E-08	7.09E-09	2.783679	***0.0055
LEV i; t	0.495932	0.040974	12.10361	***0.0000
LEV 2 i;	0.109176	0.015071	7.244138	***0.0000
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	Prob			
27.45124	0.0000	0.765062	0.737192	1.533405
Panel tests				
Detection tests		Statistic test	Significance	Result
Generalized F test		7.351662	0.0000	Emphasis on use of FE against PLS
Hausman Test		34.646700	0.0045	Emphasis on use of FE against RE
Final result		Emphasis on use of FE against PLS and RE		
FE: fixed effects model. RE: random effect model. PLS: integrative data model.				
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

5-2-4 test of fourth hypothesis: changes of financial leverage and firm performance

Following hypothesis is used for testing the third hypothesis:

$$\Delta\, Firm\, Performance_{it} = \beta_0 + \beta_1 AGE_{i,t-1} + \beta_2 SIZE_{i,t-1} + \beta_3 EBIT_{i,t-1} + \beta_4 ROA_{i,t} + \beta_5 LEV_{i,t-1} + \beta_6 \Delta LEV_{i,t} + v_i + \varepsilon_{i,t},$$

The result of table 6 displays that the index of financial leverage changes (ΔLEV variable), at the significance level of 0.0000, has a negative and significant relationship with the changes of firm performance (changes of Tobin's Q ratio).

The descriptive power (modified coefficient of determination) of this model is 75.22% and this means that 75.22% of changes in dependent variables are expressed by the independent variables. The result is the rejection of H_0 hypothesis and this means that there is a negative and significant relationship between the changes of financial leverage and firm performance (change of Tobin's Q ratio) in companies listed on Tehran Stock Exchange. Accordingly, the fourth hypothesis is accepted.

Table 6. Results of the fourth regression

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	0.097580	0.079145	1.232921	0.2179
SIZE i; t	0.004136	0.006262	0.660545	0.5090
EBIT i; t	-1.42E-09	5.89E-09	-0.240308	0.8101
ROA i; t	-1.508302	0.287426	-5.247624	***0.0000
LEV i; t-1	-0.549267	0.041065	-13.37543	***0.0000
ΔLEV i; t	-1.241840	0.108410	-11.45505	***0.0000
ε i;t	0.347920	0.093507	3.720801	***0.0002
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	prob			
544.9661	0.0000	0.753618	0.752235	2.106824
Panel tests				
Detection tests		Statistic test	Significance	Result
Generalized F test		0.993849	0.5017	Emphasis on use of

			PLS against FE
Hausman Test	30.308760	0.0000	Emphasis on use of FE against RE
Final result		Emphasis on use PLS of against FE and RE	
FE: fixed effects model. RE: random effect model. PLS: integrative data model.			
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.			

5-2-5 test of fifth hypothesis

The fifth hypothesis is concerned about the evaluation of modifying effect of the firm size on the relationship between changes of financial leverage and firm performance.

To test the hypothesis, companies were classified initially based on the first quarter, middle, and third quarter of firm size index, such that a quarter of the firm size is placed in each group of companies. Then, the fourth hypothesis model is tested in each group, separately. Finally, the acceptance or rejection of hypotheses was studied by comparing the coefficient of changes of financial leverage index and variable significance level.

Therefore, the statistical hypothesis for the test of fifth hypothesis is as follows:

The regression coefficient between the variable of financial leverage changes and performance changes should increase or decrease constantly along with the increase of firm size level. The increase of firm size level means moving from the first quarter of the firm size to the fourth quarter.

The result of table 7 shows that the index of financial leverage (ΔLEV variable), at the significance level of 0.060 and coefficient of 0.5480, has a positive and significant relationship with the changes of firm performance (changes of Tobin's Q ratio) in the first quarter of the firm size. The descriptive power (modified coefficient of determination) of this model is 09.97%.

Table 7. Results of the fifth regression test (the first quarter of companies based on size)

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	-0.081662	0.126891	1.276208	0.2030
SIZE i; t	4.16E-06	0.083083	-0.982895	0.3266
EBIT i; t	-0.620907	3.77E-06	1.105310	0.2700
ROA i; t	0.257640	0.786809	-0.789145	0.4307
LEV i; t-1	0.548004	0.141108	1.825832	*0.0690
ΔLEV i; t	0.668191	0.297968	1.839140	*0.0670
ε i;t	-0.081662	0.991463	0.673944	0.5009
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R^2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	Prob			
5.969994	0.000007	0.119871	0.099792	1.947772
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

The result of table 8 shows that the index of financial leverage (ΔLEV variable), at the significance level of 0.0009 and coefficient of 0.9792, has a positive and significant relationship with the changes of firm performance (changes of Tobin's Q ratio) in the second quarter of the firm size. The descriptive power (modified coefficient of determination) of this model is 06.85%.

Table 8. Results of the fifth regression test (the second quarter of companies based on size)

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	0.415728	0.200139	2.077199	**0.0388
SIZE i; t	-0.245596	0.218061	-1.126273	0.2611
EBIT i; t	-3.01E-06	2.65E-06	-1.136042	0.2570
ROA i; t	1.607551	1.220979	1.316608	0.1891
LEV i; t-1	0.293701	0.157896	1.860094	*0.0640
ΔLEV i; t	0.979207	0.292268	3.350368	***0.0009
ε i;t	2.514883	2.819219	0.892050	0.3732
Model test statistics				

F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	Prob			
4.286671	0.000385	0.089393	0.068539	1.773540
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

Table 9. Results of the fifth regression test (the third quarter of companies based on size)

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	0.153130	0.148994	1.027758	0.3050
SIZE i; t	-0.198550	0.211755	-0.937638	0.3493
EBIT i; t	9.31E-07	1.17E-06	0.798389	0.4254
ROA i; t	-1.139499	1.159105	-0.983085	0.3265
LEV i; t-1	-0.001559	0.286409	-0.005443	0.9957
ΔLEV i; t	0.792528	0.306246	2.587883	**0.0102
ε i;t	2.501795	2.850615	0.877634	0.3810
Model test statistics				

F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	Prob			
3.061789	0.006523	0.065994	0.044440	2.153846
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

Table 10. Results of the fifth regression test (the fourth quarter of companies based on size)

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	0.431564	0.174194	2.477485	**0.0139
SIZE i; t	0.056510	0.030229	1.869416	*0.0627
EBIT i; t	-3.79E-08	2.09E-08	-1.812348	*0.0711
ROA i; t	-0.353039	0.329759	-1.070597	0.2853
LEV i; t-1	-0.586906	0.149470	-3.926572	***0.0001
ΔLEV i; t	-1.305475	0.140808	-9.271312	***0.0000
ε i;t	-0.836869	0.551874	-1.516414	0.1306

Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination	Durbin Watson statistic
F statistic	Prob		ADJ R^2	
2470.987	0.000000	0.982570	0.982172	1.881552
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

The result of table 9 indicates that the index of financial leverage (ΔLEV variable), at the significance level of 0.102 and coefficient of 0.7925, has a positive and significant relationship with the changes of firm performance (changes of Tobin's Q ratio) in the third quarter of the firm size. The descriptive power (modified coefficient of determination) of this model is 04.44%.

The result of table 10 shows that the index of financial leverage (ΔLEV variable), at the significance level of 0.0000 and coefficient of -1.3054, has a positive and significant relationship with the changes of firm performance (changes of Tobin's Q ratio) in the fourth quarter of firm size. The descriptive power (modified coefficient of determination) of this model is 98.21%.

The regression coefficient between the changes of financial leverage index and changes of performance does not increase or decrease constantly along with the increase of the firm size level (moving from first quarter group of firm size toward the fourth quarter group of firm size). Hence, the results indicates that firm size has no modifying effect on the relationship between changes of financial leverage and changes of performance in companies listed on Tehran Stock Exchange. So, the fifth hypothesis is rejected.

5-2-6 test of the sixth hypothesis: the relationship between firm performance and changes of financial leverage

The following model is used for testing the sixth hypothesis:

$$\Delta LEV_{i,t} = \beta_0 + \beta_1 AGE_{i,t-1} + \beta_2 SIZE_{i,t-1} + \beta_3 EBIT_{i,t-1} + \beta_4 \text{Firm Performance} + \beta_5 LEV_{i,t-1} + v_i + \varepsilon_{i,t},$$

The result of table 11 displays that the index of firm performance (Tobin's Q ratio), at the significance level of 0.0000, has a negative and significant relationship with the changes financial leverage.

The descriptive power (modified coefficient of determination) of this model is 76.36% and this means that 76.36% of changes in dependent variables are expressed by the independent variables. The result is the rejection of H_0 hypothesis and this means that there is a negative and significant relationship between firm performance (Tobin's Q ratio) and changes offinancial leveragein companies listed on Tehran Stock Exchange. Accordingly, the sixth hypothesis is accepted.

Table 11. Results of the sixth regression test

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	-0.118626	0.049716	-2.386084	**0.0172
SIZE i; t	0.045289	0.011912	3.801881	***0.0002
EBIT i; t	-3.50E-09	5.30E-09	-0.659582	0.5097
Firm Performancei; t	-0.054529	0.009943	-5.483955	***0.0000
LEV i; t-1	0.897947	0.106580	8.425092	***0.0000
ε i;t	-1.022324	0.217106	-4.708883	***0.0000
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	Prob			
32.01704	0.0000	0.788301	0.763680	1.749706
Panel tests				
Detection tests		Statistic test	Significance	Result
Generalized F test		5.119117	0.0000	Emphasis on use of PLS against FE
Hausman Test		62.790285	0.0000	Emphasis on use of FE against RE
Final result		Emphasis on use PLS of against FE and RE		
FE: fixed effects model. RE: random effect model. PLS: integrative data model.				
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

5-2-7 test of the seventh hypothesis: the modifying effect of firm size on the relationship between firm performance and changes financial leverage

Similar to the fifth hypothesis, companies were initially classified based on the first, middle, and third quarter of firm size index, such that there is a quarter of firm size in each group of companies. Then, the model of the sixth hypothesis is tested in each group, separately. Finally, we study the acceptance or rejection of hypothesis in 4 groups by comparing the coefficient of firm performance index and significance level of the variable.

Thus, the statistical hypothesis of seventh hypothesis testing is expressed as follows:

The regression coefficient between the variables of firm performance and changes of financial leverage should be increased or decreased constantly along with the increase of firm size level. The increase of firm size level means moving from first firm size quarter group toward the fourth.

The result of table 12 shows that the index of firm performance (Tobin's Q ratio), at the significance level of 0.0000 and coefficient of 0.0776, has a positive and significant relationship with the changes financial leverage) in the first quarter of the firm size. The descriptive power (modified coefficient of determination) of this model is 48.96%.

Table 12. Results of seventh regression test (first quarter of companies based on size)

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	-0.072520	0.031368	-2.311893	**0.0216
SIZE i; t	0.004118	0.019564	0.210506	0.8334
EBIT i; t	-3.27E-06	4.09E-07	-8.002478	***0.0000
Firm Performancei; t	0.077612	0.011377	6.821618	***0.0000
LEV i; t-1	0.181499	0.033201	5.466683	***0.0000
ε i;t	-0.176353	0.226451	-0.778766	0.4368
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination	Durbin Watson statistic
F statistic	Prob		ADJ R^2	
52.62275	0.000000	0.499159	0.489674	1.807513

***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.

The result of table 13 indicates that the index of firm performance (Tobin's Q ratio), at the significance level of 0.0004 and coefficient of 0.0472, has a positive and significant relationship with the changes financial leverage) in the second quarter of the firm size. The descriptive power (modified coefficient of determination) of this model is 21.11%.

Table 13. Results of seventh regression test (second quarter of companies based on size)

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	-0.037898	0.046594	-0.813369	0.4167
SIZE i; t	0.018912	0.042216	0.447974	0.6545
EBIT i; t	-1.68E-06	1.99E-07	-8.468277	***0.0000
Firm Performancei; t	0.047216	0.013246	3.564574	***0.0004
LEV i; t-1	-0.174407	0.035125	-4.965395	***0.0000
ε i;t	-0.075323	0.539163	-0.139703	0.8890
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	Prob			
15.34937	0.000000	0.225894	0.211177	2.015936
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

The result of table 14 reveals that the index of firm performance (Tobin's Q ratio), at the significance level of 0.0004 and coefficient of 0.0746, has a positive and significant relationship with the changes financial leverage) in the third quarter of the firm size. The descriptive power (modified coefficient of determination) of this model is 60.58%.

Table 14. Results of seventh regression test (third quarter of companies based on size)

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	-0.034617	0.028678	-1.207079	0.2285
SIZE i; t	0.194482	0.031261	6.221282	***0.0000
EBIT i; t	-8.49E-07	7.95E-08	-10.67755	***0.0000
Firm Performancei; t	0.074664	0.014000	5.333216	***0.0000
LEV i; t-1	-0.747152	0.037216	-20.07622	***0.0000
ε i;t	-2.152424	0.424795	-5.066967	***0.0000
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	prob			
82.77323	0.000000	0.613257	0.605848	1.971656
***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.				

The result of table 15 shows that the index of firm performance (Tobin's Q ratio), at the significance level of 0.0057 and coefficient of 0.0766, has a positive and significant relationship with the changes financial leverage) in the fourth quarter of the firm size. The descriptive power (modified coefficient of determination) of this model is 98.68%.

Table 15. Results of seventh regression test (fourth quarter of companies based on size)

Descriptive variable	Coefficient	Standard error	T statistic	Prob
AGE i; t	-0.101360	0.077946	-1.300383	0.1946
SIZE i; t	-0.048484	0.012487	-3.882799	***0.0001
EBIT i; t	3.80E-08	6.92E-09	5.492960	***0.0000
Firm Performancei; t	0.076638	0.027509	2.785874	***0.0057
LEV i; t-1	1.052876	0.007439	141.5262	***0.0000
ε i;t	-0.011295	0.231426	-0.048806	0.9611
Model test statistics				
F statistic (significance of total regression)		Coefficient of determination R2	Modified coefficient of determination ADJ R^2	Durbin Watson statistic
F statistic	prob			
4047.488	0.000000	0.987123	0.986879	1.987878

***: significance level of 99%, **: significance level of 95%, *: significance level of 90%.

The regression coefficient between the variable of firm performance (Tobin's Q ratio) and changes of financial leverage does not increase or decrease constantly along with the increase of the firm size level (moving from first quarter group of firm size toward the fourth quarter group). Hence, the results indicates that firm size has no modifying effect on the relationship between firm performance (Tobin's Q ratio) and changes of financial leverage in companies listed on Tehran Stock Exchange. So, the seventh hypothesis is rejected.

Conclusion

Results of this research in case of the first hypothesis is based on the meaningful relationship between financial leverage and firm performance according in accordance with Jamal Zubairi (2009 Rajan, G, r, and Zingales L) Badri Far and Emen Far (1390), Faramarzi (1384) results. Also present research results is inconsistent with Namazi and Shirzadeh (1384), Malek Pour Gharbi (1375).

Zobairi Jamal research results (2009) show that financial leverage has a negative effect on the profitable (ROE). But its relationship with ROA has been at a significant level of %90.

Rajan and Zenghals (1995) in their research showed that financial leverage in each of these countries has a negative relationship with corporate profit and has a positive relationship with the evidence fixed assets value and firm size.

Badri and Emeni Far (1390) also in their research showed that conclusion of capital structure analysis in one hand is depend on leverage definition and in the other hand influenced by researchers incomplete measurements. also, leverage level has a reverse relationship with growth opportunity variables and profitable and has a direct relationship with firm size but there is no relationship between assets structures with leverage.

In according to Faramarzi test results (1384) obtained on total firms is proven that there is a direct relationship between variables which are indicted type of the used capital structure in firms and asset return ratio which is as a index to express profitability in firm. results show that if equity is more in firms, it is expected that more be profitable in firms and in fact, profitable is a function from shareholders equity ration than to debt.

The obtained results in Namazi and Shiezadeh(1384) stating that in general, there is a meaningful relationship between capital structure and firms profitable but this relationship from statistical point of view is weak. relationship between capital structure and profitable also is depend on type of the industry and capital structure can be determined in various industries and relationship between capital structure and profitable in different industries also depends on the profitable definition.

Malek Pour Gharbi (1375) concluded that use of the financial leverage did not affect on firms profitable. Also, firms could not increase each share by using profitable leverage. Comparison of equity standard deviation of return and assets of returns represents a reduction in the risk of financial leverage during years under investigation.

Results of this research in case of the second hypothesis based on lack of the moderator effect of firm size on relationship between financial leverage and firms performance is inconsistent with Vithessonthi & Tongurai(2014) results.

Vithessonthi & Tongurai(2014) showed that financial leverage has a effect meaningful and positive on the small firms performance. Also, financial leverage has a negative and meaningful effect on the great firm's performance. Negative effect of financial leverage on very small firm's performance is more intense than to small firms. also results indicate the existence of non –linear and curvature relationship between financial leverage and firm performance in the different levels of firm size. present research result in case of the third hypothesis based on existence of non- linear (curvature) relationship between financial leverage and firm performance is in line with Vithessonthi & Tongurai results (2014).

Vithessonthi & Tongurai (2014) and Coricelli et al. (2012) showed that financial leverage has a non- linear and curvature relationship with firm performance. They described this relationship U form.

One of the reasons that some researches merely have been achieved to a negative or positive relationship between financial leverage and firm performance is that such researches have been examined this relationship before or after financial leverage of optimal point. In this circumstances, this relationship merely will be reported the linear. while in fact, relationship between financial leverage and performance is non-linear and curvature. result of this research in case of the fourth hypothesis based on the existence of

negative and meaningful relationship between financial leverage changes is in line with firm performance changes based on Vithessonthi & Tongurai results (2014) and Giroud et al. (2012).

Vithessonthi & Tongurai(2014) showed that in all firms with different sizes there is a meaningful relationship between financial leverage changes with firm performance changes. According to their results, the last year financial leverage has a meaningful and negative with firm performance. Also, incremental changes in financial leverage reduce the performance in firm.

According to Giroud et al. (2012) financial leverage reduction improves the firm performance.

Research results in case of the fifth hypothesis impaling the lake of the existence moderator effect of firm size on the relationship between financial leverage changes and performance changes is inconsistent with Vithessonthi & Tongurai results (2014).

Vithessonthi & Tongurai(2014) showed that firm size has a reducing effect on relationship between financial leverage changes and firm performance changes so that greater firms have a more weak and negative relationship between financial leverage and firm performance changes than to smaller firms.

The present research results about sixth hypothesis based on the existent of negative and meaningful relationship between firm performance and financial leverage changes is in line with Vithessonthi & Tongurai(2014) and Bris et al. (2004) and XU (2012). They reported the negative relationship between firm performance and financial leverage changes and stated that in the very great firms or very small there is this negative relationship because the small firms is not able to receive the financial facility, therefore, firm performance will not have any effect on receiving the facilities and financial leverage changes. But with increasing firm size increase the performance effect on the financial leverage changes . this theme shows that small firms and average have the financial constraints and the severity of financial constraints is less in the greater firms.

The present research results about seventh hypothesis based on lack of the existent of moderator effect of firm size on relationship between firm performance and financial

leverage changes is inconsistent with Vithessonthi & Tongurai(2014) and Mehrotra et al. (2003).

They showed that with increasing firm size increase the performance effect on the financial leverage changes. this theme shows that small firms and average have the financial constraints and the severity of financial constraints is less in the greater firms. Small firms than to great firms have lesser features to receive the loan and bank facilities and they have more financial constraints.

The results of hypothesis testing revealed that the relationship between financial leverage, asset return, and modified economic value added, as the firm performance indexes, is negative and significant. However, the relationship between financial leverage and Tobin's Q ratio, as a firm performance index, is positive and significant. Since a significant relationship is reported in all items, the first hypothesis is accepted by all three indexes of performance. The second hypothesis is constructed using all three indexes of firm performance (asset return, Tobin's Q ratio, and modified economic value added), such that firm size has no modifying effect on the relationship between financial leverage and firm performance in companies listed on Tehran Stock Exchange and these results are in contrast with that of the Vithessonthi&Tonguari (2014). The result of the third hypothesis indicates a non-linear (curved) relationship between financial leverage and firm performance (modified economic value added) in companies listed on Tehran Stock Exchange, which is line with the results of Vithessonthi&Tonguari (2014) and Coricelli et al. (2012). The result of the fourth hypothesis showed a negative and significant relationship between the changes of financial leverage and firm performance (the change of Tobin's Q ratio), which are in accordance with the results of Vithessonthi&Tonguari (2014) and Giroud et al. (2012). The results illustrated no modifying effect of firm size on the relationship between the change of financial leverage and performance changes. Therefore, the result is the rejection of the fifth hypothesis that is in contrast with that of the Vithessonthi&Tonguari (2014). The result of sixth hypothesis indicated a negative and significant relationship between firm performance (Tobin's Q ratio) and changes of financial leverage in companies listed on Tehran Stock Exchnage. These results led to the acceptance of the sixth hypothesis and are in line with that of the Vithessonthi&Tonguari

(2014), Bris et al. (2004), and Xu (2012). Furthermore, results revealed no modifying effect of firm size on the relationship between firm performance (Tobin's Q ratio) and change of financial leverage. The result is the rejection of the seventh hypothesis that is in contrast with that of the Vithessonthi&Tonguari (2014) and Mehrotra et al. (2003).

Discussion

Based on the obtained results of research are provided the following suggestions:

It is suggested to the Stock Exchange that in accepting and measuring the small firms are considered the firm performance ration in such companies and are apply relevant disclosure requirements for these firms.

Past information can be a suitable base for future decisions. it is suggested to financial statements user such investors that before making any decision based on that to invest in which company are analyze the financial leverage ration and performance in the past years by introduced ration in this research.

Securities and stock exchange organization can publish the more comprehensive information in regard of the financial leverage and firm performance for stockholders with respect to results of this research and similar researches.

It is better that active financial analyzers in capital market, investment advisers on the stock exchange along with theirs usual analyzes and techniques analyzes the firm performance than to financial leverage optimal ratios and firms financial constraints with respect to accounting standards.

In decisions related to select of the capital structure ratio not only is pay attention to its short- term consequences but such decisions in long- term increase the firm value an finally increasing the stockholders wealth and improving the firm performance, also it is necessary that prompting the level of knowledge of managers to true decision making about capital structure ration and financial leverage.

With respect to results of based on financial constraints in small firms and duo to these firms are less able to receive banking facilities it is suggested to authorities to improving business apace and firms economic leakage provides some condition to receiving facilities by small firms.

With respect to non- linear and curvature relationship between financial leverage and firm performance it is suggested to managers that identify the financial leverage optimal point having the best function and stockholders will be have the most wealth. it is necessary that managers and decision makers in their planning considered the financial leverage optimal point about firms capital structure.

- We recommend the Securities and Stock Exchange Organization of Tehran to consider the proportions of firms' performance in the process of acceptance and evaluation of small firms and to set out more appropriate disclosure requirements for these companies.

- We recommend the users of financial statements, especially investors, to analyze and compare the previous financial leverage and performance ratios of companies prior to any decision making regarding the investment and selection of companies using the defined ratio of this research.

- We recommend the senior managers not to pay attention to short-term consequences through the process of optimal capital structure establishment, in that the impact of such decisions will affect the long-term results of performance, corporate value, and finally the shareholders' wealth.

- Concerning the financial limitation of small and medium-sized companies in supplying bank finance, we recommend banking practitioners to provide conditions for the improvement of competitive business settingto shorten the process of receiving facilities for these companies.

- We recommend the financial managers to be fully acquainted with the optimum point of leverageto be able to yield the maximum performance of the company, because in this point of financial leverage, the company has the best performance and shareholders would benefit from the highest wealth.

Suggestions for future research

It is suggested that in future researches is consider other variable such as firm risk and inflation as control variable.

With respect to changing effective factors in performance such as economical, social and political conditions, theme of this research can be study in future time by researchers and compare with present research results.

It is suggested to strengthen results in future researches are examined the financial leverage relationship and firms performance monthly and seasonal by using firms midterm information.

It is suggested that desirable accounting regulations evaluated by long- terms changes test in visible criteria of firms performance after and before regulating the important provisions.

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